Exhibit 11

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May 5, 2020

Mr. Michael Abrams
Lathrop GPM
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Re: EAA Project# 20-3225 -- Maxus Metropolitan, LLC / Bomasada BHM Construction, LLC

Opinions regarding the Sampling and Analysis Methods Used by Gallagher Bassett and the RJ Lee Group for the determination of fire related residues within perimeter wall cavities.

Dear Michael,

Per your request, I have been asked to provide my opinions regarding the fire residue sampling and analysis results and opinions provided within the Gallagher Bassett assessment report performed at the Metropolitan Apartments, 2700 7th Avenue South, in Birmingham Alabama. My opinions specifically address the limitations of the fire residue sampling procedures used by Gallagher Bassett, and the subsequent analysis results provided by the RJ Lee Group (RJLG) for samples collected inside of the wall cavities. My opinions are based on my own professional experience, industry accepted sampling and analysis procedures in place at the time of Gallagher Bassett assessment report, and to a reasonable degree scientific certainty. I reserve the right to modify my opinions based on any new evidence provided subsequent to the date of this report.

1.0 PROFESSIONAL BACKGROUND

Over the past 30 years I have performed several thousand indoor air quality and forensic environmental investigations in commercial, industrial, institutional, and residential dwellings. In 1976 I passed the board exam for a Criminalist while working as a technician in the Scientific Investigations Division (SID) Criminalistics laboratory at the Los Angeles Police Department. Based on my specialized expertise in the analysis of physical evidence, asbestos, and aerosols using Optical Microscopy and Electron Microscopy, I was selected in the mid 1980's by U.S. Environmental Protection Agency to serve on 3 different Select Panels for the development of asbestos sampling and analysis methods for both Optical and Electron Microscopy (PLM, SEM and TEM). These committees resulted in the EPA publishing standard methods for bulk sample analysis by Polarized Light Microscopy (EPA/600/R-93/116 – "*Test Method – Method for the*

Determination of Asbestos in Bulk Building Materials"), and airborne asbestos analysis using Transmission Electron Microscopy (EPA 560-5-89-001, May 1989 – "*Guidelines for Conducting the TEM Clearance Test to Determine Completion of an Asbestos Abatement Project: Final Report"*. I served as a technical reviewer for the Optical Microscopy mold spore analysis method given in Chapter 7 of the 2nd edition of the AIHA Field Guide for the Determination of Biological Contaminants in Environmental Samples, published in 2005. I am also one of several authors of the recently published 2018 "*AIHA Technical Guide for Wildfire Impact Assessments for the OEHS Professional[1]".*

I have also owned and/or managed several Analytical Microscopy and Chemistry laboratories that have been certified or accredited by the United States Environmental Protection Agency ("EPA"), American Industrial Hygiene Association, and/or the California Department of Health Services. I have conducted several thousand Indoor Air Quality investigations involving allegations of asbestos, dust, microbiological contamination, fire/combustion residue, or related aerosols and bioaerosols. I have extensive research experience (field and laboratory) in Micropaleontology, Sedimentology, and the measurement of the atmospheric settling behavior of airborne aerosols. My own personal analysis experience is directly relevant to this case. I have personally analyzed tens of thousands of surface and air samples for all types of particulate including fire residue using Optical Microscopy, Scanning Electron Microscopy, and Transmission Electron Microscopy.

My laboratory (Environmental Analysis Associates, Inc.) is currently AIHA-LAP accredited for the microscopic analysis of mold spores. The laboratory provides day-to-day microscopy analysis of environmental and building generated aerosols, fire/combustion residue, bioaerosols, and materials analysis. Over the past 5 years my laboratory has performed well over 30,000 Optical Microscopy, and Electron Microscopy analyses specifically for the assessment of wildfire and structure fire claims. I routinely provide consulting services regarding the interpretation and use of indoor air quality samples to building owners, health care facility managers, university environmental health and safety departments, and other environmental consultants. I own the patent on the design of the Air-O-Cell air sampling cassette manufactured by Zefon International. This device is the most widely used air impaction sampler in the United States and internationally for the analysis of airborne dust by Optical Microscopy and Scanning Electron Microscopy.

2.0 CASE DOCUMENT HISTORY

As of the date of this letter, the following documents provided by counsel summarize the foundation and basis for my opinions as an expert in this case.

Case documents and reports

a. 12/11/2019. Gallagher Bassett Technical Services. Assessment of Combustion Product Impact for Metropolitan Apartments.

b. 8/2/2019. WCD Group. Letter to Mr. Gregory B. Bynum, General Adjuster. WCD Project No.; 19-11836CL.

c. 10/3/2019 RJ Lee Group. Appendix B Wipe and Tape Sampling Results.

Daniel Baxter - Case Support References and Publications

a. CV of Daniel M. Baxter

b. EPA/600/R-93/116 – "*Test Method – Method for the Determination of Asbestos in Bulk Building Materials*".

c. EPA 560-5-89-001, May 1989 – "Guidelines for Conducting the TEM Clearance Test to Determine Completion of an Asbestos Abatement Project: Final Report*".*

d. Daniel Baxter, Alice Delia, Susan Evans, Brad Kovar. AIHA Technical Guide For Wildfire Impact Assessments. A Guide for the Occupational and Environmental Health and Safety Professional. American Industrial Hygiene Association, April 2018.

e. Alice Delia & Daniel Baxter: The ABC's of Wildfire Residue Contamination Testing – Post fire Assessments of the Indoor Environment. The Synergist Magazine, November 2017.

f. Brad Kovar & Ernest Crutcher: Wildfire Smoke Exposure: A Comparative Study Between Two Analytical Approaches: Particle Assemblage Analysis and Soot, Char, and Ash Analysis. August, 2016.

g. 2010 IESO / RIA Standard 6001, Evaluation of Heating, Ventilation and Air Conditioning (HVAC) Interior Surfaces to Determine the Presence of Fire-Related Particulate as a Result of a Fire in a Structure.

h. 2018 ASTM D6602 – 13 2018. Standard Practice for Sampling and Testing of Possible Carbon Black Fugitive Emissions or Other Environmental Particulate, or Both.

i. EPA/600/B-07/01. United States Environmental Protection Agency, "Guidance for Preparing Standard Operating Procedures (SOPs)", EPA QA/G-6.

j. AIHA-LAP Environmental Microbiology Laboratory accreditation certificate for Environmental Analysis Associates, Inc.

k. Patent – Versatile Airborne Particle Impaction Sampler. Patent # 5,693,895. December 2, 1997.

l. EPA 600/4-85-049 1985. Measuring Airborne Asbestos Following An Abatement Action.

m. May 1, 2020. Environmental Analysis Associates White Paper. "*The Analysis of Fire Residue Particles Using Optical Microscopy*. *An Overview of Method Advantages, Limitations, and Fire-related Particle Terminology".*

3.0 OVERVIEW OF THE APPROPRIATE USE OF OPTICAL AND ELECTRON MICROSCOPY SAMPLING AND ANALYSIS METHODS

As stated in the background section of this report, I am one of the authors of the 2018 AIHA Technical Guide. I was chosen to help write the microscopy sampling and analysis section of this document because of my 30 years of experience developing Optical Microscopy, Scanning Electron Microscopy (SEM), and Transmission Electron Microscopy (TEM) methods for a wide range of particulate materials. The analysis of dust samples (by any Microscopy method) is only as good as the representativeness of the sample collection media, sample preparation procedures, and subtle but critical limitations of the microscopic analysis method. The resulting analysis must provide an optimum background contrast so the analyst can easily see and distinguish individual particles that are not overlapping, and ensure particles have not been altered or selectively removed by the sample collection, preparation, or analysis process. Based on these criteria, the Transmission Electron Microscopy analysis results provided by the RJ Lee Group is inherently unreliable when specifically applied to the detection of aciniform soot particles generated in structure fires such as the Metropolitan building. The scientific foundation for this opinion is supported below.

