

November 14, 2017

Boulder County Risk Management
PO Box 471
Boulder, CO 80306

Attention: Mr. Jesse Newcomb

Subject: Asbestos Air Sampling and Analysis - Addendum
Boulder County Justice Center
1777 6th Street, Boulder, Colorado
CTL Project No. FC08117.000-226

CTL|Thompson, Inc. (CTL) was retained to perform air sampling at the Boulder County Justice Center located at 1777 6th Street in Boulder, Colorado. Our initial air sampling results were outlined in a letter report dated October 23, 2017 (CTL Project No. FC08117.000-226). At your request, the seven samples with Phase Contrast Microscopy (PCM) results greater than 0.008 fibers per cubic centimeter were submitted to Reservoirs Analytical Laboratory to be re-analyzed by Transmission Electron Microscopy. As shown on the attached laboratory report, none of these seven samples contained asbestos fibers above laboratory method detection limits.

If we can be of further service discussing the contents of this report, please call us.

CTL|THOMPSON, INC.

A handwritten signature in blue ink that reads "Levi A. Stockton".

Levi A. Stockton, EIT
Staff Engineer

Reviewed By:

A handwritten signature in blue ink that reads "Dana L. Harris".

Dana L. Harris
Environmental Department Manager



November 13, 2017

Subcontract Number: NA
Laboratory Report: RES 394341-1
Project # / P.O. # FC08117.000-226
Project Description: Boulder County Justice Center

Dana Harris
CTL/Thompson, Inc. (Ft. Collins)
400 North Link Lane
Ft. Collins CO 80524

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 394341-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

A blue ink signature of Gina Vettraino, written in a cursive style. Below the signature is the text "Gina Vettraino for" in a small, blue, sans-serif font.

Gina Vettraino for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL, INC.

NVLAP Lab Code 101896-0; TDH: #30-0015

TABLE I. TEM AIR FILTER SAMPLE DATA AND ANALYTICAL RESULTS

RES Job Number: RES 394341-1
Client: CTL/Thompson, Inc. (Ft. Collins)
Client Project Number / P.O.: FC08117.000-226
Client Project Description: Boulder County Justice Center
Date Samples Received: November 13, 2017
Method: CFR-763 (TEM AHERA), Air
Turnaround: 6 Hour
Date Samples Analyzed: November 13, 2017

Client ID Number	Lab ID Number	Area Analyzed (mm ²)	Air Volume Sampled (L)	Number of Asbestos Structures Detected	Analytical Sensitivity (s/cc)	Asbestos Concentration (s/cc)	Filter Loading (s/mm ²)
A-8	EM 1972092	0.0700	1266	ND	0.0043	BAS	BAS
A-9	EM 1972093	0.0700	1202	ND	0.0046	BAS	BAS
A-10	EM 1972094	0.0700	1164	ND	0.0047	BAS	BAS
A-12	EM 1972095	0.0700	1195	ND	0.0046	BAS	BAS
A-21	EM 1972096	0.0600	1376	ND	0.0047	BAS	BAS
A-22	EM 1972097	0.0600	1319	ND	0.0049	BAS	BAS
A-23	EM 1972098	0.0600	1313	ND	0.0049	BAS	BAS

NA = Not Analyzed
 ND = None Detected
 BAS = Below Analytical Sensitivity
 Average Grid Opening in mm² = 0.010

Filter Material = Mixed Cellulose Ester
 Filter Diameter = 25 mm
 Effective Filter Area = 385 sq mm

Data QA:


Gina Vettrai

REILAB Reservoirs Environmental, Inc.

