



Boelter & Yates
environmental engineers and scientists

Boelter & Yates, Inc.

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Privileged and Confidential
Attorney Work Product
VIA FAX 312/920-8139

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April 27, 2001

Mr. James K. Toohey
Attorney at Law
Ross & Hardies
150 N. Michigan Avenue
Suite 2500
Chicago, IL 60601-7567

Re: Kewanee Boiler - Burner Flange Testing
BYI Project #2215B-6515

Dear Mr. Toohey:

Enclosed are two (2) copies of our report entitled - Fiber Release Rate Study, Burner Flange Gasket Removal, Kewanee Boiler.

We appreciated the opportunity to have assisted you with this important project. If you have any questions or need additional information, please contact me.

Sincerely,

Dan Podraza, CHMM
Senior Consultant
Direct Dial 847/685-9221
E-Mail: dpodraza@boelter-yates.com

Enclosure

F:\APP\BMP\SHKPRT\w22158015\Reest\rdoo\2215B-6515 Boiler Burner.rpd



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N O T E S
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**FIBER RELEASE RATE STUDY
BURNER FLANGE GASKET REMOVAL
KEWANEE BOILER**

April 27, 2001
BYI Project #2215B-6515

28117

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**FIBER RELEASE RATE STUDY
BURNER FLANGE GASKET REMOVAL
KEWANEE BOILER**

EXECUTIVE SUMMARY

Objectives

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The purpose of the study was to determine the concentration of fibers in the air while removing a burner flange gasket from a Kewanee Boiler.

Background

The study was performed using the intact burner flange of an old Kewanee boiler.

The study was conducted in an isolation chamber to eliminate outside influences. The study simulated activity associated with removing the burner and associated gasket. The gasket was scraped free of the flange using a flat blade scraper (a.k.a. putty knife).

The study was conducted on April 18, 2001 by Mr. Dan Podraza. This report presents the results of the study described herein.

Sample Results

All samples measured concentrations of fibers in air substantially below the U.S. Department of Labor Occupational Safety and Health Administration (USDOL-OSHA) 8 hour Time Weighted Average (TWA) Permissible Exposure Limit (PEL) of 0.1 fibers per cubic centimeter (f/cc). Sample results are presented in the accompanying tables.

Fiber Release Rate Study - Burner Flange Gasket Removal, Kewanee Boiler
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METHODOLOGY

PCM Sampling Procedure

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Samples were collected and analyzed by Phase Contrast Microscopy (PCM) following NIOSH Method 7400. Air was drawn through a 25mm, conductive cowl cassette with a 0.8 micron mixed cellulose ester (MCE) filter for collecting airborne particulate. The cassette was connected to a dedicated Gilian or equivalent servo-drive pump. The pump was used to maintain a flow rate of two (2) liters per minute (lpm) for both personal and area room air samples.

A Brooks rotometer was used to calibrate the pumps prior to and post sample collection. The rotometer was calibrated against a primary standard.

The samples were sealed, labeled and shipped to the laboratory for analysis. Samples were signed, placed in an Airborne shipping envelope, sealed, tracked by Airborne, and arrived at the laboratory by next day air.

"Personal" Samples

Personal samples were collected during the testing by attaching the cassette in the breathing zone of the individual performing the work for the duration of the test. The sampling pump was worn on the individual's belt.

"Average Room Air" Samples

The isolation chamber was subdivided into 4,140 one cubic foot (1ft³) modules. For purposes of identification, each module was assigned a discrete, consecutive number.

To determine the "average room air" concentration during the testing, eight (8) of the modules were selected using a random number generator. A sample cassette was located in the center of the respective module for the duration of the test.

"Background Air" Samples - PCM & TEM Sampling

Prior to conducting the test, the room was sampled to verify cleanliness. Five (5) samples were collected inside the isolation chamber following AHERA Protocol. Three (3) blanks were also reserved. Analysis was performed by transmission electron microscopy (TEM) following AHERA protocol.

Just prior to collecting the samples, a "leaf blower" was utilized to aggressively disturb the isolation chamber's interior surfaces. During the background sampling, a fan was used to circulate the air in the room.

Air was drawn through a 25mm, conductive cowl cassette with a 0.45 micron mixed cellulose ester (MCE) filter for collecting airborne fibers. The cassette was connected to a dedicated Gast high volume pump. The pump was used to maintain a flow rate of 10 liters per minute (lpm). A BGI rotometer was used to calibrate the pumps prior to, during, and post sample collection. The rotometer was calibrated against a primary standard.

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Additionally, five (5) PCM air samples were collected to determine background fiber concentrations prior to testing within the chamber. The cassettes were located in the same areas as the AHERA samples; however, PCM sampling and analysis methodologies were followed.

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Both PCM and TEM samples were sealed, labeled and shipped to the laboratory for analysis. Samples were placed in an Airborne shipping envelope, sealed, tracked by Airborne, and arrived at the laboratory by next day air.