In my opinion, Electron Microscopy (SEM and TEM) and dispersive X-ray analysis are very useful tools to differentiate corrosion, fugitive emissions, and other "non-carbonaceous" particle interferences from potential fire-related char and ash particles. Although the Transmission Electron Microscopic method is appropriate for the detection and analysis of aciniform "carbon black" (i.e. Method D6602 – 03b 2018. "*Standard Practice for Sampling and Testing of Possible Carbon Black Fugitive Emissions or Other Environmental Particulate, or Both*[5]"), the soot residues typically associated with indoor structure fires are not carbon black. Carbon black is composed of both non-soluble and non-volatile combustion particles that are the end result of complete high temperature combustion. Unlike carbon black, the aciniform soot particles generated during structure fires (as is the case in the Metropolitan building) are typically formed at lower temperatures and are comprised of semi-soluble and semi-volatile compounds that condense on surfaces that are colder than the heated air into which they have been lofted. Soot particle clusters in indoor fires are typically composed of aciniform or grape-like structures ranging in size from 1.0µm to 100µm. These clusters are comprised of very fine chains and agglomerates of individual carbon soot particles ranging in individual size from 0.01µm to 1.0µm. The larger (i.e. >20µm) aciniform soot clusters characteristic of an internal structure fire source are easily identified in situ on tape-lift samples using Optical Microscopy.

The limitations of using any form of Electron Microscopy (especially TEM) for fire residue analysis (soot, char, and ash) are found in three critical areas including 1). The sampling collection procedure, 2). Sample preparation, and 3). The actual TEM analysis procedure.

1. **Sample collection using "wipe" sampling media –** Using a cloth wipe to collect dust samples (e.g. the procedure performed by Gallagher Bassett) does not preserve the integrity of the larger aciniform soot clusters that are characteristic of indoor generated soot residues. The ASTM D 6602 – 13 TEM method used by the RJ Lee Group clearly states on page 9, Section 7.3.2, that aciniform soot particle clusters can be identified by Optical Microscopy from tape lift samples. "*Aciniform soot will appear as opaque, jet black aggregates of particles displaying a dull reflection in top light*". The same section also clearly states the limitations of the wipe sample method they used on this project "*The tape lift generally preserves the integrity of the particle aggregates without the smearing that tends to occur when using the wipe sampler*".

Although there are some advantages to using wipe sampling for specific applications, these advantages according to the AIHA Technical Guide only apply to "*Efficient for relatively smooth nonporous surfaces with low or heavy loading*", and for the "*Chemical analysis of organic compounds associated with wildfire residues (e.g. PAHs)*" "*Corrosivity analysis……*", and are "*Not appropriate for porous surfaces*" such as the sampling of oriented strand board (OSB) performed by Gallagher Bassett. The advantages and limitations are stated in detail on page 9 of the "*AIHA Technical Guided for Wildfire Impact Assessments*[1]". All of the limitations described in the "*Disadvantages of wet wipes*" sampling section cited on page 9 are shown below, and directly apply to the wipe sampling method employed by Gallagher Bassett.

"Disadvantages of wet wipes include:

- *Not appropriate for porous surfaces*
- *Not quantitative for particle analysis due to unknown release efficiency from sampling media*
- *Physical separation of particles collected as agglomerates often results*
- *Can leave traces of liquid agents behind, along with particles in the liquid agents*
- *Liquid agents may degrade or solubilize the particles, introducing sampling bias*
- *Alcohol can remove finishes (e.g. paint) affecting analytical results*
- *Can induce some damage to brittle particles, (i.e. change the appearance of fragile char and ash)*
- *Does not preserve positions of particles on original surface and the population per unit area.*
- *Limitation if agglomerate size and distribution over the collection surface is of interest"*

In other words, the sampling method chosen by Gallagher Bassett (wipe sampling) of OSB board (a porous surface), should never have been used in first place. This creates a second problem, especially for the analysis of aciniform soot particles as described below.

2. **TEM sample preparation procedures –** First of all, aciniform fire-related soot particle clusters generated by the combustion of organic fuels and plastics in indoor structure fires typically range in size from 3.0-100µm depending upon the type of material that burned, and the temperature of the fire. These aciniform clusters are composed of carbonaceous chains of individual sub-micron condensate particles. These condensed particle clusters are very fragile, potentially soluble, and easily dispersed in water or solvents (as described in the AIHA Technical Guide[1]).

   The only effective way to transfer the dust and residues impacted on a wipe sample to second substrate to be placed in the TEM (e.g. a copper grid), is to mechanically remove the sample from the wipe media. According the Gallagher Bassett report, RJ Lee used the ASTM Method D6602 – 13 2018. "*Standard Practice for Sampling and Testing of Possible Carbon Black Fugitive Emissions or Other Environmental Particulate, or Both*"[5]. The preparation procedures described in Sections 8.3.1 – 8.3.6 of the ASTM method require placing a cut section of the "wipe" sampling media in a liquid solvent solution (chloroform or acetone) and then ultrasonicating the sample until the dust it is fully dispersed in the solvent solution. This process not only dislodges the material from the wipe (as intended by the method), but also breaks up and dissolves an unknown quantity of the semi-soluble aciniform fire residues that were originally present on the wipe sample, thus making the original particle structure microscopically unrecognizable. Very small aliquots of this solvent

and particle suspension are then placed dropwise onto a TEM grid and placed directly into the TEM. In structure fire residues, this essentially means that only a very small and unknown fraction of the original sample actually remains for analysis. This unknown remaining sample fraction will only be representative of the material that survives being aggressively broken apart from the ultrasonication process, and being dissolved in a solvent such as acetone. In our experience, the remaining aciniform fraction will be very small and composed primarily of the non-structure fire related particles more likely associated with high temperature combustion, or with other outdoor resilient fugitive emission sources.

3. **TEM analysis procedures –** As described above, a lower unknown and altered percentage of non-soluble aciniform soot residue remains on the TEM grid used for analysis. The sample is now subjected to two additional modes of potential sample loss. The remaining semi-soluble and/or semi-volatile soot particles will evaporate (sublimate) under the low vacuum used to operate the TEM, or actually "burn" and volatilize when the electron beam is turned on. This means an even smaller fraction of recognizable soot particles will remain on the TEM copper grid (media) and potentially be visible (See pages 12-13 in the AIHA Technical Guide[1]). This is especially of concern because the TEM analysis performed by RJ Lee Group used an accelerating voltage or beam energy of 200kv (200,000 volts). All of the limitations described above are not a problem for the evaluation of carbon black or "non-volatile" soot particles as was intended in the ASTM 6602 - 13 TEM Method. Specific sections within the published ASTM test method clearly recommend and describe a staged analysis between Optical Microscopy (bright field, polarized light, and reflected light), Scanning Electron Microscopy, and Transmission Electron Microscopy. The TEM portion of the method is specifically designed to measure "carbon black", and differentiate it from other environmental aciniform carbon sources found within the remaining sample. Section 8.1.1, page 5, states "*This test method is a mandatory evaluation of the aciniform materials present in the sample to determine primarily if their morphology is consistent with grape-like or branch-like structures typically associated with carbon black and soots*".