5801 Logan St. Denver, CO 80216 • Ph: 303 864-1986 • Fax: 303-477-4275 • Toll Free: 866-RES-ENV

Pager: 303-509-2098

Due Date: 11-13-17
Due Time: _____

INVOICE TO: (IF DIFFERENT)

CONTACT INFORMATION:

Company: CTL Thompson, Inc. Address: 400 N. Link Lane Fort Collins, CO 80524	Contact: Dana Harris Phone: 970-420-0533 Fax: _____ Cell/pager: _____
Project Number and/or P.O. #: F108117, 000-226 Project Description/Location: Boulder County Justice Center	Contact: dharris@ctlthompson.com Final Data Deliverable Email Address: dharris@ctlthompson.com

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm
PLM / PCM / TEM RUSH (Same Day) PRIORITY (Next Day) STANDARD
 (Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm
 Metal(s) / Dust: _____ RUSH 24 hr. 3-5 Day
 RCRA 8 / Metals & Welding: _____ RUSH 5 day 10 day
 Fume Scan / TCLP: _____ RUSH 24 hr. 3 day 5 Day

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm
 E.coli O157:H7, Coliforms, S.aureus: _____ 24 hr. 2 Day 3-5 Day
 Salmonella, Listeria, E.coli, APC, Y & M: _____ RUSH 24 Hr. 48 Hr. 3 Day 5 Day
 Mold: _____ RUSH 24 Hr. 48 Hr. 3 Day 5 Day

****Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.****

REQUESTED ANALYSIS

PLM - Spot report Long report Point Count
 TEM - AHERA Level II 7402 ISO +/- Quant. Semi-quant. Micro-vac. ISO-Indirect Preps
 PCM - 7400A, 7400B OSHA
 DUST - Total, Respirable
 METALS - Analyte(s) RCRA 8 / TCLP, Welding Fume, Metals Scan
 ORGANICS - METH
 Salmonella +/-
 E.coli O157:H7 +/-
 Listeria +/-
 Aerobic Plate Count +/- or Quantification
 E.coli +/- or Quantification
 Coliforms +/- or Quantification
 S.aureus +/- or Quantification
 Y & M +/- or Quantification
 Mold +/- Identification, Quantification

SAMPLER'S INITIALS OR OTHER NOTES

VALID MATRIX CODES

Air = A Bulk = B
 Dust = D Paint = P
 Soil = S Wipe = W
 Swab = SW F = Food
 Drinking Water = DW Waste Water = WW
 O = Other
 ASTM E1792 approved wipe media only

Client sample ID number (Sample ID's must be unique)	Sample Volume	Matrix Code	# Containers	Date Collected (mm/dd/yyyy)	Time Collected (hh:mm a/p)	EM Number (Laboratory Use Only)
1 A-8	1266 A1	A1	1			1572092
2 A-9	1208 A1	A1	1			93
3 A-10	1164 A1	A1	1			97
4 A-12	1195 A1	A1	1			98
5 A-21	1376 A1	A1	1			96
6 A-22	1319 A1	A1	1			97
7 A-23	1313 A1	A1	1			98
8						
9						
10						

Number of samples received: _____ (Additional samples shall be listed on attached long form.)
 NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days. Failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: _____ Date/Time: 11/10/17 via UPS	Carrier: _____ Date/Time: 11/17 @ 7:30am
Laboratory Use Only	Carrier: _____
Received By: _____ Date/Time: _____	Carrier: _____
Results: Contact _____ Phone Email Fax _____	Contact _____ Phone Email Fax _____
Contact _____ Date _____	Contact _____ Date _____
Initials _____ Time _____	Initials _____ Time _____
Temp (F°) _____	Temp (F°) _____
Sealed Yes / No _____	Sealed Yes / No _____
On Ice Yes / No _____	On Ice Yes / No _____
Intact Yes / No _____	Intact Yes / No _____

Attachment I

Key to Count Sheets
Count Sheets
Analytical Procedures

Structures identifications consist of an Asbestos Type followed by a Structure Type

Asbestos Type

A = Amosite
An = Anthophyllite
C = Chrysotile
Cr = Crocidolite
Trem-Act = Tremolite-Actinolite

Structure Types

F = Fiber
B = Bundle
C = Cluster
M = Matrix

ND = no structures detected
M = other structure associated with a matrix
NAM = Non Asbestos Mineral
XGB = partly obscured by a grid bar