PCM Light Microscopy Analysis

Samples were analyzed in accordance with NIOSH Method 7400. Total fiber counts were determined by phase contrast microscopy (PCM) in accordance with the NIOSH Manual of Analytical Methods, Fourth Edition, dated 8/15/94, A Rules. Values for PCM analysis are provided in the Appendix A and Appendix B spreadsheets.

The only fibers which are counted are those which are longer than 5 microns and have a length to width ratio equal to or greater than 3:1. PCM analysis counts all fibers meeting the specified dimensions. The analysis is not specific for asbestos but is the method specified to be used in the OSHA regulations.

The PCM laboratory reports are presented in Appendix C.

Electron Microscopy Analysis

AHERA Protocol transmission electron microscopy (TEM) analysis was performed on all background samples to verify the cleanliness of the isolation chamber prior to beginning the test. The sample analysis was performed as described in the Federal Register Vol. 52, No. 210, the Asbestos Hazard Emergency Response Act (AHERA Protocol).

Small squares were cut from each filter, processed appropriately, placed onto 200 mesh copper screens (grids) and transferred to a modified Jaffe Wick Washer containing acetone solvent. After the appropriate processing time, the grids were examined with a JEOL 1200EX or 100CX TEM. Grid openings from each sample were scanned at 20,000X. When fibers or structures of various shapes were encountered, they were assessed for morphological characteristics and crystalline structure with selected area electron diffraction (SAED).

The TEM laboratory reports are presented in Appendix D.

PLM Light Microscopy Analysis

Bulk samples were analyzed for asbestos by Polarized Light Microscopy (PLM) in accordance with guidelines set forth in the EPA Method for Determination of Asbestos in Bulk Building Materials, U.S. EPA/600/R-93-116 (7/93 Edition).

The PLM laboratory reports are presented in Appendix E.

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Statistical Comparisons

Data was formatted in spreadsheets for analysis. Statistical functions were performed including maximum, average, minimum, standard deviation, and variance.

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The spreadsheets in Appendices A and B present the data and summarize the statistical analyses performed.

Laboratory Accreditation

PCM and TEM air samples were shipped to and analyzed by R. J. Lee Group, Inc. in their Monroeville, Pennsylvania laboratory. R. J. Lee is accredited for TEM analysis by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) as Lab #101208. R. J. Lee is also accredited for PCM analysis by the American Industrial Hygiene Association (AIHA) as Lab #8204.

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DISCUSSION OF FINDINGS

Isolation Test Chamber

Testing was performed in an Isolation Test Chamber built at the offices of the Hillcrest Construction Corporation. The chamber is 23 feet wide by 20 feet deep and is 9 feet in height. The chamber was constructed of 6 mil polyethylene sheeting to physically separate the activity being tested from "outside of the chamber" influences. The chamber schematic is shown in Figure 1.

The chamber was a static environment. During the test, there was no air movement into the chamber and there was no air movement out of the chamber. Entry into the chamber was only through an access airlock.

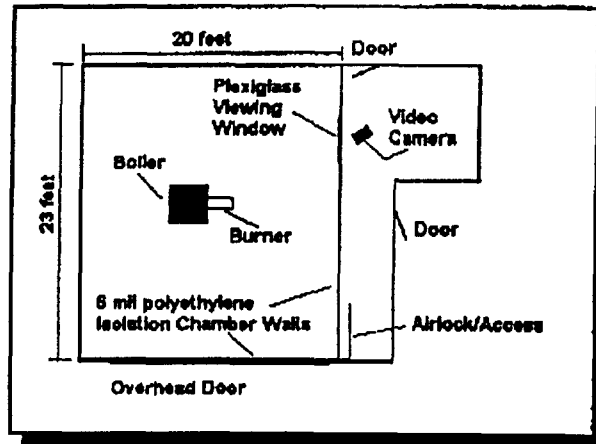


Figure 1 - Isolation Test Chamber

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Background Sampling Results

Prior to conducting any tests, the isolation chamber was systematically cleaned. A waterborne encapsulant was used at the end of the cleaning process to "lock-down" remaining fibers. Following the initial cleaning sampling shown in Figure 2, a series of air samples were collected and analyzed from five (5) area sampling locations in accordance with NIOSH 7400 protocol.

Final cleaning background samples were collected under "aggressive" conditions with analysis by TEM in accordance with AHERA Protocol. Background air samples were collected and analyzed from five (5) area sampling locations in accordance with AHERA protocol.

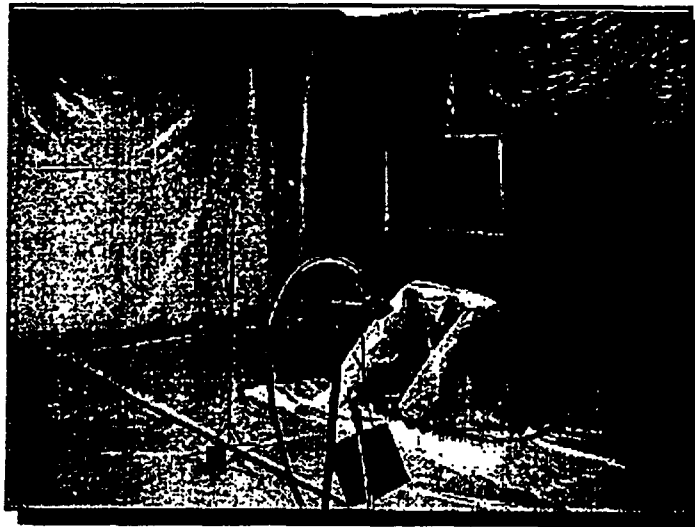


Figure 2 - Initial cleaning sampling arrangement.