   As described above, the ASTM 6602 – 13 (2018) method specifically states in Section 7.3.2 that tape lift samples should be examined to analyze for environmental particles using both "*polarized light microscope using both transmitted and reflected light*". Section 7.3.4 also provides for differentiation of the aciniform soot and to "*Estimate the percentage of each components from Table 3 and record. The identification of environmental particles and classification into categories by PLM has been published*". The *IESO / RIA Standard 6001, "Evaluation of Heating, Ventilation and Air Conditioning (HVAC) Interior Surfaces to Determine the Presence of Fire-Related Particulate as a Result of a Fire in a Structure"*[4] also relies on Optical Microscopy (using Optical Microscopy and specifically reflected light dark field imaging) as the primary analysis tool and not TEM. This method states in Section 9.6.1, page 16, "*If the optical microscopy methods used above are deemed by the analyst to be inconclusive with respect to the identification of agglomerated particles comprising the individual soot particles (e.g., extremely small particles of zinc from the galvanized duct surfaces can also appear black, non-magnetic and non-reflective), scanning electron microscopy (SEM) with energy dispersive spectroscopy (EDS) may be employed on the wipe samples*". Section 9.6.2. also states "*If the soot particles are suspected to be unrelated to the fire (e.g., combustion of diesel fuel, candles, oil, etc.) or carbon black, additional techniques* "other than optical microscopy, "*such as TEM or GC/MS may be used*. These analysis techniques are not part of this standard". It is important to note the RJ Lee Group has provided a summary table of Optical

Microscopy (PLM) dust results collected on tape-lift samples. However, the results do not include any categorization of fire related particles that might include soot, char, ash, or other fire indicator particles.

As stated above, the ASTM 6602–13 TEM sample preparation and analysis method (Section 8.1–8.3.6) uses chemical solvents, ultrasonication to break up aggregate particles, and a very low vacuum and an electron beam to analyzed the sample. Therefore, by definition the TEM method is specifically designed to only analyze aciniform carbon micro-structures (such as carbon black) that are non-soluble in chloroform or acetone, are not impacted by ultrasonication, or volatilized by the low vacuum or heat generated during the TEM analysis. As a result, both the sampling and TEM analysis methods used by Gallagher Bassett and the RJ Lee Group are inherently unreliable for the detection of condensed aciniform soot particles generated from structure fires.

According to industry accepted documents, the "primary" method for analyzing wildfire and structure fire residue particles (that are not carbon black) is Optical Microscopy (i.e. combined Bright Field, Polarized Light, and Reflected Light Dark Field). These methods are described in the AIHA Technical Guidelines[1] as indicated above, and also described in the IESO guidelines[4].

Example photos of wildfire soot, char, and ash particles using Optical Microscopy and SEM are given on page 10 of the AIHA Technical Guide[1] and shown below in Figure 1 (Figure 5 of the AIHA Technical Guide[1]).

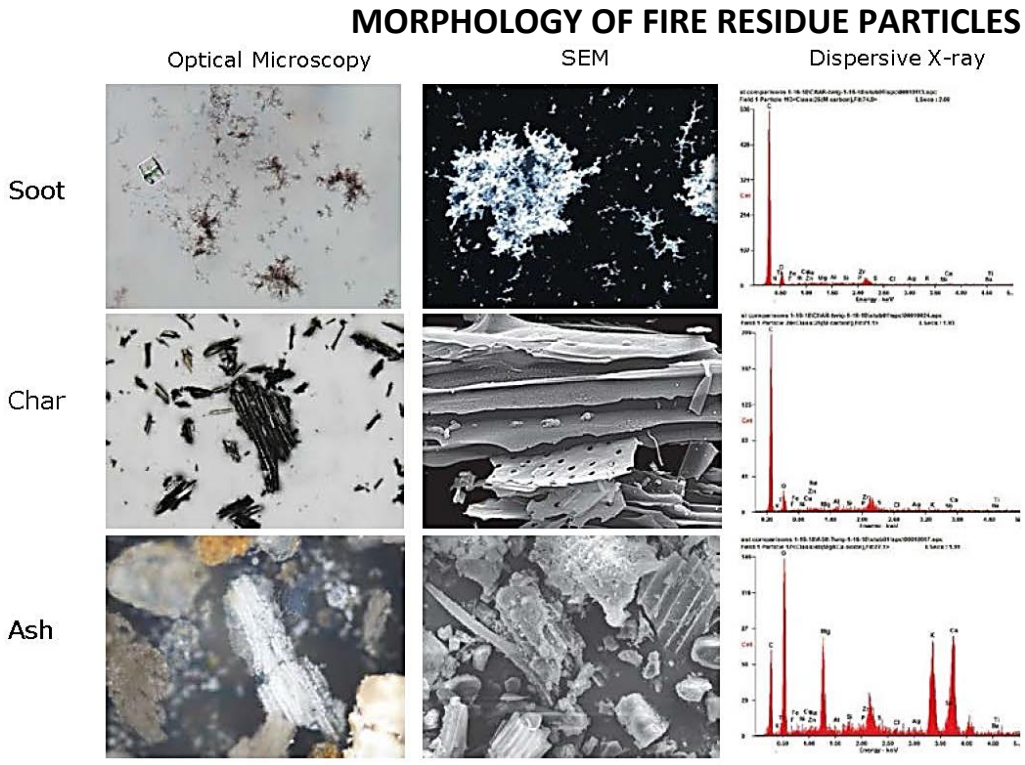


Figure 1 – Example of Optical Microscopy (Reflected Light/Dark Field), Scanning Electron Microscopy and Dispersive X-Ray Analysis of Wildfire Residue (Figure 5. AIHA Technical Guide[1]).

The pictures of soot, char, and ash, in these photos were collected on tape lift samples and illustrate the differences in particle morphology. The Optical Microscopy photo (Figure 1 – top and upper left-hand side, 200x) was taken at a magnification of 200x. This image clearly shows large aciniform soot clusters

characteristic of fire-related soot. The SEM "soot" photo (Figure 5 - top and center, 5,000x) also shows the aciniform clusters only after significant image enhancement. Finding soot in the background of other particles using SEM imaging becomes very difficult. The ash SEM photo (center and bottom) also shows the normal SEM image contrast typically found in a mixed dust sample.