Sizing Conversion

1 length unit = 5 mm on screen = 0.278 micron

1.80 length units = 0.5 micron

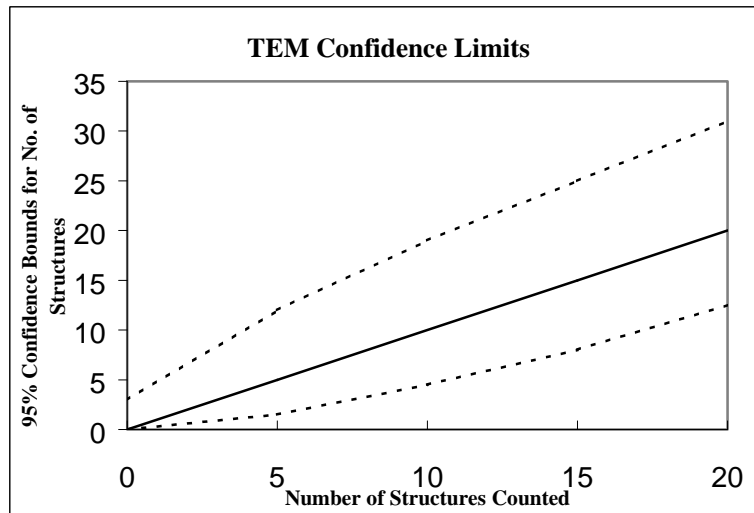
18.0 length units = 5 microns

1 width unit = 1 mm on screen = 0.0556 micron

TEM Analysts

Jeanne Spencer
Norberto Zimbleman
Nik Merrill

Paul D. LoScalzo
Sean Flynn
Cameron Powers



Upper and lower 95% confidence bounds for the number of structures counted assuming a Poisson distribution.

Lab Name	Reservoirs Environmental, Inc	Client	CTL/Thompson, Inc. (Ft. Collins)	Analyzed By:	JO
Instrument	JEOL 100 CX (S)	Sample Type	Air	Analysis Date:	11/13/2017
Voltage	100KV	Volume (L)	1266	Prep Method:	Direct
Magnification	20000	Res Number	394341-1	Date Recvd.	11/13/2017
Primary Filter Area (mm2)	385	EM Number	1972092	Storage Loc.	November
Secondary Filter Area (mm2)		Sample ID	A-8	Scope Align.	11/13/2017
Grid Opening Area (mm2)	0.01	Method	CFR-763 (TEM AHERA)		

Grid	GO	Type	Count	Total	Length	Width	ID	MineralClass	Comments	Photo	EDS
A	L4-1	ND									
	K4-1	ND									
	H4-1	ND									
	G4-1	ND									
	F4-1	ND									
B	B4-1	ND									
	C3-3	ND									

*NAM = Non Asbestos Material

Lab Name	Reservoirs Environmental, Inc	Client	CTL/Thompson, Inc. (Ft. Collins)	Analyzed By:	JO
Instrument	JEOL 100 CX (S)	Sample Type	Air	Analysis Date:	11/13/2017
Voltage	100KV	Volume (L)	1202	Prep Method:	Direct
Magnification	20000	Res Number	394341-1	Date Recvd.	11/13/2017
Primary Filter Area (mm2)	385	EM Number	1972093	Storage Loc.	November
Secondary Filter Area (mm2)		Sample ID	A-9	Scope Align.	11/13/2017
Grid Opening Area (mm2)	0.01	Method	CFR-763 (TEM AHERA)		

Grid	GO	Type	Count	Total	Length	Width	ID	MineralClass	Comments	Photo	EDS
A	A4-3	ND									
	C4-3	ND									
	A4-4	ND									
B	B3-1	ND									
	B3-3	ND									
	C3-3	ND									
	E3-3	ND									

*NAM = Non Asbestos Material

Lab Name	Reservoirs Environmental, Inc	Client	CTL/Thompson, Inc. (Ft. Collins)	Analyzed By:	JO
Instrument	JEOL 100 CX (S)	Sample Type	Air	Analysis Date:	11/13/2017
Voltage	100KV	Volume (L)	1164	Prep Method:	Direct
Magnification	20000	Res Number	394341-1	Date Recvd.	11/13/2017
Primary Filter Area (mm2)	385	EM Number	1972094	Storage Loc.	November
Secondary Filter Area (mm2)		Sample ID	A-10	Scope Align.	11/13/2017
Grid Opening Area (mm2)	0.01	Method	CFR-763 (TEM AHERA)		