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Results of the Pre-Test Background sampling are shown in the following table:

STATISTICAL FUNCTION	Aggressive Air TEM (s/mm ²) - Background -	Aggressive Air PCM (f/cc) - Background -
MAXIMUM	<15.4	0.034
AVERAGE	<15.4	0.024
MINIMUM	<15.4	0.015
STAND. DEV.	0	0.006
COUNT	5	5

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The levels met the AHERA TEM Clearance Criteria of an average of less than seventy structures per millimeter squared ($<70 \text{ s/mm}^2$) for the 5 samples and the room was considered clean. Nevertheless, there was a residual total fiber count of 0.024 f/cc determined to be cellulose. Results are shown in the spreadsheet presented in Appendix B.

Burner Flange and Gasket

The Kewanee Boiler Burner Flange and Gasket were obtained from an old warehouse on the near west side in the City of Chicago.¹ See photo in Figure 3.

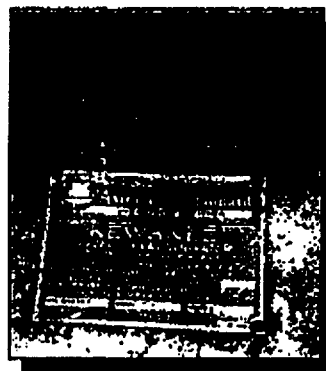


Figure 3 - Boiler nameplate.

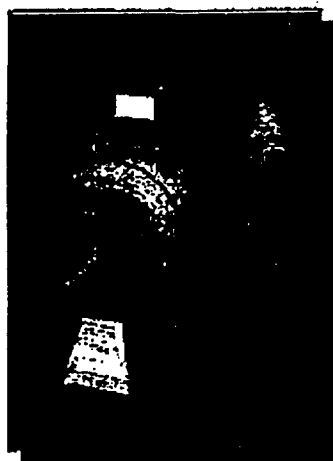


Figure 4 - Burner flange.

The piece of boiler face was cut from the unit using an acetylene/oxygen torch. The extraction was performed under the direction of Mr. Dan Podraza (See Figure 4). Following removal of the flange, the exterior of the flange and attached piping was HEPA vacuumed and wet wiped to remove loose dust, corrosion and fiberglass. The extracted blower/flange/gasket/boiler face was transported to the testing location in Mr. Podraza's enclosed pickup truck. The gasket and flange assembly remained intact during the removal, transportation and subsequent installation on a mock-up face plate.

¹ The name plate displays the following information; American Standard Products; Industrial Division - Detroit; Kewanee Compact Square Heat Generator; 4250 MBH; 126.9 hp; Max pressure; 15lb steam; 30lb water; Series No. 1X; Size M-425-FG; Serial Number N1463; Order #411846A.

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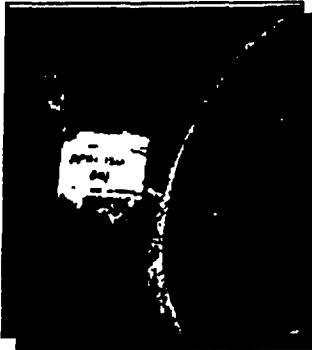


Figure 5 - Gasket sample.

As shown in Figure 5, the gasketing material was bulk sampled to determine asbestos content. The PLM analysis verified it to be composed of 50% chrysotile asbestos by PLM analysis of a bulk sample (See Appendix E).

Flange Disassembly

A mock-up of the original boiler front was constructed of plywood and wrapped in plastic sheeting. The boiler burner flange was mounted to this mock-up. See Figure 6.



Figure 6 - Mockup of burner.

The process of disassembling the flange and gasket was performed according to methods described by a boiler repair contractor. Each step to the process was video recorded. The flange disassembly and gasket removal was completed in approximately one (1) hour and twenty (20) minutes.

Personal and average room air samplers were started prior to beginning the testing. The samplers were left inside the test chamber to run for 480 minutes, and thus represent an eight hour exposure.

Sampling Results During Test

Results of 8-Hour Time-Weighted Average Permissible Exposure Limit sampling shown in the following table:

STATISTICAL FUNCTION	PCM Analysis by NIOSH 7400 (Total f/cc)	
	- Personal Samples -	- Average Room Air
MAXIMUM	0.027	0.046
AVERAGE	0.027	0.035
MINIMUM	0.027	0.025
STAND. DEV.	0.000	0.006
COUNT	2	8

All sample results indicate the concentrations to be well below the current OSHA Permissible Exposure Limit of 0.1 f/cc as sampled over an 8-hour time-weighted average period of time.