As described above, the detection of aciniform soot particles in structure fires generate an entirely different distribution of soot, char, ash, and indicator particles. Because the heated plume of a structure fire is usually contained within the building envelope (such as the Metropolitan Building), the fuel based and heated organic compounds form aciniform soot condensates that can deposit as large (e.g. 10-100µm) clusters, or even larger spider web-like chains on cooler ceiling and wall surfaces within the structure. The depositional patterns generated by aciniform soot condensation are critical diagnostic indicators for an indoor fire, and can be readily observed when using an Optical Microscopy examination of tape lift samples collected directly from walls, ceilings, or contents. These diagnostic in situ deposition patterns can never be observed when samples are collected on wipe samples, and/or analyzed by any other indirect sampling or analysis method such as the ASTM D6602 TEM method used by the RJ Lee Group. Example micrographs taken by EAA of these in situ indicator conditions as analyzed by Bright Field Optical Microscopy are shown below in Figures 2 and 3.

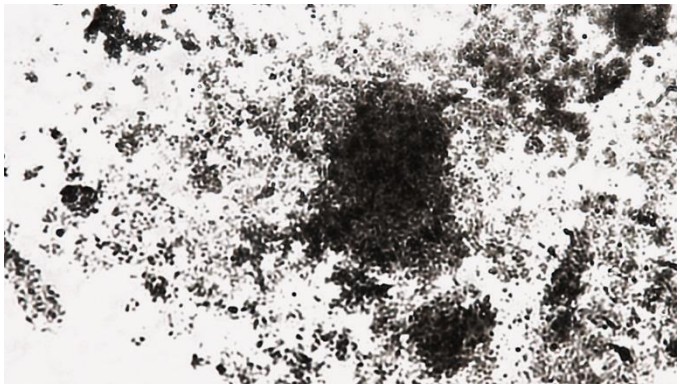


Figure 2. Structure fire soot clusters ~ 600x

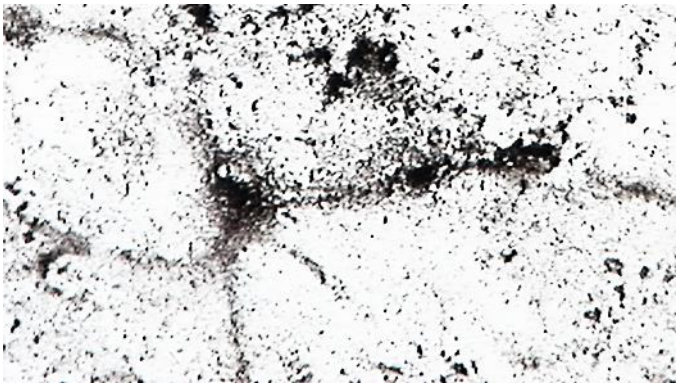


Figure 3. Structure fire soot spider web-like chains ~ 600x

Example Optical Microscopy photographs collected on a tape-lift sample from interior wall cavities in a structure fire (not from this project), and also analyzed by Environmental Analysis are shown below in Figures 4 and 5. This sample was determined by Environmental Analysis Associates, Inc. to contain high area ratio percentages of fire residue particles.

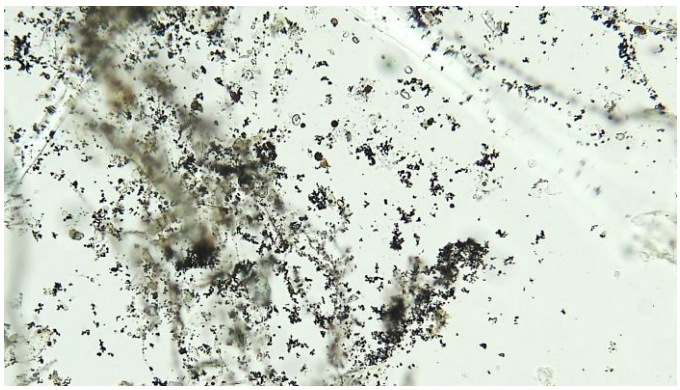


Figure 4. Example photo 1 – Wall cavity - Aciniform soot particles, Bright Field Transmitted Light Microscopy - 200x

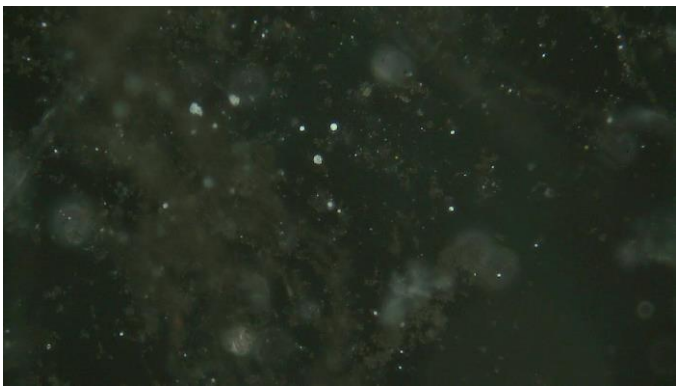


Figure 5. Example photo 2 – Wall cavity -Aciniform soot particles, Reflected Light/Dark Field Microscopy – 200x

Figure 4 (Example photo 1) shows a high concentration of aciniform soot clusters within a matrix of other carbonaceous biological debris. The soot clusters are easily visible using Optical Microscopy (Transmitted Light) at a magnification of 200x. Figure 5 (Example photo 2) is the exact same field-of-view showing the use of Reflected Light Dark Field Microscopy. Black carbon and combustion soot particles have a high opacity when observed in transmitted light (Figure 4) and a very low reflectivity when using Reflected Light Dark Field Microscopy (Figure 5). Optical Microscopy (when employing a wide range of illumination modes) can be used to rapidly and simultaneously switch back and forth in these illumination modes to rapidly identify and quantify particles including aciniform soot clusters. As a result, carbon soot (based on its optical properties and morphology alone) can be differentiated from other particles by absence of light reflectivity and/or their surface color and texture in reflected light. In other words, the "invisibility" of carbon particles using reflected light (as seen in Figure 3) is another identifying characteristic or analytical property of carbon soot and other diffuse carbon particles. Other similar appearing particles of different composition such as iron oxide or paint would still be visible and appear colored or white if present. As can be observed, there are several spherical (white) particles visible in Figure 5 that are consistent with paint.

4.0 OPINIONS ON THE SAMPLING METHODS USED BY GALLAGER BASSETT AND THE RJ LEE GROUP

As described above, there are industry accepted Optical Microscopy methods for the analysis of fire related combustion dust, asbestos, and mold. The most current and definitive methods for the characterization of fire related combustion materials (including aciniform soot, Char, Ash, and indicator particles) are provided in the April, 2018 AIHA *Technical Guide for Wildfire Impact Assessments for the OEHS Professional*[1]". Gallagher Bassett and the RJ Lee Group are apparently relying on the "*ASTM Method D6602 – 13 method "Standard Practice for Sampling and Testing of Possible Carbon Black Fugitive Emissions or Other Environmental Particulate, or Both*[5]*"* as the sole basis of their combustion definitions and testing procedures. The ASTM TEM testing method and its' fire-related particle definitions are inadequate for the accurate classification of structure fire related particles.

The AIHA document goes into detail on the limitations of sampling and analysis methods for the assessment of wildfire combustion residues. These limitations are directly applicable to structure fires which produce lower temperature aciniform soot and other combustion byproducts that are not carbon black. As previously described, the ASTM D6602 method used by the RJ Lee Group is specifically directed at the determination of carbon black, or materials that would have similar resilient properties. The aciniform soot clusters generated in wildfires and structure fires (as in the case in the Metropolitan building) do not have these same resilient properties. The limitations of using the ASTM D6602 TEM analysis method are discussed in Section 7.3.2, in more detail on pages 8-10 of the April, 2018 AIHA *Technical Guide*[1], and are also summarized below.

