



Lab/Cor Portland, Inc.

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Portland, OR 97239

Analysis Report Cover Final Report

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Asbestos and Environmental Analysis

Job Number: 196379 **PDX**
Client: TRC Environmental Corp.
Address: 4105 SE International Way, #505
Milwaukie, OR 97222
Project Name: BSD - Highland Park Middle School
Project Num: 362317
PO Number:
Sub Project:

Report Number: 196379R01
Report Date: 11/22/2019

Enclosed please find results for samples submitted to our laboratory. A list of samples and analyses follows:

PASSES AHERA CLEARANCE CRITERIA - THE TOTAL FILTER DENSITY FOR THIS SET OF SAMPLES IS: 0 S/MM2

Lab/Cor Sample #	Client Sample # and Description	Analysis	Analysis Notes	Date Received:
196379 - S1	HPMS-TEM-11 - Gym (Activity)	AHERA		11/22/2019
196379 - S2	HPMS-TEM-12 - Gym (Activity)	AHERA		11/22/2019
196379 - S3	HPMS-TEM-13 - Gym (Activity)	AHERA		11/22/2019
196379 - S4	HPMS-TEM-14 - Gym (Activity)	AHERA		11/22/2019
196379 - S5	HPMS-TEM-15 - Gym (Activity)	AHERA		11/22/2019

AHERA - Method 40-CFR Part 763 App. A, Subpart E Preparation and analysis of the above samples was conducted in accordance with the AHERA method for the identification of asbestos. Briefly, the samples were collapsed with a solution of N,N-dimethylformamide and acetic acid, then etched in a low temperature plasma etcher to remove the top surface of the filter and other organics. The samples were carbon coated at high vacuum with a thin layer of carbon, placed on 200 mesh copper grids and allowed to dissolve in N,N-Dimethylformamide / Acetone baths until cleared of filter debris.

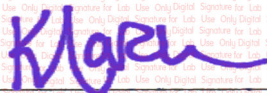
Analysis was performed using a transmission electron microscope equipped with an EDS X ray analyzer. The samples were analyzed at approximate screen magnification of between 15,000x-20,000x, with an accelerating voltage of 100 KV. The sizing of grid openings was performed using a calibrated digital imaging system at low magnification. Grid preparations are evaluated by the analyst before commencing analysis. Proper preparations have >75% replicate coverage, have a 10% etch rate, have acceptable particulate loading and show no evidence of preparation remnants (chemical or material).

Passing criteria for this method is based on the Filter Density (str/mm2). The Total Filter Density is divided by the number of inside work area samples; if the average Filter Density is >70 str/mm2 the sample set fails initial AHERA clearance criteria.

Disclaimer The results reported relate only to the samples tested or analyzed; the laboratory is not responsible for data collected by personnel who are not affiliated with the laboratory. Results reported in both structures/cm3 and structures/mm2 are dependent on the sample volume and area. These parameters are measured and recorded by non-laboratory personnel and are not covered by the laboratory's accreditation. Interpretation of these results is the sole responsibility of the client.

If further clarification of these results is needed, please call us. Thank you for allowing the staff at Lab/Cor Portland, Inc. the opportunity to provide you with the analytical services.

Reviewed by:


X

Kate March
Analyst

Asbestos and Environmental Analysis

AHERA Rapid Summary

Job Number: 196379 PDX

Report Number: 196379R01

Client: TRC Environmental Corp.

Date Received: 11/22/2019

Project Name: BSD - Highland Park Middle School

Lab/Cor Sample No.	Client Sample No.	Description	Structure Type	Filter Density (s/mm2)	Concentration* (struct/cc)	95% Confidence Interval (struct/cc)	Struct Count ¹ Prim/Total	Analytical Sens. (struct/cc) :
S1	HPMS-TEM-11	Gym (Activity)	AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0	0.00437
S2	HPMS-TEM-12	Gym (Activity)	AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0	0.00437
S3	HPMS-TEM-13	Gym (Activity)	AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0	0.00437
S4	HPMS-TEM-14	Gym (Activity)	AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0	0.00437
S5	HPMS-TEM-15	Gym (Activity)	AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0	0.00437

Reviewed by:


 X
 Digitally signed by Kate March, DN: cn=Kate March, o=LabCor Portland Inc., ou=LabCor Portland Inc., email=kate@labcorpdx.net, c=US