Refer also to Figure 7 for a graphical presentation of the air sample results. The Appendix A spreadsheets and charts present and depict the results of the testing in detail.

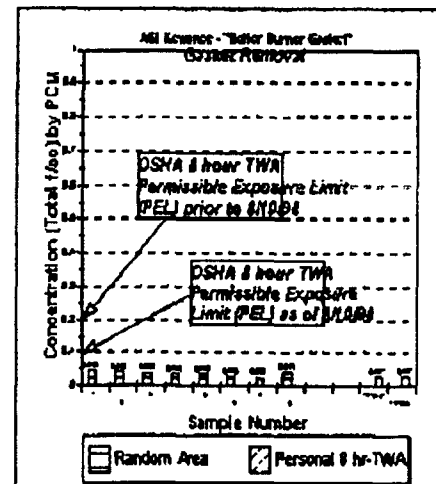


Figure 7 - Graphical presentation of results

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The photo in Figure 8 shows the gasket material which was removed.



Figure 8 - Gasket material removed from the burner flange.

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CONCLUSIONS

An old intact Kewanee Boiler woven asbestos burner gasket was disassembled within a test chamber. After disassembly of the burner flange, the gasket was scraped clean using a flat blade scraper (a.k.a. putty knife). Eight (8) room air samples and two (2) personal samples were collected during the processing. Boelter & Yates, Inc.
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All sample results show the airborne concentrations of fibers to be well below the current OSHA Permissible Exposure Limit of 0.1 f/cc as sampled over an 8-hour time weighted average period of time.

Respectfully submitted,

BOELTER & YATES, INC.


Daniel M. Podraza, CHMM

Reviewed by,


Frederick W. Boelter, CIH, PE

Enclosures

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APPENDIX A

Compilation Spreadsheets and Graphs
TESTING RESULTS

Date Printed: April 25, 2001 BOILER FLANGE GASKET REMOVAL
 Time Printed: 10:14 AM Ross & Hardies - ASI Kennewick
 Last Updated: April 23, 2001 BY: Project #2215B-0515

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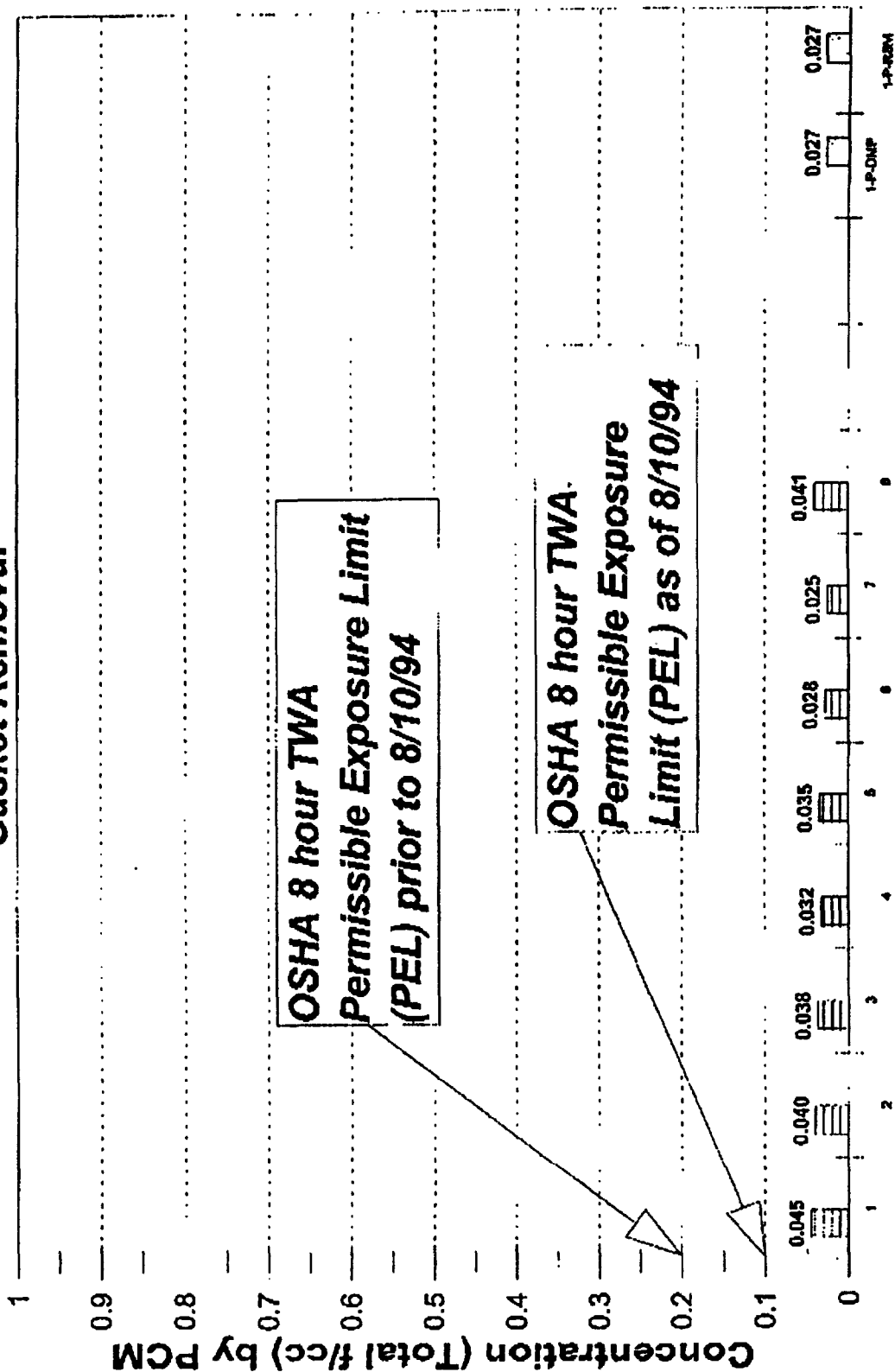
TEST	TEST DATE	SAMPLE NUMBER	SAMPLE TYPE	AREA NUMBER	RANDOM AREA NUMBER	SOUTH	EAST	HIGH	SAMPLE TIME	SAMPLE RATE	SAMPLE VOLUME	PCM RESULTS (Total %)	- Personal 10hrTW - Area @ 2 -	AREA NUMBER	PERSONAL
Burner Flange	April 18, 2001		1 RANDOM AREA		629	6	9	8	480	2	960	0.045		1	
Burner Flange	April 18, 2001		2 RANDOM AREA		1506	13	12	3	480	2	960	0.040		2	
Burner Flange	April 18, 2001		3 RANDOM AREA		71	1	8	8	480	2	960	0.036		3	
Burner Flange	April 18, 2001		4 RANDOM AREA		842	16	4	6	480	2	960	0.032		4	
Burner Flange	April 18, 2001		5 RANDOM AREA		1125	10	6	9	480	2	960	0.035		5	
Burner Flange	April 18, 2001		6 RANDOM AREA		1330	12	9	7	480	2	960	0.028		6	
Burner Flange	April 18, 2001		7 RANDOM AREA		1879	17	1	5	480	2	960	0.025		7	
Burner Flange	April 18, 2001		8 RANDOM AREA		543	5	9	3	480	2	960	0.041		8	
Burner Flange	April 18, 2001		BLANK						0	0	0				
Burner Flange	April 18, 2001		BLANK						0	0	0				
Burner Flange	April 18, 2001	1-P-DIAP	PERSONAL-10hrTWA						480	2	960	0.027			Podriza
Burner Flange	April 18, 2001	1-P-RSM	PERSONAL-10hrTWA						480	2	960	0.027			Helper