First of all, Gallagher Bassett has chosen a sample collection method (wipe media as specified by the ASTM method) that is non-quantitative and inappropriate to measure the impact of "aciniform soot" deposition from a structure fire. When "large" aciniform soot cluster aggregates are present, they are direct indicators of a structure fire. They are easily visible using Optical Microscopy when collected from the intact surface using tape lift sampling. These soot particles can also be non-resilient (e.g. fragile, semi-

soluble, and semi-volatile). These limitations are directly addressed in the ASTM D6602-13 method in Section 7.3.2 used by RJ Lee Group "*The tape lift generally preserves the integrity of the particle aggregates without the smearing that tends to occur when using the wipe sampler*". The industry accepted sampling method for the representative collection of particulate fire combustion residues for microscopic evaluation is tape lift or vacuum dust sampling. Wipe sampling is primarily used for collection and subsequent extraction of organic chemicals, or for the specific disaggregation and analysis of sub-micron carbon black). These limitations as they apply the analysis of aciniform soot found in structure fires are discussed below in items 2 and 3 on page 11.

Second, the locations of collected fire-related dust samples are only accurate if they address the entry route, and the most likely locations where aciniform carbonaceous soot is likely to condense. Because this fire originated inside the building, there are only specific locations where surfacing sampling would be representative of infiltration into the exterior perimeter wall cavities. In my opinion, and based on my background conducting both field inspections and subsequent laboratory analysis, the appropriate sampling locations are determined by the following facts and conditions:

1. Aciniform soot can migrate into wall cavities when the interior spaces become pressurized and/or significant heated as in the case of this structure fire.

2. The fine aciniform soot materials will typically migrate through penetrations such as wall outlets, switch plates, can lighting, or anywhere there is an unsealed penetration.

3. Once the heated air mass enters the wall cavity, semi-volatile particles will condense on the cooler surfaces they first come in contact with.

4. Based on the sampled locations given in the Gallagher Bassett report shown in *Appendix 2, "Photographs of Sampled Locations"*, the locations with the highest potential fire residue deposition and contamination are the fiberglass wall insulation facing the interior of each room, or interior drywall, and not on the OSB (oriented strand board) on the exterior perimeter wall where Gallagher Bassett collected both their wipe and tape lift samples.

According to Gallagher Bassett report and photos 1-20 shown in Appendix 2, the wipe samples were collected from the OSB board on the "exterior" side of the perimeter wall and not the interior cavity-side of the fiberglass insulation or around interior penetrations where the soot-forming fuels would likely condense. As a result, their sampled locations did not accurately represent the highest potential for wall cavity contamination.

The Gallagher Bassett report, states on page 7 "*Typically, soot deposits will manifest as black darkening on a white cloth wipe test conducted herein. Construction dust and dirt will tend to display brownish discoloration*". Based on this assumption, they conclude "*The majority of sample media revealed brownish to reddish discoloration, which was not suggestive of impact from a fire*". In some circumstances this assumption is true, however, this opinion is only correct when the surfaces being sampled are not the source of "colored" residues or debris. Based on my own experience and examination of hundreds of OSB materials and other weathered or water-impacted wood surfaces, wipe samples from these surfaces

routinely leave a brown and/or reddish tint on a white cloth wipe from the tannins that are leaching from the wood fibers. This condition obscures and alters the coloration observed on the wipe making the color of the discoloration an unreliable indicator for the presence of fire-related debris. As a result, assuming this coloration has a unique identifying characteristic or quantitative meaning as "*not suggestive of impact from a fire*" is misleading and inaccurate.

The accuracy of any Microscopy Analysis requires the sampling method to representatively transfer the dust from the sampled surface to the analysis media while simultaneously preventing samples loss, preserving the particle integrity, and maintaining the spatial distribution of the sample. These important criteria are discussed in the April, 2018, the American Industrial Hygiene Association published the *Technical Guide for Wildfire Impact Assessments*[1]. Another document that prescribes Optical Microscopy as a primary method is the IESO / RIA Standard 6001, *"Evaluation of Heating, Ventilation and Air Conditioning (HVAC) Interior Surfaces to Determine the Presence of Fire-Related Particulate as a Result of a Fire in a Structure*[4]*"*. This document describes optical microscopy as being the primary method for fire residue analysis, and specifies the combined use of bright field, reflected light dark field, and polarized light microscopy. These industry accepted procedures were not utilized by the RJ Lee Group on this assessment.

There are four (4) major flaws with the wall cavity sampling performed by Gallagher Bassett. In my opinion, these flaws have precluded the RJ Lee Group from being able to determine the presence or absence of aciniform soot contamination within the perimeter wall cavities. My opinions are supported by the following:

1. First, and as described above in page 10, the locations of the collected wall cavities samples were on the exterior OSB board and are not representative of the most likely locations where potential soot would be deposited and subsequently identified.

2. Second, the accepted quantitative method for the analysis of fire related debris (soot, char, ash, and other indicator particles) is Optical Microscopy. An accurate analysis specifically requires the use of bright field, polarized light, and reflected light dark field imaging. This requirement is covered in the AIHA Technical Guide[1] (pages 11-12), the ASTM D6602-13 method[5] (Section 7.3.2 – 7.3.4 on pages 4-5), and in the 2010 IESO / RIA Standard 6001 method[4], Section 9, pages 14-16.

3. Third, the statement given on page 7 of the Gallagher Bassett report that "*char, is the primary indicator for impact from a fire, in any location*" is simply not true as it applies to structure fires. All fires produce particles characterized as soot, char, and ash. Wildfires produce a wide range of fire-related materials including aciniform soot, char, ash, and "indicator" particles specific to each type of fire, and what material actually was consumed in the fire. In structures fires (including the Metropolitan building), the most common fire-generated material found depositing on surfaces is aciniform soot. Soot residues from a structure fire typically "condense" on surfaces as larger 5-100µm chains and clusters. As stated above, these soot chains and clusters are easily observed using Optical Microscopy. The only Optical Microscopy results provided by the RJ Lee Group is a summary table of "*Tape Lift – Light Microscopy Observations*" provided on pages 6-7 of the RJ Lee

report. There is no category or listing of classifications for fire-related particles within this table. On page 5, the RJ Lee Group states they used "*stereo-optical reflected light microscopy, reflected light microscopy and transmitted light microscopy techniques*". It is unclear if the RJ Lee Group intended "*Table 1. Summary of Microscopy Evaluations*" to represent a complete Optical Microscopy laboratory report to include aciniform soot or not. Furthermore, the RJ Lee Optical Microscopy analysis referenced on page 5 "*Stereo-optical and PLM Analysis*" does not reference the use of Dark Field Reflected Light Microscopy which as stated above, is critical for a proper analysis of fire-related particles.

