TECHNICAL BULLETIN

Sentinel Products, Inc.
BETTER SOLUTIONS FOR A CLEANER ENVIRONMENT

PRODUCT SELECTOR TABLE -WILDFIRE WUI- IMPACT RECOMMENDATIONS

Wildfire remediation is a demanding disaster restoration discipline. While some skills and materials are transferrable, there are differences and variables that benefit from specific experience and professional judgment. Not only does wildfire differ in some key aspects from structural fire, wildfire itself is hardly uniform.

The 2025 Los Angeles fire breakout tragically illustrated the difference in aftermath when there is deep intrusion into a community. While certain areas may have been primarily vegetation fire, there is also the mix of debris and damage from fuels from human development.

RECOVERY CONSIDERATIONS GUIDE FOR MATERIALS & METHODS POST WILDLAND-URBAN INTERFACE (WUI) EVENT

V 25048

Required for:

- Restoration Contractors
- Abatement & Demolition Contractors
- General Contractors
- Owners/Facility Management
- Civic Leaders/Government
- Occupants
- Architects
- Engineers/Consulting Specialists
- Occupational and Environmental Health and Safety (OEHS)/CIH/IH
- VOADs

This was a WUI (Wildland Urban Interface) event. According to the U.S. Fire Administration, the WUI definition is: “The WUI is the zone of transition between unoccupied land and human development. It is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.” More than 60,000 communities in the United States are at risk for WUI fires, and because of ongoing development, the WUI area grows by approximately two million acres per year (according to the U.S. Fire Administration). This Technical Bulletin focuses on these fires and has been prepared for the restorer and the consulting professional. The purpose is to enhance education on wildfire remediation, influence the development of better Restoration Work Plans (RWP), and provide a shared vocabulary among the Materially Interested Parties (MIP) that may share complex responsibilities post-WUI fires.

In this Technical Bulletin, Sentinel recommends a three-tier approach to impact levels and guidance for cleaning/contaminant removal. Issues of cleaning, deodorization and isolation of non-removable particulates are differentiated for the degree and character of damage. To use a category approach built around simple descriptions (light, medium, heavy) is inspired by the anticipated positive effect of the 2025 releases of the ***IICRC S700***

Standard for Professional Fire & Smoke Damage Restoration, and the *AIHA Technical Guide for Wildfire Impact Assessments for the Occupational and Environmental Health and Safety (OEHS) Professional*.[i] Presently and looking forward, it is Sentinel's informed opinion that these two documents represent excellent guidance. However, there are other resources, and no written document can replace input from qualified experts. Every project is unique, and every successful project involves clear communication among MIPs, a carefully crafted RWP (Note for architects[ii]), and the professional judgment of experienced professionals.

LIGHT-MEDIUM-HEAVY: Organizing The WUI Workplan[iii]

The RWP (restoration workplan) houses goals and targets that substantiate completion of work. Restoration may require a progression of light, medium, and heavy cleaning methods, and different areas and surfaces of impacted buildings will need a combination of methods. An impacted building may require repeat cleanings, and sometimes other hazardous contaminants need to be addressed (e.g., asbestos, lead). The restorer typically designs the RWP, gets consensus from the MIPs, and as the wildfire remediation progresses, can use professional judgment to adjust the workplan surface-by-surface from light, medium to heavy cleaning. See the tables on pages 3 - 6:

Example WUI fire.
Lake St., Altadena, CA
2025 Los Angeles Wildfires
(photo: Sentinel Response Team)

WUI-WILDFIRE IMPACT – RESTORATION RECOMMENDATIONS TABLE:

Level[iv]	Impact[v]	Corrective Action (Examples)[vi]	Sentinel™ [vii]
LIGHT	CLEANING: -Visible contamination by particulates (principally ash[viii]). May deposit dry but can be tacky and resistant given a chance to stick. -Residues are generally alkaline (vegetation burn), but in WUI the burn of plastics can add acidic pH to the mix, which affects best cleaning chemistry choices. -Often most noticeable at entry points where air currents (plume) loaded with combustion byproducts buffeted against structure perimeter, e.g., human entry doors & windows (tracks, threshold, sills, rails, frames, stools, jambs, casing), and adjacent floors. -Residues can be on other surfaces or contents in small amounts but may be hard to see. ODOR: -Odors at this level may not be noticeable to some but faintly identified by others. Can be scattered, dispersed and may come and go with changes in temperature and humidity.	DRY METHODS: -HEPA vacuums with attachments to maximize suction (bristle brush heads when rough, textured, porous surfaces). -Dry clean manually: cellular sponges, cloths and rags, feather dusters. -Use tack cloth for smooth, non-porous. -HEPA vacuum carpet with powerhead attachment. WET METHODS: -Persistent residues after dry cleaning: damp detergent wiping. See column at right, and Medium Cleaning below. -TIP: Chemistry choices for wet cleaning of wildfire residues for light, medium & heavy: Residues are typically alkaline (especially ash from vegetation), and so restorers may focus on cleansers with an acidic pH (pH between 4 and 6), and which offer detergency, and pH correction/neutralization with minimal solvents or VOCs. -TIP: a potable water rinse between any two chemicals is advisable. -TIP: Harmful levels of lead can be dispersed from the destruction of both structural (lead-based paint, lead plumbing) and contents (automotive and other batteries)[ix]	**EnviroWash 300 & EnviroTowels 300**: For residues persisting after dry cleaning methods (At left). -Used on all types of wildfire residues to break residue surface tension, and free-rinsing detergency reduces effort to remove from surfaces. -Select for WUI projects or other where hybrid mix of organic and inorganic residues. The pH of 4.5-5.5 is ideal for cleaning and neutralizing alkaline as-impacted surfaces at the same time. -Hydrogen peroxide in 300 also can have deodorizing/oxidizing ability. or **EnviroWash 805** **EnviroTowels 805ET:** -Used where burning structures have dispersed lead-containing particulate. -With a mildly acid (5.75-6.75) formulation, this cleaner is effective against wildfire ash deposits, while advanced chelation detaches and carries away heavy, stubborn lead. 300 EnviroWash is ready-to-use; 805 EnviroWash:1 5g=1 55g drum Both towels:10”x13”, cleans 4ft^2 Odor Control Option: **Sentinel 522OB Odor Destroyer Block**: can be used in a variety of spaces to remove unwanted odors. Set out 1/1000ft^3 at job start, pull at wrap-up. Effective for 2-3 mos. Xactimate 522OB: CLN DODRCRY

WUI-WILDFIRE IMPACT – RESTORATION RECOMMENDATIONS TABLE:

Level	Impact	Corrective Action	Sentinel
MEDIUM	CLEANING: - Property (exterior, interior, contents) has noticeable wildfire residue[x]. -More widespread residues requiring extra attention/effort (including cleaning adjacent areas that do not initially appear contaminated. Non-visible residues can be a source of odor). -Infiltration of residues into interstitial spaces is influenced by time & distance: by the proximity of the burn (intensity of temperature and pressure differentials; plus duration). -Directional firestorm winds that produce a high-pressure differential between the windward and leeward sides, or the interior of a structure.	-Wall washing of painted walls and ceilings (e.g., water-based detergents formulated with solvents, emulsifiers) to aid in complete removal of combustion particulates. -Ceilings, walls, and exposed framing may need to be sealed to eliminate visual and odor impacts. When MIPs request a preventative treatment against odor, wall washing to a state of ready to prime or seal (often described as "***cleaned for paint***". See 538 at right). -Attics and other unoccupied spaces where air exchange could occur (e.g., crawl space, roof space) are likely impacted and need a mix of removal/replacement, and extensive cleaning with some sealer. -Insulation that cannot be cleaned should be removed including blown-in, fill, and batt (e.g., fiberglass).	(See above: restorers can start with: 300 EnviroWash and/or 805 EnviroWash Both are suited for cleaning with detergency and acidic formulas that aid in neutralizing alkaline pH of most wildfire residues. For the Medium level impact surface of impact, restorers can start with a dry clean, then either cleaner above, Or/then **522 Smoke & Odor - Cleaner & Destroyer:** Restorers can, as necessary, escalate cleaning and/or deodorizing with 522 - formulated with more powerful surfactants as well as odor counteractant ingredients to provide restorers with one product on-site that can serve two roles. As a tough-jobs cleaner/degreaser, apply ready-to-use. And/or Use 522 as a concentrate 5:1 – 10:1 as an odor counteractant that can be sprayed, foamed or fogged. And/or **538 Smoke & Odor Encapsulant.** The correct choice as sealer to complete areas ***"cleaned for paint"***.