Grid	GO	Type	Count	Total	Length	Width	ID	MineralClass	Comments	Photo	EDS
A	K5-4	ND									
	H5-4	ND									
	G5-4	ND									
	F5-4	ND									
B	E3-1	ND									
	C3-1	ND									
	B3-1	ND									

*NAM = Non Asbestos Material

Lab Name	Reservoirs Environmental, Inc	Client	CTL/Thompson, Inc. (Ft. Collins)	Analyzed By:	JO
Instrument	JEOL 100 CX (S)	Sample Type	Air	Analysis Date:	11/13/2017
Voltage	100KV	Volume (L)	1195	Prep Method:	Direct
Magnification	20000	Res Number	394341-1	Date Recvd.	11/13/2017
Primary Filter Area (mm2)	385	EM Number	1972095	Storage Loc.	November
Secondary Filter Area (mm2)		Sample ID	A-12	Scope Align.	11/13/2017
Grid Opening Area (mm2)	0.01	Method	CFR-763 (TEM AHERA)		

Grid	GO	Type	Count	Total	Length	Width	ID	MineralClass	Comments	Photo	EDS
A	H4-6	ND									
	G4-6	ND									
	F4-6	ND									
	E4-6	ND									
B	E3-1	ND									
	B3-1	ND									
	C3-1	ND									

*NAM = Non Asbestos Material

Lab Name	Reservoirs Environmental, Inc	Client	CTL/Thompson, Inc. (Ft. Collins)	Analyzed By:	JO
Instrument	JEOL 100 CX (S)	Sample Type	Air	Analysis Date:	11/13/2017
Voltage	100KV	Volume (L)	1376	Prep Method:	Direct
Magnification	20000	Res Number	394341-1	Date Recvd.	11/13/2017
Primary Filter Area (mm2)	385	EM Number	1972096	Storage Loc.	November
Secondary Filter Area (mm2)		Sample ID	A-21	Scope Align.	11/13/2017
Grid Opening Area (mm2)	0.01	Method	CFR-763 (TEM AHERA)		

Grid	GO	Type	Count	Total	Length	Width	ID	MineralClass	Comments	Photo	EDS
A	E6-4	ND									
	C6-4	ND									
	B6-4	ND									
	A6-4	ND									
B	E5-1	ND									
	C5-1	ND									

*NAM = Non Asbestos Material

Lab Name	Reservoirs Environmental, Inc	Client	CTL/Thompson, Inc. (Ft. Collins)	Analyzed By:	JO
Instrument	JEOL 100 CX (S)	Sample Type	Air	Analysis Date:	11/13/2017
Voltage	100KV	Volume (L)	1319	Prep Method:	Direct
Magnification	20000	Res Number	394341-1	Date Recvd.	11/13/2017
Primary Filter Area (mm2)	385	EM Number	1972097	Storage Loc.	November
Secondary Filter Area (mm2)		Sample ID	A-22	Scope Align.	11/13/2017
Grid Opening Area (mm2)	0.01	Method	CFR-763 (TEM AHERA)		

Grid	GO	Type	Count	Total	Length	Width	ID	MineralClass	Comments	Photo	EDS
A	E6-6	ND									
	F6-6	ND									
	G6-6	ND									
	H6-6	ND									
B	B4-6	ND									
	C4-6	ND									

*NAM = Non Asbestos Material

Lab Name	Reservoirs Environmental, Inc	Client	CTL/Thompson, Inc. (Ft. Collins)	Analyzed By:	JO
Instrument	JEOL 100 CX (S)	Sample Type	Air	Analysis Date:	11/13/2017
Voltage	100KV	Volume (L)	1313	Prep Method:	Direct
Magnification	20000	Res Number	394341-1	Date Recvd.	11/13/2017
Primary Filter Area (mm2)	385	EM Number	1972098	Storage Loc.	November
Secondary Filter Area (mm2)		Sample ID	A-23	Scope Align.	11/13/2017
Grid Opening Area (mm2)	0.01	Method	CFR-763 (TEM AHERA)		