4. Fourth, and as described above, the most common type of fire-related particle associated with indoor structure fires is aciniform soot. Aciniform soot particles are also the most likely fire related particles to actually penetrate into wall cavities (and not the larger char particles). The larger aciniform soot clusters typically associated with indoor structure fires are easily identified (from direct surface tape-lift samples) when using Optical Microscopy. The potential chemical solubility and physical resiliency of structure fire soot particles is much lower than "carbon black", thereby making their detection with Transmission Electron Microscopy (TEM) inherently unreliable. These limitations are discussed below in Section 5.0.

5.0 SPECIFIC OPINIONS REGARDING THE FIRE ANALYSIS RESULTS PROVIDED BY THE RJ LEE GROUP

As stated above, the only reference for the apparent use of Optical Microscopy in the entire Gallagher Bassett report is given on page 7. This document states that "*Polarized light microscopy analysis did not reveal the presence of char, the primary indicator for impact from a fire, in any location*". This statement is simply incorrect and demonstrates Gallagher Bassett has a fundamental lack of knowledge of the combustion by-products that infiltrate into buildings from wildfires, and the particulates / and semi-volatile compounds that condense and are deposited on interior surfaces during a structure fire. Char and ash are the primary particles that infiltrate structures from burning vegetation, or are part of the burned particulate residues remaining from the combustion of building materials (cellulose, plastics, metals, fabrics, etc.) inside of a structure. The definition for "char" used in the ASTM D6602 method on page 2, Section 3.1.5, "*char – a particulate larger than 1µm made by incomplete combustion which may not deagglomerate or disperse by ordinary techniques, may contain material which is not black, and may contain some of the original material's cell structure, minerals, ash, cinders, and so forth."* is inappropriate as applied to structure fire residues. The definition is based on the residual particles larger than 1µm that are not destroyed by the sampling and TEM preparation and analysis procedures that have the specific goal of comparing the remaining residual "disaggregated" fraction to carbon black.

This inaccurate assumption (given on page 7) that char is the primary particle or residue generated during a structure fire (or *any location*) also brings into question how the Optical Microscopy data provided by the RJ Lee Group was viewed or utilized by Gallagher Bassett. Although the RJ Lee Group did provide a summary table of samples analyzed by Optical Microscopy, no laboratory reports or certificates of analysis were provided. This statement also brings into question whether or not the RJ Lee Group actually looked for presence or absence of any aciniform soot clusters in their Optical Microscopy analysis. The only way

to clarify this issue is by reviewing the fire particle analysis Standard Operating Procedure (SOP) used by the RJ Lee Group.

As stated above, the limitations of using TEM as a primary technique for the analysis of aciniform soot particles in wildfire are described in detail on pages 7-9 of the AIHA Technical Guide[1]. These limitations become even more problematic when attempting to analyze the lower temperature soot particles found in structure fires. Based the sampling and analysis methods used by Gallagher Bassett and the RJ Lee Group, have created a significant negative bias for the detection of aciniform soot within the Metropolitan building. The advantages and limitations of these procedures are also discussed on pages 28-29 in the AIHA Synergist magazine November 2017 article entitled "*The ABCs of Wildfire Residue Contamination Testing*[2]". Tape-lift and micro-vacuum samples are best suited for this task. The serious limitations of using "wipe" sampling (as employed by Gallagher Bassett) is also described in both of the above referenced publications.

The main combustion fuel sources in a wildfire is the cellulose vegetation, and the small aciniform soot particles that are generated from the resins and organic compounds found in the vegetation, are volatilized in the crown of the fire. Structure fires are entirely different. Although particles generated in a structure fire are determined by the type of materials that burn, in our experience, the main fire component is a lower temperature smoldering aciniform "soot" that is trapped within the building envelope and condenses onto the cooler surfaces within the structure. The heavier char and ash particles generated in a structure fire end up settling on the horizontal surfaces. As mentioned above, it is unclear if the RJ Lee Group actually produced an industry recognized Optical microscopy-based report, or if this reference in the Gallagher Bassett report on page 7 is just commentary.

The RJ Lee Group has assumed the published ASTM 6602-13 TEM method used for the analysis of carbon black will be suitable for all fire-related analyses, which is simply not true. The problems regarding using this TEM assessment method as a tool for the analysis of aciniform soot particles in general (wildfire and structure fire) are not readily obvious. Some TEM laboratories (including the RJ Lee Group) are simply unaware of the limitations (as described above), and until they have actually performed sublimation and solubility tests on various "structure fire" residues, and directly compared the Optical Microscopy results with Electron Microscopy, the limitations are not fully understood. The limitations of these procedures as employed by the RJ Lee Group are described below:

1. As described above in Section 3.0, the sample preparation procedures used by the RJ Lee Group (ASTM Method 6602 - 13) requires multiple destructive procedures to complete the transfer of dust collected on the "wipe" sample to the TEM sample grid placed into the TEM.

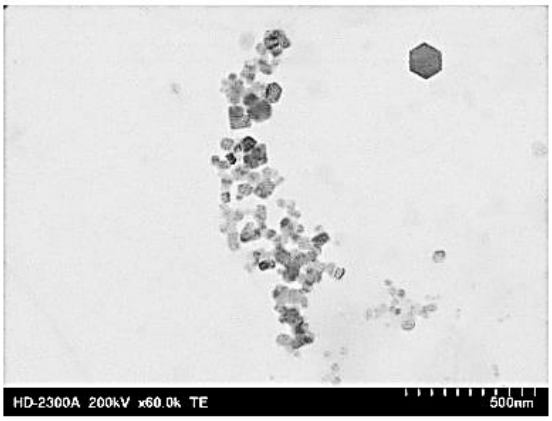
2. The TEM analysis requires placing the sample under vacuum and potentially "sublimating" or evaporating an additionally unknown fraction of the sample.

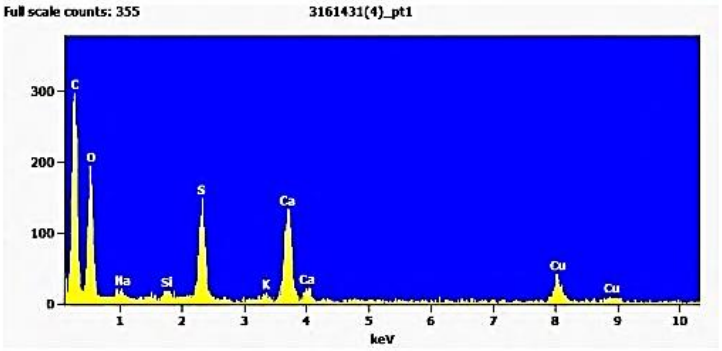
3. RJ Lee Group used an unusually high energy electron beam 200kv (i.e. 200,000 volts) in the analysis of their samples. Even the TEM analysis of asbestos fibers, a highly resilient particle, is performed with a lower beam energy of 100kv (i.e. 100,000 volts). In my own experience, beam energies (SEM or TEM) above ~15kv (15,000 volts) will also cause significant "burning" or evaporation of any remaining "semi-volatile" soot particles.

4. As a result, only the non-soluble and high temperature generated soot particles (similar to carbon black) will be remaining in the sample. This remaining aciniform soot-like fraction is more likely to be representative of other exterior and more stable pollution sources, and not building generated fire residues.