MAXIMUM
 AVERAGE
 MINIMUM
 STAND. DEV.
 VARIANCE
 COUNT

0.027 0.045
 0.027 0.035
 0.027 0.025
 0.000 0.006
 0.000 0.000
 2 8

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ASI Kewanee - "Boiler Burner Gasket" Gasket Removal



Sample Number

Random Area

Personal 8 hr-TWA

APPENDIX B

**Compilation Spreadsheets
PRE-TEST BACKGROUND RESULTS**

PRE-ACTIVITY BACKGROUND TESTING RESULTS

Kewanee Boiler Flange Gasket

BAI Project #2215B-6515

TEST NUMBER	TEST DATE	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE LOCATION	SAMPLE TIME	SAMPLE RATE	SAMPLE VOLUME	AGGRESSIVE AIR TEM RESULTS (Total Asbestos $\mu\text{m}/\text{m}^2$) (avg <70 $\mu\text{m}/\text{m}^2$)	LESS THAN LIMIT OF ANALYTICAL SENSITIVITY ($<15.4 \mu\text{m}/\text{m}^2$)	AGGRESSIVE AIR PCM RESULTS (Total Fibers f/cc)
1	13-Apr-01	1-B-1	AREA	NW5	120	10	1200	7.7	15.4	
1	13-Apr-01	1-B-2	AREA	NE5	120	10	1200	7.7	15.4	
1	13-Apr-01	1-B-3	AREA	CENTER	120	10	1200	7.7	15.4	
1	13-Apr-01	1-B-4	AREA	SW5	120	10	1200	7.7	15.4	
1	13-Apr-01	1-B-6	AREA	SE5	120	10	1200	7.7	15.4	
1	13-Apr-01	1-B-8	BLANK							
1	13-Apr-01	1-B-7	BLANK							

MAXIMUM
AVERAGE
MINIMUM
STAND. DEV.
VARIANCE
COUNT

7.7
7.7
7.7
0.0
5

1	13-Apr-01	1	AREA	NW5	120	2	240			0.023
1	13-Apr-01	2	AREA	NE5	120	2	240			0.023
1	13-Apr-01	3	AREA	CENTER	120	2	240			0.015
1	13-Apr-01	4	AREA	SW5	120	2	240			0.034
1	13-Apr-01	5	AREA	SE5	120	2	240			0.026
1	13-Apr-01	6	BLANK							
1	13-Apr-01	7	BLANK							

MAXIMUM
AVERAGE
MINIMUM
STAND. DEV.
VARIANCE
COUNT

0.034
0.024
0.015
0.009
0.000
5

APPENDIX C

PCM Laboratory Reports

RJ Lee Group, Inc.