WUI-WILDFIRE IMPACT – RESTORATION RECOMMENDATIONS TABLE:

Level	Impact	Corrective Action	Sentinel
MEDIUM (continued)	CLEANING: Medium cleaning techniques can be most helpful when residues are indelible, tacky, or otherwise difficult to vacuum or wipe off surfaces. ODOR: Odors associated with the wildfire burn may be universally noticeable in designated areas. NOTE: There is no single "wildfire" odor, although "campfire" or "fireplace" are predominant. It can be hard to differentiate indoor odors from external conditions, and in the mixed burn zone/ or WUI, the combination of building contents, vegetative matter, building contents, and other items a complex mixture can be created.	-When deemed salvageable, carpet cleaning may include pre-treating (powder cleaning, solvent or detergent spray-wipe and bonnet cleaning) HEPA vacuuming, followed by a water rinse/extraction. Carpet steam cleaning, rotary shampooing, and hot water extraction are other options. Cleaning will reduce or remove most odors. As a close-out step, an odor counteractant can be used to address lingering, holdover odors, and freshen the space (but should not substitute for standard cleaning and deodorization). NOTE: Misting or fogging can be implemented per restorers decision. However note that component removal, surface abrasion, and proper cleaning can sufficiently remove odor. No chemical treatment is a substitute for source removal of wildfire residues.	And/or **538 Smoke & Odor Encapsulant.** The correct choice as sealer to complete areas ***"cleaned for paint".*** For odor, particulate lockdown and stain blocking, Sentinel 538 Primer/Sealer Odor Encapsulant is an innovative water based coating used to seal and lockdown odors commonly found on restoration projects. Sentinel 538 is a multi-surface coating with a low odor formula that contains no volatile organic compounds (VOC's). 528 is available in white, clear or natural wood finish, and serves as a base coat primer/sealer offering excellent stain blocking qualities. 538 can be used as a sealer for properly prepared closed cel foam-in-place insulation. For best odor and stain control, all water-based professional sealers for fire restoration, inc. 538, are best applied by spray in a cross-hatch pattern (L-R, U-D)

WUI-WILDFIRE IMPACT – RESTORATION RECOMMENDATIONS TABLE:

Level	Impact	Corrective Action	Sentinel
HEAVY	CLEANING: -The property (exterior, interior, contents), via visual observation, can be confirmed as having wildfire residue that is widespread. -Thermal damage to the exterior and/or interior surfaces may be present. When heat, thermal shock, may have compromised structural materials, repairs should be planned with approval of a structural engineer. -Char on structural timber, when present, may or may not be cleanable. Repair or replacement of structural elements in many places is anticipated -Sufficient combustion products intruded to create conditions common with structural fire: e.g., ghosting (electrophoresis), thermophoresis, smoke webs, filtration markers. -Carpet is generally not restorable. ODOR: Odors are irritating, widespread, and concern exists that odors may emanate out of surfaces (flat paint, uncoated wood) in the future when changes to humidity, temperature, hydrostatic pressure.	-Escalation to aggressive tools in the restorer's toolbox, including certain chemical treatments/etching, and surface abrasives (media blasting). -When significant loss of surface and integrity of a wood structural element is not a risk, then char up to ¼ inch thick can be removed, and the wood then cleaned and sealed. -For Heavy conditions, the restorer has supplemental deodorization techniques available, which may include strategic use of odor counteractants, as well as smoke & odor sealers. -Most insulation must be replaced, although smooth closed cel spray foam may be cleanable, and coated with a water-based smoke & odor sealer. Removal and replacement of open cel spray foam; as well as rock wool mineral wool, fiberglass, cellulose should all be removed and replaced following heavy impact from any wildfire event.	See **522OB Odor Block** above under Light Cleaning. (Set out several OBs to immediately start work on odors. Improve conditions for work on challenging, nasty projects.) **315 Carbon & Soot Cleaner/Wash:** A concentrated, water-based, biodegradable cleaner and degreaser that is specifically formulated to clean up smoke residues, the 315 works effectively on fire restoration projects as a hard surface and structural cleaner and degreaser. Good fit for the complex hybrid residues of a WUI restoration project. **531 Smoke & Odor Counteractant:** A professional strength, odor control product used to reduce the most heavy-duty odors associated with restoration cleaning projects. -Use in low-pressure sprayers and ambient temperature misters/foggers. Sentinel 531 is non- flammable, neutral-range pH, and non-hazardous -531 can also be used as an odor control additive to clean odors from hard surfaces as well as soft goods and other materials. Can be used in the exfoliation of charred wood. **538 Smoke & Odor Encapsulant.** The correct choice as sealer to complete areas ***"cleaned for paint".*** See more in MEDIUM above.

