EXECUTIVE SUMMARY

Mr. Michael Wachob of Safeco Insurance retained Clark Seif Clark, Inc. (CSC) to perform a limited wildfire smoke assessment at the property located at California (referred to hereunder as “Subject Property”). The main objective of this investigation was to determine the presence or absence and concentration of particulates including soot, char, ash, and burned debris that can be associated with wildfires. On June 01, 2018, Mr. Ryan Terwilliger, CAC of CSC, conducted the on-site assessment of the Subject Property.

The scope of this investigation included a visual inspection of the subject property, digital photography of key observations, non-destructive surface sample collection, laboratory analysis of samples, and production of this written report of findings, conclusions, and recommendations.

The Tubbs (Central LNU Complex Fire) started as a vegetation fire on October 8, 2017 at 9:45 pm off Hwy 128 and Bennett Lane in Calistoga, Napa and Sonoma Counties; the fire was contained on October 18, 2017. The fire burned 110,720 acres of central oak woodland, redwood forests, valley grasslands and vineyards, destroyed 6,957 structures and damaged 486 more. It burned approximately up to the subject property. CSC observed burned homes in the immediate neighborhood.

CSC collected dust samples of suspect wildfire debris from windowsills and tracks, surfaces inside the home, heating ventilation and air-conditioning (HVAC) system, surfaces in the attic, and surfaces outside the home. In addition, CSC observed the physical condition of the surrounding grounds of the home for evidence of ash and other wildfire remnants.

Visual observation revealed evidence of potential wildfire particulates on the exterior surfaces of the home. Specifically, the roof has suspect wildfire residue, roof eaves have visible holes and dark spots, burnt shrubbery and trees.

The laboratory particulate identification analysis of the submitted samples revealed the following:

- 5% char, and no ash or soot was detected on interior windowsills and tracks.
- Less than 1% char, and no ash or soot was detected on the interior soft contents.
- Less than 1% char, and no ash or soot was detected on interior finishes and contents.
- Less than 1% char, and no ash or soot was detected on the HVAC system.
- 5% char, and less than 1% ash and soot was detected in the attic space.
- 80% char, less than 1% soot and no ash was detected on the exterior surfaces.

The soot, char, and ash concentrations in the samples collected from the property meet CSC’s criteria for specialty cleaning in the following areas:

- Windowsills and tracks.
- Attic space.
- Exterior of the subject property.

The soot, char, and ash concentrations in the samples collected from the property did not meet CSC’s criteria for specialty cleaning in the following areas:

- Interior of the subject property.
- HVAC system.
# Table of Contents

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 PROJECT TITLE PAGE</td>
<td>4</td>
</tr>
<tr>
<td>2.0 GENERAL</td>
<td>5</td>
</tr>
<tr>
<td>2.1 Introduction</td>
<td>5</td>
</tr>
<tr>
<td>2.2 Authorization</td>
<td>5</td>
</tr>
<tr>
<td>2.3 Purpose &amp; Scope</td>
<td>5</td>
</tr>
<tr>
<td>2.4 Site Description</td>
<td>5</td>
</tr>
<tr>
<td>2.5 Site Background</td>
<td>6</td>
</tr>
<tr>
<td>2.6 Wildfire Smoke Background</td>
<td>6</td>
</tr>
<tr>
<td>3.0 LABORATORY</td>
<td>6</td>
</tr>
<tr>
<td>4.0 ANALYTICAL METHODS</td>
<td>6</td>
</tr>
<tr>
<td>5.0 SITE OBSERVATIONS</td>
<td>7</td>
</tr>
<tr>
<td>6.0 METHODOLOGIES AND RESULTS</td>
<td>8</td>
</tr>
<tr>
<td>6.1 &quot;Micro-Vacuum&quot; Bulk Dust Samples</td>
<td>8</td>
</tr>
<tr>
<td>6.2 Alcohol Wipe Surface Samples</td>
<td>8</td>
</tr>
<tr>
<td>6.3 Results</td>
<td>8</td>
</tr>
<tr>
<td>7.0 CONCLUSIONS</td>
<td>9</td>
</tr>
<tr>
<td>8.0 RECOMMENDATIONS</td>
<td>10</td>
</tr>
<tr>
<td>9.0 LIMITATIONS</td>
<td>10</td>
</tr>
</tbody>
</table>

## Appendices

- Appendix A: Site Photographs
- Appendix B: Laboratory Analytical Results and Chain of Custody
1.0 PROJECT TITLE PAGE

Project Name: Daciana Iancu Residence

Project Address: 3735 Coffey Lane
Santa Rosa, CA 95403

Client: Safeco Insurance

Contact: Mr. Michael Wachob

Claim No.: 8005 9707 6002

CSC Project Number: 1027042

CSC Project Manager: Franco A. Seif
Phone No.: 818-727-2553
Email: fseif@csceng.com

CSC Project Technician: Ryan Terwilliger
Phone No.: 818-727-2553

Site Visit Date: June 01, 2018
2.0 GENERAL

2.1 Introduction

2.2 Authorization

2.3 Purpose & Scope

The main objective of this investigation was to determine the presence or absence of smoke particulates including soot, char, ash, and burned debris reportedly caused by the wildfire event and, if present, attempt to quantify the concentration of particle deposits.