AIHA Accreditation No. 460 NVLAP Accreditation No. 101208-0

350 Hochberg Road · Monroeville, PA 15146
Voice 724-325-1776 · Fax 724-733-1799

Laboratory Report

Boelter & Yates, Inc.
O'Hare Corporate Center
1300 Higgins Road Suite 301
Park Ridge, IL 60068-5772
Attention: Mr. Darin H. Cauley
Telephone: 847-692-4700

Report Date 4/24/2001
Sample Receipt Date 4/16/2001
RJ Lee Group Job No LAH102571-28
Client Job No. 2215B-6515
Authorization P.O. No. 2215B-6515

Analysis: Fibers (≥ 5 μ m long) on Mixed Cellulose Ester Filters
Method: NIOSH 7400, Issue # 2
Filter Size: 25 mm

Blank Correction: 0 f/mm²

Graticule: .00785 mm²

Uncorrected Fiber Concentrations

RJLG Sample Number	Client Sample Number	Volume (Liters)	Fibers	Fields	Fiber Density (f/mm ²)	95% Upper Limit of Confidence Quantitation		Analyst	Analysis Date	Comment
						(f/mL)	(f/mL)			
LAH102571-28-1	PCM-BGD-01	240	12	100	15.3	0.0245	0.0399	BAS	4/17/2001	
LAH102571-28-2	PCM-BGD-02	240	11	100	14	0.0225	0.037	BAS	4/17/2001	
LAH102571-28-3	PCM-BGD-03	240	7.5	100	9.6	0.0153	0.0266	BAS	4/17/2001	
LAH102571-28-4	PCM-BGD-04	240	16.5	100	21	0.0337	0.0527	BAS	4/17/2001	
LAH102571-28-5	PCM-BGD-05	240	12.5	100	15.9	0.0255	0.0414	BAS	4/17/2001	

Authorized Signature

Barbara A. Smith

Barbara A. Smith, Microscopist

Notes:

1. Air volumes provided by the client were used to calculate airborne concentrations.
2. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
3. "<" indicates the fiber density is below the detection limit. A fiber density of 7 f/mm² is used to calculate the quantitation limit.
4. Samples will be held for 90 days and then disposed of per Federal regulations.

RJ Lee Group, Inc.

Laboratory Report (cont.)

RJ Lee Group Job No: LAH102571-28
Client Job No: 2215B-6515

Uncorrected Fiber Concentrations

RJLG Sample Number	Client Sample Number	Volume (Liters)	Fibers	Fields	Fiber Density Concentration (f/mm ²)	95% Upper Limit of Confidence Quantitation		Analyst	Analysis Date	Comment
						(f/mL)	(f/mL)			
LAH102571-28-6	PCM-BGID-06	0	0	100	<7	-	-	BAS	4/17/2001	
LAH102571-28-7	PCM-BGID-07	0	.5	100	<7	-	-	BAS	4/17/2001	

Authorized Signature

Barbara A. Smith
Barbara A. Smith, Microscopist

Notes:

1. All volumes provided by the client were used to calculate airborne concentrations.
2. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
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RJ Lee Group, Inc.

ALHA Accreditation No. 460 NVLAP Accreditation No. 101208-0

350 Hochberg Road · Monroeville, PA 15146
Voice 724-325-1776 · Fax 724-733-1799

Laboratory Report

Boelter & Yates, Inc.
O'Hare Corporate Center
1300 Higgins Road Suite 301
Park Ridge, IL 60068-5772
Attention: Mr. Darin H. Cauley
Telephone: 847-692-4700

Report Date 4/24/2001
Sample Receipt Date 4/19/2001
RJ Lee Group Job No LAH102571-30
Client Job No. 2215B-6515
Authorization/P.O. No. 2215B-6515

Analysis: Fibers (≥ 5 μ m long) on Mixed Cellulose Ester Filters
Method: NIOSH 7400, Issue # 2
Filter Size: 25 mm

Blank Correction: 0 f/mm²

Graticule: .00785 mm²

Uncorrected Fiber Concentrations

RJLG Sample Number	Client Sample Number	Volume (Liters)	Fibers	Fields	Fiber Density (f/mm ²)	Concentration (f/mL)	95% Upper Confidence Limit (f/mL)	Limit of Quantization (f/mL)	Analyst	Analysis Date	Comment
LAH102571-30-1	TEST-AREA-01	960	88.5	100	112.7	0.0452	0.0595	0.0028	BAS	4/20/2001	
LAH102571-30-2	TEST-AREA-02	960	79	100	100.6	0.0404	0.0536	0.0028	BAS	4/20/2001	
LAH102571-30-3	TEST-AREA-03	960	75	100	95.5	0.0383	0.0512	0.0028	BAS	4/20/2001	
LAH102571-30-4	TEST-AREA-04	960	64.5	100	82.2	0.033	0.0446	0.0028	BAS	4/20/2001	
LAH102571-30-5	TEST-AREA-05	960	68.5	100	87.3	0.035	0.0471	0.0028	BAS	4/20/2001	

Authorized Signature

Barbara A. Smith
Barbara A. Smith, Microscopist

Notes:

1. Air volumes provided by the client were used to calculate airborne concentrations.
2. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
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RJ Lee Group, Inc.