5. In my opinion, the RJ Lee Group and Gallagher Bassett have mis-interpreted their own data. Appendix B shows a significant number of "aciniform" particle samples that they claim to be non-structure fire soot particles that are unrelated to interior fire sources. In my opinion, and based on over 30 years of experience analyzing thousands of aerosols and fire-related samples by Optical Microscopy, SEM and TEM; samples W1, W2, W3, and W4 for example, are all consistent with interior construction-related contamination (i.e. a Calcium sulfate "drywall" chemistry) likely generated during the wall cavity sampling procedures performed by Gallagher Bassett. The aciniform-like morphology represented in Sample W-6 (and a significant number of the other micrographs provided by the RJ Lee Group) are typical for heated or solubilized Calcium sulfate (i.e. gypsum/drywall dust).

   The aciniform-like structure represented in sample W-6 is more likely an artifact of agglomerated drywall dust that has been subjected to re-crystallization from water or solvents (such as acetone) used in the TEM sample preparation process. Micrographs taken from sample W6 Unit 330 (RJLG No. 3161431) on page 91 shows the aciniform and hexagonal crystal micro-structure at 60,000x. The morphology and elemental chemistry (i.e. Calcium sulfate) is consistent with indoor drywall dust contamination subjected to surface "carbonization". In my opinion, it is not an exterior fugitive emission source, nor does it represent soot from an indoor fire.





**S/Ca with K and Na

Page 91 - W6: 60,000 x - Unit 330 (RJLG No. 3161431)

Photo A (provided by EAA below) is a Scanning Electron Microscopy micrograph taken at 4,000x. This micrograph shows the similar hexagonal crystal micro-structure (as RJLG – W6) collected from US Gypsum (Red label) drywall board that has been sonicated in water and then evaporated and re-crystallized. This morphological artifact condition is similar to the particle morphology produced by the TEM wipe sampling procedure used by RJ Lee Group.

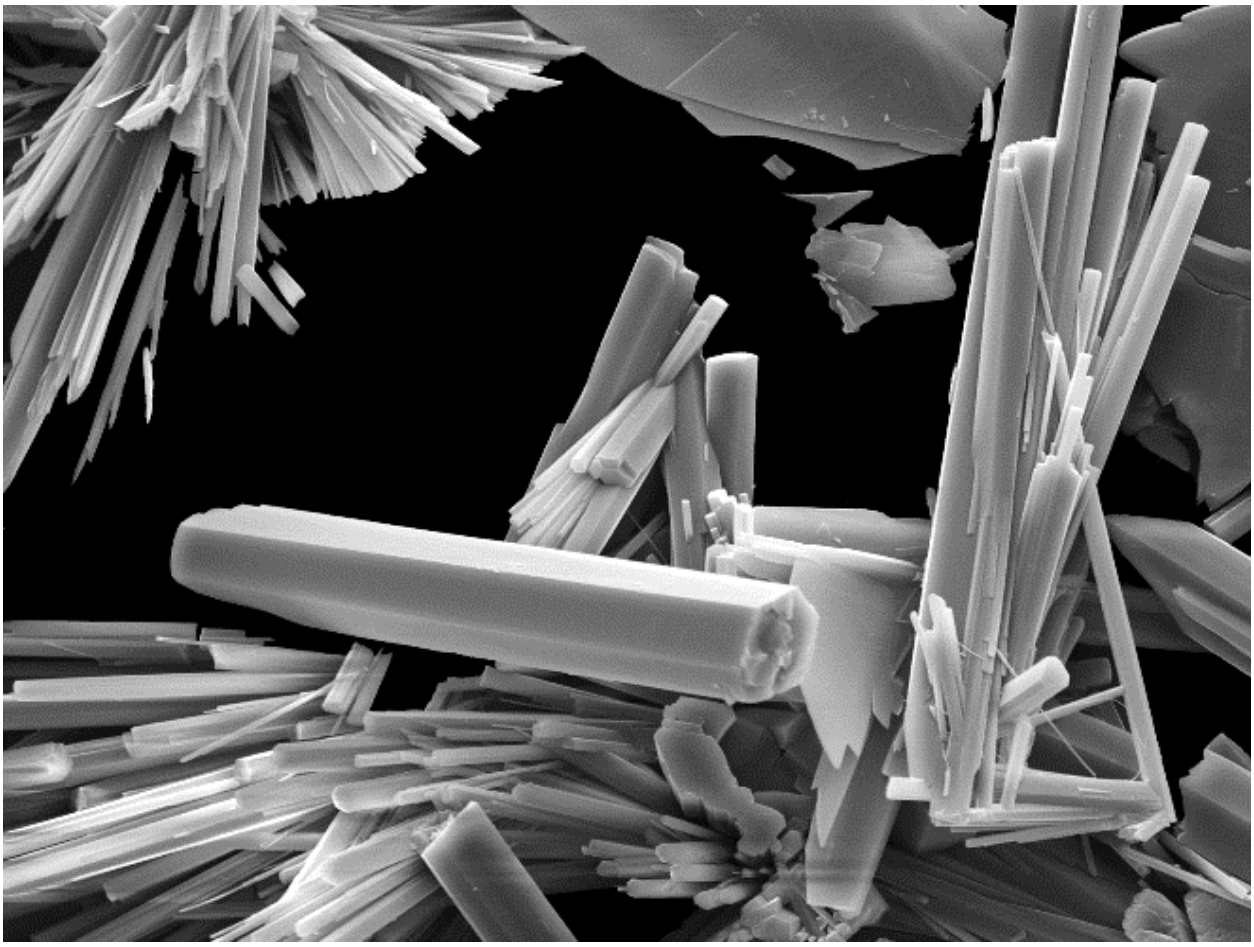


Photo A – ~4,000x - EAA Scanning Electron Microscopy (SEM) example of re-crystallized US Gypsum (red label) drywall dust evaporated from a water solution.