The scope of this investigation included a visual inspection of the Subject Property, digital photography of key observations, non-destructive surface sample collection, laboratory analysis of samples, and production of this written report of findings, conclusions, and recommendations.

This report is a record of the activities performed by CSC at the Subject Property to date and has been developed as a means of conveying the results, opinions, and recommendations to our Client. The issuance of this letter does not indicate the termination of work at the Subject Property. Also, this report represents our findings during our site visit only.

2.4 Site Description

The Subject Property is an approximately 1,700 square feet, 1-story, single-family home, with an attached two-car garage constructed circa 1957. The property is located in a fully developed residential neighborhood.

In general, the construction materials consist of wooden frame, concrete slab foundation in the garage and raised foundation in the structure, stucco, brick and wood panel exterior finish, composition shingle roof, drywall walls and ceilings, and various floor finishes including wood laminate, vinyl tile and carpeting. The attic is insulated with blown-in cellulose.

The heating, ventilation, and air conditioning (HVAC) system for the structure is composed of split air conditioning with a condensing unit on the ground level outdoors and the ductwork and air-handling units, (AHUs) and gas furnaces in the interior mechanical closet.
2.5 Site Background

Mr. Daciana Iancu, the property owner, reported that the Subject Property was affected by wildfire smoke from the Tubbs (Central LNU Complex Fire) started as a vegetation fire on October 8, 2017 at 9:45 pm off Hwy 128 and Bennett Lane in Calistoga, Napa and Sonoma Counties; the fire was contained on October 18, 2017. The fire burned 110,720 acres of central oak woodland, redwood forests, valley grasslands and vineyards, destroyed 6,957 structures and damaged 486 more. The fire burned approximately up to the of the subject property. The property owner reported seeing wildfire contamination on the exterior and in the interior of the property. He also reported that the insurance company had hired professionals to clean the HVAC system, replace the insulation material in the attic and clean the carpets. The Subject Property was unoccupied at the time of the investigation.

2.6 Wildfire Smoke Background

Wildfire smoke is a by-product of the combustion of forest fuels, as well as any homes/structures in the path of the wildfire. The type of materials burned and the temperature at which the materials burned generally determine the types of chemicals generated in the smoke. Smoke is a complex mixture of particles, liquids, and gaseous compounds including, but not limited to:

- Particulate Matter (PM), including soot, char, and ash
- Polynuclear Aromatic Hydrocarbons (PAHs)
- Carbon monoxide
- Aldehydes
- Organic acids
- Semi-volatile and Volatile Organic Compounds (VOCs)
- Free radicals
- Ozone
- Inorganic fraction of particles

3.0 LABORATORY

All samples collected from the Subject Property were submitted for laboratory analysis under chain of custody to EMSL Analytical, Inc. located at 200 Rt. 130 in North, Cinnaminson, NJ. EMSL Analytical, Inc. participates in the American Industrial Hygiene Association (AIHA), Environmental Microbiology Laboratory Accreditation Program (EMLAP), Industrial Hygiene Laboratory Accreditation Program (IHLAP), and Environmental Lead Laboratory Accreditation Program (ELLAP) (Laboratory No. 100194). The laboratory analytical results and chain of custody can be found in Appendix B.

4.0 ANALYTICAL METHODS

Commonly, presence of smoke is determined by analysis of surface dust samples for the existence of carbonized materials; black or grey colored deposits. Samples are analyzed by a variety of techniques to confirm the absence or presence and concentration of particulates consistent with wildfire smoke residue. Interpretations of results assist CSC in determining the
presence or absence and concentration of wildfire particulates at the property, which might warrant action.

Bulk samples of settled materials are collected from suspect surfaces utilizing various collection methods including, but not limited to, wipe and vacuum techniques. Samples are submitted under chain of custody to a qualified laboratory for particle analysis. In order to ensure a reasonable degree of scientific certainty, CSC samples are analyzed using Polarized Light Microscopy (PLM), cpi-Reflected Light Microscopy (RLM), Transmission Electron Microscopy (TEM, by methods ASTM D3849 and/or ASTM D6602), Scanning Electron Microscopy (SEM) and/or Energy Dispersive X-ray (EDX).