Grid	GO	Type	Count	Total	Length	Width	ID	MineralClass	Comments	Photo	EDS
A	H6-1	ND									
	G6-1	ND									
	F6-1	ND									
	E6-1	ND									
B	F3-4	ND									
	E3-4	ND									

*NAM = Non Asbestos Material

Analytical Procedures – AHERA

Transmission electron microscopy/energy dispersive X-ray spectrometry/selected area electron diffraction (TEM/EDX/SAED) was employed in the analysis of the samples, which were collected on 25 mm mixed cellulose ester air filters. A portion of each filter was collapsed with acetone and etched in a plasma asher. The etched filter was then coated with a thin layer of carbon in a carbon side down. The sample was then placed inside a condensation washer and treated with acetone to remove the filter matrix and expose any inert material.

For each sample, enough grid openings on a 200 mesh TEM grid are analyzed to ensure an analytical sensitivity of at least 0.005 structures/cc. A minimum of four grid openings from two preparations are analyzed for each sample. The grid openings are searched for fibrous structures which, if present are analyzed by SAED and/or EDX (elemental analysis). The AHERA protocol requires SAED confirmation of enough chrysotile asbestos structures on each sample to cause the sample to exceed 70 structures/mm² (usually 4 or 5 structures). Both SAED and EDX confirmation are required of enough amphibole structures on each sample to cause the sample to exceed 70 structures/mm² (usually 4 or 5 structures) per sample. Either SAED or EDX is required for the remaining asbestos structures of either type. The morphology of each structure is determined and the length and the diameter of any asbestos structures are recorded. Asbestos fibers, bundles, cluster and matrices were identified and recorded. The asbestos structures have been defined in AHERA as follows:

- Fiber:** is a structure having a minimum length greater than or equal to 0.5 micron with an aspect ratio of 5:1 or greater with substantially parallel sides.
- Bundle:** is a structure composed of three or more fibers in parallel arrangement, with each fiber closer than the diameter of one fiber.
- Cluster:** is a structure with fibers in random arrangements such that all fibers are intermixed and no single fiber is isolated from the group.
- Matrix:** is a fiber or fibers with one end free and the other end embedded or hidden by a particulate. The exposed fiber end must meet the fiber definition given above.

If more than 50 asbestos structures are identified and confirmed on a sample, AHERA analysis may be terminated after completion of the grid opening, which contains the 50th structure. AHERA protocol requires the laboratory to reject any clearance sample which contains in excess of 25% total particulate loading or which appears to be unevenly loaded.

The AHERA protocol includes specific sampling requirements, including minimum numbers of samples and minimum air volumes. Specifically, the 70 structures/mm² clearance criteria is only allowed for sets five inside samples (collected in a group of 13 samples including: five outsides and three blanks) with volumes greater than 1200 liters (40 CFR Part 763, page 41894). Deviation from the AHERA sampling protocol may affect the validity of the analytical results. Analysis of samples collected by non-protocol methods are not accredited by NVLAP

Equations Used for Calculations

$$\text{Area Analyzed, mm}^2 = \# \text{ GO counted} \times \text{Average GO Area (mm)}$$

$$\text{Concentration, s/cc} = \frac{\# \text{ Asbestos Structures}}{\# \text{ GO Counted}} \times \frac{1}{\text{Volume (L)}} \times \frac{\text{Eff. Filter Area (mm}^2\text{)}}{\text{Average GO area (mm}^2\text{)}} \times \frac{1\text{L}}{1000\text{cc}}$$

$$\text{Filter loading, s/mm}^2 = \frac{\# \text{ Asbestos structures}}{\text{Area Analyzed (mm}^2\text{)}}$$

GO = TEM grid opening