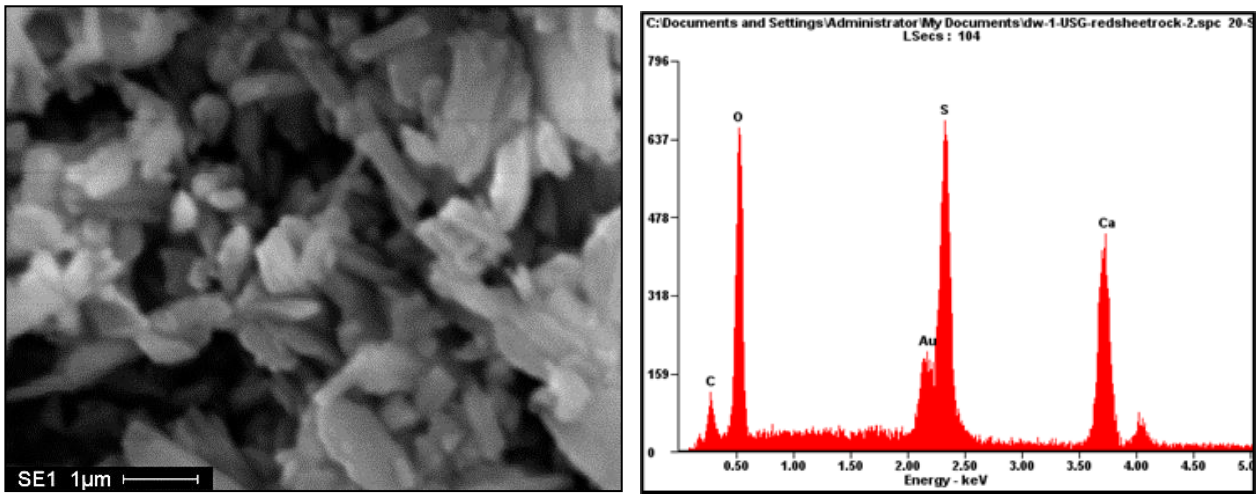
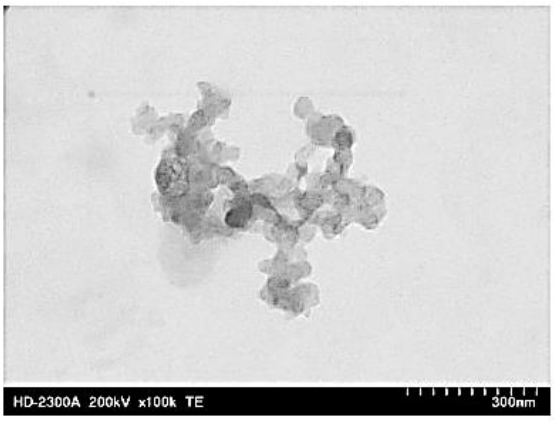
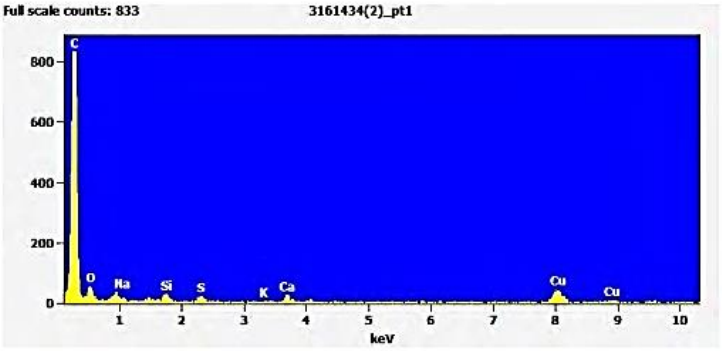


Photo B - ~10,000 x - EAA SEM / EDAX example of US Gypsum Green board (drywall)

Photo B and the accompanying dispersive X-ray spectra shows the Calcium Sulfate composition of the same US Gypsum (green label) drywall dust. The composition of the US Gypsum drywall dust is consistent with the elemental composition shown in Sample W-6 provided by the RJ Lee Group.





**S/Ca with K and Na

Sample W-7 Unit 306 (RJLG No. 3161434) is more consistent with a carbonaceous "aciniform soot" micro-cluster with minor peaks of Sodium, Silicon, Sulfur, and Calcium. The origin of this sample is consistent with a mixed aciniform carbon soot and Calcium silicate and Calcium sulfate (drywall) construction dust contamination. The actual origin of this aciniform carbon particle cannot be determined (because of the destructive sampling, preparation, and analysis procedures used) and could potentially come from an indoor structure fire or an exterior pollution source. The ratios of Sodium (Na), Silicon (Si), Sulfur (S), and Calcium (Ca) in all of the RJ Lee Group example micrographs and X-ray spectra are more consistent with an indoor contamination source from the construction materials (drywall dust) commonly generated when disturbing wall cavity surfaces.

6.0 CONCLUSIONS

The locations sampled, the sample collection methods, and the analysis procedures employed by Gallagher Bassett and the RJ Lee Group (TEM analysis) have selectively limited their ability to detect the structure fire-related soot particles that may have infiltrated into wall cavities from the structure fire at the Metropolitan building. There are 4 major flaws that make the analytical results and opinions regarding the presence or absence of fire related debris inside perimeter wall cavities inherently unreliable.

1. **Gallagher Bassett collected their wipe and tape lift samples inside the wall cavities on the exterior OSB on the perimeter wall.** This is the least-likely location where aciniform soot particles from an interior fire would have been deposited. Representative sampling locations should have included the back of switch or electrical outlets cover plates, or fiberglass insulation in close proximity to wall penetrations on the interior side of the wall cavity. As a result, the locations sampled are not representative and are unreliable for the detection of soot penetration and deposition within the perimeter wall cavities.

2. **Wipe sampling and not tape lift sampling was used as the primary sampling method to evaluate the presence or absence of aciniform soot deposition in the building.** This procedure is

significantly flawed and seriously limited the ability of the RJ Lee Group to confirm either the presence or the absence of any surface contamination.

3. **Transmission Electron Microscopy and not Optical Microscopy was used by the RJ Lee Group as the primary analysis method to detect aciniform soot particles.** The advantages and limitations of each method microscopy method are clearly stated in the AIHA Technical Guide[1]. The use of Transmission Electron Microscopy (TEM) for the analysis of structure fire residues is inherently unreliable because the aciniform soot particles are less resilient than those particles for which the ASTM 6602 TEM Method was originally intended (e.g. carbon black). The large and non-resilient aciniform soot clusters characteristic of condensed indoor fire residues, and not indicative of exterior infiltration, are easily identified by Optical Microscopy alone. These same aciniform structures were likely destroyed by sampling and analysis procedures employed by Gallagher Bassett and the RJ Lee Group. Although the TEM analysis procedure used by the RJ Lee Group has the theoretical image resolution to analyze small resilient aciniform soot particles such as carbon black, the destructive nature of both the preparation and analysis procedure is overkill and severely inhibits the ability to reliably detect the non-resilient aciniform soot particles typically associated with a structure fire.

   In other words. ***If all you have is a sledge hammer, everything still looks like a nail, and you break the nail in the process.***

4. **This propensity to over-analyze the samples by using more complex methods than necessary or appropriate, also holds true for the fractal analysis performed by Andrew Havics (Appendix 4 of the Gallagher Bassett report).** As discussed above, the TEM analysis and the fractal analysis procedure was performed on the remaining resilient aciniform-like particles that were present after the destructive TEM sample preparation process. A large effort went into trying to apply a fractal image and shape analysis procedure on the remaining dust fraction that was placed in acetone or another solvent, ultra-sonicated to disaggregated the sample, and then re-deposited through evaporation onto a copper "grid" for analysis in the TEM. The presence, absence, shape, and morphology of the remaining particles likely have nothing to do with the morphology, shape, or composition of the condensed soot clusters or chains that may have originally been deposited on surfaces as direct result of the structure fire. The use of fractal analysis is a highly useful tool as long as it is providing an analysis of the original integrity of the sample in the first place (which it this case, it does not).

In conclusion, the sampling locations and collection methods used by Gallagher Bassett, and the analysis procedures used by the RJ Lee Group, have ensured they are unlikely to detect any aciniform soot particles related to the Metropolitan structure fire (even if they were present). In the best case, they will under-report the combustion soot particles they are supposedly analyzing. In my opinion, there is no way to know (based on the sampling design and analysis methods used by the RJ Lee Group) if significant fire-related aciniform soot contamination (from the fire event) was present or absent within the sampled wall cavities. As result, the conclusions reported by Gallagher Bassett are both inconclusive and inherently unreliable.

If you have any questions regarding my response, please contact me and 858-272-7747.

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President

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