- **Light microscopy (PLM & RLM) provides:**
  - Relatively inexpensive screening of samples.
  - Rapid general overview of sample contents.
- **Advanced non-optical microscopy (TEM, SEM, EDX, etc.) provides:**
  - Verification that particles resembling wildfire smoke are indeed what they appear to be via optical microscopy, and that these particles are not one of a diverse group of particles that emulate the physical characteristics (morphology) of smoke particles but which are completely unrelated.
  - The ability to see the miniscule fractions of dust (ultra-fine particles) that are invisible to even the finest optical microscope. In some cases all of these ultra-fine particles may be directly related to wildfire smoke, but can be completely missed by optical microscopy.
  - The ability to chemically differentiate carbonaceous materials from origins other than the burning of organic materials consistent with wildfire smoke.
  - Detection of non-carbonaceous elements, such as silicon, calcium, sodium, sulfur, chlorine, phosphorus, or potassium in the carbonized materials.

  - The identification of carbonized materials via EDX along with these elements is consistent with wildfire smoke.

### 5.0 SITE OBSERVATIONS

CSC made the following noteworthy observations during the site visit on June 01, 2018.

1. Overall, the Subject Property had average levels of cleanliness with a normal accumulation of household dust.
2. The interior windowsills, doorsills and tracks at the property had accumulations of dust and black particles.
3. The following factors were noted: Two wood operated and one electric fireplaces.
4. Burned homes were visible around the residence.
5. The contents inside the home appeared to be in good condition.
6. CSC observed structural damages and darkened surfaces on the roof and the roof eaves of the house structure.
7. CSC observed warped vinyl windows inside the subject property.
8. CSC detected smoke odor inside the subject property.
6.0 METHODOLOGIES AND RESULTS

6.1 “Micro-Vacuum” Bulk Dust Samples

“Micro-Vacuum” bulk dust sampling is designed to confirm and identify the presence of dust/carbonized materials found on a surface, and is also useful in the characterization of settled dust, soot, char, and ash found on suspect surfaces. Bulk samples of settled materials were collected in a cowl neck cassette with a 0.45-micrometer Mixed Cellulose Ester (MCE) filter attached to a high volume air pump. Sampled surfaces were “vacuumed” to collect approximately 1 to 2 grams of dust. The cassette was then capped and placed into a sealed plastic bag for shipping and then submitted to a laboratory for microscopic screening and dust, soot, char, and ash identification.

6.2 Alcohol Wipe Surface Samples

Alcohol wipe surface sampling is designed to confirm and identify the presence of dust/carbonized materials found on a surface and is also useful in the characterization of settled dust, soot, char, and ash found on suspect surfaces. Wipe samples of settled material and materials adhered to a surface were collected by wiping the suspect material from the surface with an alcohol prep wipe. The wipe was then placed into a sealed plastic bag for shipping and then submitted to a laboratory for microscopic screening and dust, soot, char, and ash identification.

6.3 Results

CSC collected a total of six (6) dust samples of suspect wildfire debris, 5 wipe and 1 micro vacuum samples. The following table represents a summary of the laboratory data:

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Sample Location</th>
<th>Smoke-Related Constituents Identified</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7042-W01</td>
<td>Wipes: Windowsills - Kitchen, Bedroom 1-5, Bath 1, Bed 2.5, Dining Rm + M. Bedroom Door Tracks</td>
<td>Soot, Char, Ash</td>
<td>ND, 5, ND</td>
</tr>
<tr>
<td>7042-W02</td>
<td>Microvac: Softgoods - Couch, Mattress all Rooms, Carpet - Under Windows Bed 1 + 2 by Sliding Door - Bedroom</td>
<td>Soot, Char, Ash</td>
<td>ND, &lt;1, ND</td>
</tr>
<tr>
<td>7042-W03</td>
<td>Wipes: Contents - Top of Cabinets, Kitchen, Top of Fan/Lights, Living Rm, Top of Pictures, Bed 1, Top of Bedframe/ Door ... Bed 2</td>
<td>Soot, Char, Ash</td>
<td>ND, &lt;1, ND</td>
</tr>
<tr>
<td>7042-W04</td>
<td>Wipes: HVAC – Air Return – Post Filter, Vents – Living Rm, Bed 2</td>
<td>Soot, Char, Ash</td>
<td>ND, &lt;1, ND</td>
</tr>
<tr>
<td>Sample Number</td>
<td>Sample Location</td>
<td>Smoke-Related Constituents Identified</td>
<td>Concentration (%)</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------</td>
<td>--------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>7042-W05</td>
<td>Wipes: Attic – Framing, Framing by Vent, Vent</td>
<td>Soot, Char, Ash</td>
<td>&lt;1, 5, &lt;1</td>
</tr>
<tr>
<td>7042-W06</td>
<td>Wipes: Exterior – Burnt Beams, Exterior Windows Ext Wall South</td>
<td>Soot, Char, Ash</td>
<td>&lt;1, 80, ND</td>
</tr>
</tbody>
</table>

ND: None Detected
< 1%: Three or more target analytes (soot, char, or ash) were detected with confidence, but were too infrequent to be quantified with confidence.