Laboratory Report (cont.)

RJ Lee Group Job No: LAH102571-30
Client Job No: 2215B-6515

Uncorrected Fiber Concentrations

RJLG Sample Number	Client Sample Number	Volume (Liters)	Fibers	Fields	Fiber Density (fibers/mm ²)	95% Upper Limit of		Analysis Date	Analyst	Comment
						Concentration (fibers/mL)	Confidence Quantitation (fibers/mL)			
LAH102571-30-6	TEST-AREA-06	960	56.5	100	72	0.0289	0.0395	0.0028	BAS	4/20/2001
LAH102571-30-7	TEST-AREA-07	960	50	100	63.7	0.0255	0.0354	0.0028	BAS	4/20/2001
LAH102571-30-8	TEST-AREA-08	960	81	100	103.2	0.0414	0.0549	0.0028	BAS	4/20/2001
LAH102571-30-9	TEST-PRS-RSM	960	53	100	67.5	0.0271	0.0373	0.0028	BAS	4/20/2001
LAH102571-30-10	TEST-PRS-DMP	960	54	100	68.8	0.0276	0.0379	0.0028	BAS	4/20/2001
LAH102571-30-11	TEST-BLANK-01	0	1	100	<7	-	-	-	BAS	4/20/2001
LAH102571-30-12	TEST-BLANK-02	0	1	100	<7	-	-	-	BAS	4/20/2001

Authorized Signature

Barbara A. Smith
Barbara A. Smith, Microscopist

Notes:

1. Air volumes provided by the client were used to calculate airborne concentrations.
2. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
3. "<" indicates the fiber density is below the detection limit. A fiber density of 7 fibers/mm² is used to calculate the quantitation limit.
4. Samples will be held for 90 days and then disposed of per Federal regulations.

APPENDIX D

TEM Laboratory Reports

Test Report

Total Asbestos Structure Concentration

TEM AHRA Analysis

Project LAH102571-29

RJ Lee Group Sample Number	Client Sample Number	Filter Area (sq mm)	Volume† (Liters)	Area		Structures Chr Amp	Analytical Sensitivity † (S/sq. mm)	Concentration		Analysis Date
				Analyzed (sq. mm)	Chr			(S/sq. mm)	(S/cc)	
0118534HT	AHERA-BGD-01	385	1200.00	0.0651	0	0	15.4	0.0049	<15.4*	4/16/1
0118555HT	AHERA-BGD-02	385	1200.00	0.0651	0	0	15.4	0.0049	<15.4*	4/16/1
0118556HT	AHERA-BGD-03	385	1200.00	0.0651	0	0	15.4	0.0049	<15.4*	4/16/1
0118557HT	AHERA-BGD-04	385	1200.00	0.0651	0	0	15.4	0.0049	<15.4*	4/16/1
0118558HT	AHERA-BGD-05	385	1200.00	0.0651	0	0	15.4	0.0049	<15.4*	4/16/1
0118559HT	AHERA-BGD-06	385	Blank	N/A	-	-	-	-	-	-
0118560HT	AHERA-BGD-07	385	Blank	N/A	-	-	-	-	-	-
0118561HT	AHERA-BGD-08	385	Blank	N/A	-	-	-	-	-	-

† Volumes provided by Boelter & Yates, Inc. for Project 2215B-6515 were used to calculate analytical results and sensitivities.
* Analytical sensitivity is the calculated concentration based on one structure in the area analyzed.

Samples received on: Monday, April 16, 2001

Chr - Chrysotile, Amp - Amphibole

* Results Less Than Analytical Sensitivity.

N/A - Sample not analyzed

Authorized Signature

Kimberly A. Allison, Manager-TEM Analysis

Date Tuesday, April 17, 2001

RJ Lee Group, Inc.
Headquarters

350 Hochberg Road
Monroeville, PA 15146

Phone (724) 325-1776
Fax (724) 733-1799

Test Report Page: 1 of 1

RJ Lee Group, Inc
Count Sheet

Client Name Boelter & Yates, Inc.
Project Number LAH102571-29
RJL Sample # 0118554HT
Client Sample # AHERA-BGD-01
Microscope 2000 FX
Accelerating Volt 120 Kv
Magnification 21000X
Analyst BF
EDS Disk

RJL QA Number HQ19302
Grid Openings 8
Total Asbestos 0
Total Non-Asbestos 0
Filter CE 385 mm²
Volume 1200.0 Liters
Grid Opening Area 0.0081 mm²