[i] As of this writing, in January 2025 the Institute of Inspection Cleaning and Restoration Certification had released the S700, which is the first-edition, and first of its kind standard for the professional restorer for structural fire. Although the S700 clearly states that it "*does not comprehensively address…issues occurring from certain situations such as wildfires*", it is our experienced opinion that certain concepts are transferrable to wildfire. Similarly, as of this writing, the American Industrial Hygiene Association is imminently expecting 2025 release of the 2nd edition of the Technical Guide, also known as the Redbook. The 1st edition and incumbent Redbook was published in 2018, and includes helpful guidance for the restorer, while serving as the primary reference for the consulting and assessment experts. Sentinel personnel contributed to both 2025 documents.
At the time of putting this information together, Sentinel was experiencing such a high-demand for guidance in the aftermath of the Los Angeles wildfire events, this Technical Bulletin was composed using insight from the IICRC and AIHA (as well as field experience and other resources). Since both employ multi-tier gradations of impact and correction methods, we have elected to provide something similar to enrich wildfire education, and steer selection of materials.
[ii] for architects, a specification *02 51 29 Surface Cleaning Decontamination*. *Contact Sentinel for more information on the availability of guide specifications, available continuing education, and assistance in customizing specifications for structural fire/wildfire-WUI projects.*
[iii] Please note that HVAC recommendations are notably absent from this document. HVAC and Wildfire are taken together a subject requiring their own Technical Bulletin. Similarly, a proper treatment of Contents (Personal Property) and Wildfire is reserved for a separate venue.
[iv] Building materials and flooring impacted beyond restoration and repair will require removal and replacement.
[v] [vi] Please remember: The first step is ensuring the structure is safe to enter.
Separate and isolate work areas to prevent the spread of particulates during cleaning.
[vi] By "examples"", the intent is for the user of this document to understand the corrective recommendations listed are not exhaustive, nor are they automatic because every event and impacted structure combination is unique.
[vii] All names, brands and logos are owner exclusively by Sentinel Products, Inc.
[viii] Soot is a carbon-based deposit from incomplete combustion, made of carbon and organic compounds, and principally associated with structural fire. Soot can also contain non-carbon elements like sulfur and trace amounts of metals. Ash is an inorganic residue from fire Made of inorganic, incombustible particles, including metals and other elements. Chicora Foundation, Inc. 2008. Fire. Accessed February 12, 2025. https://chicora.org/fire.html
[ix] California Air Resources Board. New analysis shows spikes of metal contaminants, including lead, in 2018 Camp Fire wildfire smoke. July 12, 2021. Accessed February 12, 2025. https://ww2.arb.ca.gov/news/new-analysis-shows-spikes-metal-contaminants-including-lead-2018-camp-fire-wildfire-smoke#:~:text=CARB%20staff%20compared%20air%20quality,effects%20and%20cancer%20in%20adults.
[x] TIP: Judging combustion completeness is an inexact but sometimes helpful rule of thumb: black ash < gray ash < white ash. "Black ash" is produced at lower temperatures and is often a misnomer because it is actually often soot. For wildfire, the products of combustion are neither all black, nor even all dark hued. When optically analyzed, most black particles in a wildfire structure are not wildfire produced particles. Wildfire consumes carbon at higher temperatures. The color of wildfire ash can be brown, red, yellow or white. Color may indicate the temperature at which the fire burned, and can relate to easier or harder to clean (but not always). Rodela, Mrittika Hasan & Chowdhury, Indranil & Hohner, Amanda. (2022). Emerging investigator series: Physicochemical Properties of Wildfire Ash and Implications for Particle Stability in Surface Waters. Environmental Science: Processes & Impacts. 24. 10.1039/D2EM00216G.