When considering lab data from wildfire smoke investigations, CSC evaluates the level of wildfire smoke particulates and recommends specialty cleaning based on the following criteria:

1. For windowsills and tracks: 1% or greater of soot, char, or ash that are consistent with wildfires.
2. For interior surfaces (structure and contents) such as carpet, furniture, personal contents, walls, baseboards, clothing, etc.; as well as mechanical systems: 1% or greater of soot, char, or ash that are consistent with wildfires.
3. For attic, garage and exterior spaces: 3% or greater of soot, char, or ash that are consistent with wildfires.

7.0 CONCLUSIONS

Based on the visual inspection and interpretation of the analytical results of this investigation, CSC concludes the following:

1. The wildfire was approximately up to the residence.
2. CSC’s interpretation of the laboratory data and the visual observations suggest that wildfire smoke particulate concentrations warrant cleaning in the following areas:
   - Windowsills and tracks of the home.
   - Attic space.
   - Exterior of the subject property.
3. CSC’s interpretation of the laboratory data and the visual observations suggest that wildfire smoke particulate concentrations do not warrant cleaning in the following areas:
   - Interior of the subject property.
   - HVAC system.
8.0 RECOMMENDATIONS

Based on the visual observations and the results of the laboratory analyses, CSC recommends the following:

1. Clean the windowsills, window tracks and perimeter door tracks throughout the subject property interior.
   a. Use wet methods, such as wiping with a damp disposable cloth, to clean the windowsills, window tracks, window shutters and door tracks.

2. Clean attic space. Use HEPA vacuuming and negative air containment to prevent dust migration from the attic into the residence.

3. Clean the exterior of the residence. Care must be taken to prevent water from penetrating the building envelope during cleaning.

9.0 LIMITATIONS

The field observations, measurements, and research reported herein are considered sufficient in detail and scope to form a reasonable basis for a limited smoke assessment of the Subject Property. The assessment, conclusions, and recommendations presented herein are based upon the subjective evaluation of limited data. They may not represent all conditions at the Subject Property as they reflect the information gathered from specific locations. CSC warrants the findings and conclusions contained herein have been promulgated in accordance with generally accepted industrial hygiene methodology and only for the site described in this report.

Use by Third Parties

This report was prepared pursuant to the request of the Client. That contractual relationship included an exchange of information about the Subject Property that was unique and between CSC and its Client and serves as the basis upon which this report was prepared. Because of the importance of the communication between CSC and its Client, reliance or any use of this report by anyone other than the Client, for whom it was prepared, is prohibited and therefore not foreseeable to CSC.

Reliance or use by any such third party without explicit authorization in the report does not make said third party a third party beneficiary to CSC’s contract with the Client. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at third party’s risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

---

Unidentifiable Conditions

This limited wildfire smoke assessment has been developed to provide the Client with information regarding apparent conditions relating to the Subject Property. Although CSC believes that the findings and conclusions provided in this report are reasonable, the assessment is necessarily limited to the conditions observed and to the information available at the time of the work. Due to the nature of the work, there is a possibility conditions exist that could not be identified within the scope of the assessment or which were not apparent at the time of our site work. The assessment is also limited to information available from the Client at the time it was conducted. It is also possible that the testing methods employed at the time of the report may later be superseded by other methods. CSC does not accept responsibility for changes in the state-of-the-art.

CSC does not guarantee that all areas affected by smoke in the Subject Property were recognized during our evaluation. This report is limited only to the samples taken and locations sampled. Additional sampling may be needed to further identify other pollutants, or other smoke affected areas inside the Subject Property.

We have employed state-of-the-art practices to perform this analysis of risk and identification, but this evaluation is limited in scope to the areas listed above. No demolition or product review was performed in attempts to reveal material compositions. Our services consist of professional opinions and recommendations made in accordance with generally accepted engineering principles and practices, and are designed to provide an analytical tool to assist the Client. CSC or those representing CSC bear no responsibility for the actual condition of the structure or safety of a site pertaining to smoke regardless of the actions taken by the Client.

Thank you for choosing CSC to provide professional consulting services. Should you have any questions or concerns regarding this report, please do not hesitate to contact us.

Respectfully submitted,
CSC - Clark Seif Clark, Inc.

Written by,
Laura Smolyar
Industrial Hygienist

Reviewed and endorsed by,
Zahid Iqbal, MPH, CIH
Technical Director