Field	Fiber	< 5 µm	≥ 5 µm	Structure Type	Morph	EDS	Photo	SAED	Amphibole Type	Comment
1	0			NSD						
2	0			NSD						
3	0			NSD						
4	0			NSD						
5	0			NSD						
6	0			NSD						
7	0			NSD						
8	0			NSD						

RJ Lee Group, Inc
Count Sheet

Client Name Boelter & Yates, Inc.
Project Number LAH102571-29
RJL Sample # 0118555HT
Client Sample # AHERA-BGD-02
Microscope 1200 EX
Accelerating Volt 120 Kv
Magnification 20000 X
Analyst LEH
EDS Disk

RJL QA Number HQ19302
Grid Openings 8
Total Asbestos 0
Total Non-Asbestos 0
Filter CE 385 mm²
Volume 1200.0 Liters
Grid Opening Area 0.0081 mm²

Field	Fiber	< 5 µm	≥ 5 µm	Structure Type	Morph	EDS	Photo	SAED	Amphibole Type	Comment
1	0			NSD						
2	0			NSD						
3	0			NSD						
4	0			NSD						
5	0			NSD						
6	0			NSD						
7	0			NSD						
8	0			NSD						

RJ Lee Group, Inc
Count Sheet

Client Name Boelter & Yates, Inc.
Project Number LAH102571-29
RJL Sample # 0118556HT
Client Sample # AHERA-BGD-03
Microscope 1200 EX
Accelerating Volt 120 Kv
Magnification 20000 X
Analyst LEH
EDS Disk

RJL QA Number HQ19302
Grid Openings 8
Total Asbestos 0
Total Non-Asbestos 0
Filter CE 385 mm²
Volume 1200.0 Liters
Grid Opening Area 0.0081 mm²

Field	Fiber	< 5 μ m	$\geq$ 5 μ m	Structure Type	Morph	EDS	Photo	SAED	Amphibole Type	Comment
1	0			NSD						
2	0			NSD						
3	0			NSD						
4	0			NSD						
5	0			NSD						
6	0			NSD						
7	0			NSD						
8	0			NSD						

RJ Lee Group, Inc
Count Sheet

Client Name Boelter & Yates, Inc.
Project Number LAH102571-29
RJL Sample # 0118557HT
Client Sample # AHERA-BGD-04
Microscope 2000 FX
Accelerating Volt 120 Kv
Magnification 21000X
Analyst BF
EDS Disk

RJL QA Number HQ19302
Grid Openings 8
Total Asbestos 0
Total Non-Asbestos 0
Filter CB 385 mm²
Volume 1200.0 Liters
Grid Opening Area 0.0081 mm²

Field	Fiber	< 5 μ m	$\geq$ 5 μ m	Structure Type	Morph	EDS	Photo	SAED	Amphibole Type	Comment
1	0			NSD						
2	0			NSD						
3	0			NSD						
4	0			NSD						
5	0			NSD						
6	0			NSD						
7	0			NSD						
8	0			NSD						

RJ LeeGroup, Inc
Count Sheet

Client Name Boelter & Yates, Inc.
Project Number LAH102571-29
RJL Sample # 0118558HT
Client Sample # AHERA-BGD-05
Microscope 1200 EX
Accelerating Volt 120 Kv
Magnification 20000 X
Analyst LEH
EDS Disk

RJL QA Number HQ19302
Grid Openings 8
Total Asbestos 0
Total Non-Asbestos 0
Filter CE 385 mm²
Volume 1200.0 Liters
Grid Opening Area 0.0081 mm²

Field	Fiber	< 5 µm	≥ 5 µm	Structure Type	Morph	EDS	Photo	SAED	Amphibole Type	Comment
1	0			NSD						
2	0			NSD						
3	0			NSD						
4	0			NSD						
5	0			NSD						
6	0			NSD						
7	0			NSD						
8	0			NSD						

APPENDIX E

PLM Bulk Sample

JMS Environmental Associates, Ltd.
Westmont, Illinois

Bulk Sample Analysis For Asbestos Content

Client: Boelter & Yates
 Project Name: UIC Boiler
 Client Project Ref: 2215B-6507

Project Number: J-8507
 Work Order: 9358
 Batch Number: 9416

Log Number	Layer I.D.	Sample Identification	Sample Description	Asbestos Fibers (%)			Nonasbestos-Fibers (%)		
				% By Visual Estimate					Other
				Chrys.	Amos.	Other	Cellulose	Fibrous Glass	
193400	--	MFM-0301-001	Homogeneous Gray Friable Insulation	50	--	--	--	--	35/Synth.

Abbreviations: Croc. Crocidolite Trem. Tremolite Synth. Synthetic Fibers
 Anth. Anthophyllite Actin. Actinolite CaSil Calcium Silicates

Explanation: Percentages will not necessarily add up to 100%, with the balance being nonfibrous filler and binder materials.

*Comments:

Analyst: Kirsten Bolda Date: March 05, 2001
 Kirsten Bolda