Kate March
 Analyst

* One-sided upper 95% Poisson confidence limits may be used to calculate sample concentrations ([Struct count] * [Analytical Sensitivity]) when the structure count is below 4. The limits are: 0 str - 0, 1 str - 1, 2 str - 2, 3 str - 3

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

Asbestos and Environmental Analysis

AHERA Summary Data

Job Number: 196379 **PDX**
Client: TRC Environmental Corp.
Project Name: BSD - Highland Park Middle School

Report Number: 196379R01
Date Received: 11/22/2019

Lab/Cor Sample No.: S1

Client Sample No.: HPMS-TEM-11
Description: Gym (Activity)

Volume (L) : 1200
Lab Filter Area (mm2) : 385
Grid Openings Analyzed : 7
Average Grid Opening Area : 0.0105
Area Analyzed (mm2) : 0.0735
Analytical Sens. (struc/cc) : 0.00437
Detection Limit. (struc/cc) : 0.01305

Analyst(s)	Analysis Date	Microscope	Magnification
KM	11/22/2019	JEOL 1200 EX	20000

Structure Type	Filter Density (s/mm2)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count ¹ Prim/Total
AHERA >=0.5 to 5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA >=5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

Lab/Cor Sample No.: S2

Client Sample No.: HPMS-TEM-12
Description: Gym (Activity)

Volume (L) : 1200
Lab Filter Area (mm2) : 385
Grid Openings Analyzed : 7
Average Grid Opening Area : 0.0105
Area Analyzed (mm2) : 0.0735
Analytical Sens. (struc/cc) : 0.00437
Detection Limit. (struc/cc) : 0.01305

Analyst(s)	Analysis Date	Microscope	Magnification
KM	11/22/2019	JEOL 1200 EX	20000

Structure Type	Filter Density (s/mm2)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count ¹ Prim/Total
AHERA >=0.5 to 5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA >=5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

* One-sided upper 95% Poisson confidence limits may be used to calculate sample concentrations ([Struc count] * [Analytical Sensitivity]) when the structure count is below 4. The limits are: 0 str - 0, 1 str - 1, 2 str - 2, 3 str - 3

Asbestos and Environmental Analysis

AHERA Summary Data

Job Number: 196379 **PDX**
Client: TRC Environmental Corp.
Project Name: BSD - Highland Park Middle School

Report Number: 196379R01
Date Received: 11/22/2019

Lab/Cor Sample No.: S3

Client Sample No.: HPMS-TEM-13
Description: Gym (Activity)

Analyst(s) **Analysis Date** **Microscope** **Magnification**
KM 11/22/2019 JEOL 1200 EX 20000

Volume (L) : 1200
Lab Filter Area (mm2) : 385
Grid Openings Analyzed : 7
Average Grid Opening Area : 0.0105
Area Analyzed (mm2) : 0.0735
Analytical Sens. (struc/cc) : 0.00437
Detection Limit. (struc/cc) : 0.01305

Structure Type	Filter Density (s/mm2)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count ¹ Prim/Total
AHERA >=0.5 to 5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA >=5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

Lab/Cor Sample No.: S4

Client Sample No.: HPMS-TEM-14
Description: Gym (Activity)

Analyst(s) **Analysis Date** **Microscope** **Magnification**
KM 11/22/2019 JEOL 1200 EX 20000

Volume (L) : 1200
Lab Filter Area (mm2) : 385
Grid Openings Analyzed : 7
Average Grid Opening Area : 0.0105
Area Analyzed (mm2) : 0.0735
Analytical Sens. (struc/cc) : 0.00437
Detection Limit. (struc/cc) : 0.01305

Structure Type	Filter Density (s/mm2)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count ¹ Prim/Total
AHERA >=0.5 to 5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA >=5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

* One-sided upper 95% Poisson confidence limits may be used to calculate sample concentrations ([Struc count] * [Analytical Sensitivity]) when the structure count is below 4. The limits are: 0 str - 0, 1 str - 1, 2 str - 2, 3 str - 3



Asbestos and Environmental Analysis

AHERA Summary Data

Job Number: 196379 **PDX**
Client: TRC Environmental Corp.
Project Name: BSD - Highland Park Middle School

Report Number: 196379R01
Date Received: 11/22/2019

Lab/Cor Sample No.: S5

Volume (L) : 1200

Client Sample No.: HPMS-TEM-15

Lab Filter Area (mm2) : 385

Description: Gym (Activity)

Grid Openings Analyzed : 7

Analyst(s) **Analysis Date** **Microscope** **Magnification**
KM 11/22/2019 JEOL 1200 EX 20000

Average Grid Opening Area : 0.0105

Area Analyzed (mm2) : 0.0735

Analytical Sens. (struc/cc) : 0.00437

Detection Limit. (struc/cc) : 0.01305

Structure Type	Filter Density (s/mm2)	Concentration* (struc/cc)	95% Confidence Interval (struc/cc)	Structure Count! Prim/Total
AHERA >=0.5 to 5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA >=5.0µm, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0
AHERA TOTAL >=0.5, 5:1	0	< 0.0044	0 - 0.0161 - Poisson	0

¹ Concentration and 95% Confidence Level are calculated based upon the number showing under the Structure Count header.

Reviewed by:

Kate March

Kate March
Analyst

* One-sided upper 95% Poisson confidence limits may be used to calculate sample concentrations ([Struc count] * [Analytical Sensitivity]) when the structure count is below 4. The limits are: 0 str - 0, 1 str - 1, 2 str - 2, 3 str - 3



Asbestos and Environmental Analysis

AHERA Raw Data

Job Number: 196379

PDX

Method 40-CFR Part 763 App. A, Subpart E

Report Number: 196379R01

Client: TRC Environmental Corp.

Date Received: 11/22/2019

Project Name: BSD - Highland Park Middle School

Project No.: 362317

Lab/Cor Sample No: S1

Client Sample No: HPMS-TEM-11

Description: Gym (Activity)

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	E44				NSD							
G1	2	F43				NSD							
G1	3	F52				NSD							
G1	4	G51				NSD							
G2	5	C34				NSD							
G2	6	E33				NSD							
G2	7	E42				NSD							

Lab/Cor Sample No: S2

Client Sample No: HPMS-TEM-12

Description: Gym (Activity)

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	C34				NSD							
G1	2	E33				NSD							
G1	3	E42				NSD							
G1	4	F41				NSD							
G2	5	C33				NSD							
G2	6	C42				NSD							
G2	7	E41				NSD							

Lab/Cor Sample No: S3

Client Sample No: HPMS-TEM-13

Description: Gym (Activity)

Gr	No.	Loc.	ID	Prim	Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	C44				NSD							
G1	2	E43				NSD							
G1	3	E52				NSD							
G1	4	F51				NSD							
G2	5	C33				NSD							
G2	6	C42				NSD							
G2	7	E41				NSD							



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Asbestos and Environmental Analysis

AHERA Raw Data

Job Number: 196379 PDX

Method 40-CFR Part 763 App. A, Subpart E

Report Number: 196379R01

Client: TRC Environmental Corp.

Date Received: 11/22/2019

Project Name: BSD - Highland Park Middle School

Project No.: 362317

Lab/Cor Sample No: S4

Client Sample No: HPMS-TEM-14

Description: Gym (Activity)

Gr	No.	Loc.	ID	Prim Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	C34			NSD							
G1	2	E33			NSD							
G1	3	E42			NSD							
G1	4	F41			NSD							
G2	5	E33			NSD							
G2	6	E42			NSD							
G2	7	F41			NSD							

Lab/Cor Sample No: S5

Client Sample No: HPMS-TEM-15

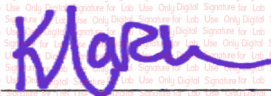
Description: Gym (Activity)

Gr	No.	Loc.	ID	Prim Tot	Class	Length	Width	Aspect	Analyte	Elements	Comment	Count Categories
G1	1	C34			NSD							
G1	2	E33			NSD							
G1	3	E42			NSD							
G1	4	F41			NSD							
G2	5	E33			NSD							
G2	6	E42			NSD							
G2	7	F41			NSD							

Count Categories

AHERA	AHERA TOTAL >=0.5, 5:1	AHERA_0.5-5.0	AHERA >=0.5 to 5.0µm, 5:1	AHERA_5.0	AHERA >=5.0µm, 5:1
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Reviewed by:

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Kate March
Analyst