



# Wildfires: A newly emergent and persistent threat to industrial facilities



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Annually between August and November, many areas of the US face the risk of wildfires. While most industrial facilities are well aware of managing and mitigating internal fire threats, now they face an increase in frequency and severity of external threats from wildfires.

In 2020, it was not just the number of fires – **according to Cal Fire, there were nearly 10,000 incidents** – it was the scale at which the fires burned. Five of the six largest blazes in California were recorded in 2020. The 4.1 million acres that burned were double the previous annual record. The August Complex fire alone affected more than 1 million acres, entering a new classification into the description of wildfires: the **gigafire**.

External threats have long been recognized from adjacent facilities, transportation accidents, and natural hazards such as hurricanes, floods, and earthquakes. As we have emphasized in all our articles, a threat assessment and preplan is needed to mitigate fire risks both internally and externally. Some of the same techniques used to mitigate internal fire risks also apply directly or with some modification to wildfire risks.

Know your risk is the most important thing you can do. In California for example, you have access to the **Fire Hazard Severity Zone (FHSZ)** which is based on an evaluation of the landscape, fire history in the area, and terrain features such as slope of the land. Organizations can also request the FHSZ rating from local building or fire officials in their area. In other areas, a similar methodology is available through FM Global Data Sheet 9-19 Wildland Fire.

In this article, we explore four categories of institutional fire risks and offer suggestions on what can be done to mitigate the risks:

- Exposure to off-premises infrastructures such as pumps, pipelines, electrical, communication and transportation
- Yard exposures such as fire pumps, idle pallets, propane, and other tanks, baled waste, and on-site infrastructure
- The building itself, especially the roof, if it includes rooftop solar arrays
- The interior, primarily due to smoke or smoke odor infiltration

## Off Premises Exposures

The most heavily exposed and the most easily overlooked risks include off-premises infrastructures that may or may not be under the control of the facility. These infrastructures remain exposed long after the fire because of the potential for erosion and even landslides after the natural cover has burned away.

Once the off-premises risks are identified and cataloged, they can be prioritized. To the extent permitted by local regulations, a clear zone can be established. Detection may be possible with cameras or other sensors. If the facility is part of the public infrastructure, local authorities might also provide surveillance during high-risk periods.

Depending on the importance of the facility and its infrastructure, it could be placed on the local priority list for public fire protection resources. Even if this is done, it should be noted that public resources are frequently stretched beyond their limit. This is also true for private industrial response teams protecting assets against wildfire.

A wide variety of services are available from vegetation clearing to full fire protection services. Some of these services have received negative attention for failure to operate with the public overall Incident Command Systems (ICS) so integration with the ICS, expectations of services to be delivered, and terms and conditions, should all be arranged ahead of time.

Since mitigation measures can still fail, a business continuity plan should be developed beforehand on how to deal with the loss of the asset.

## Yard Exposures

Flying embers from the fire can easily ignite outdoor combustibles such as idle pallets, waste bales, and rolled paper. It is easy to underestimate the risk as embers can travel a surprising distance.

The best way to manage this risk is for the combustibles not to be there in the first place. Moving them inside exposes the facility directly and could represent a threat that might overtax the sprinklers - so that is not a good strategy. Instead, the combustibles should be drawn down to the bare minimum needed for operations. It may be necessary to improve protection of the remaining minimum combustibles.

Outdoor detection technology should also be considered. Protection could include temporary or permanent monitor nozzles, wall spray systems to protect the building from the yard storage, or fire barriers. Low value three-sided metal sheds located away from the main building could protect the storage from embers and radiant heat.

Hazards such as outdoor tanks are more difficult to ignite and typically pose a greater threat once ignited. Water spray, permanent, or temporary monitors may be needed. A fire protection consultant can help evaluate the threat, which will be heavily dependent on proximity to the hazard and the associated radiant heat.

There are portable monitor systems with short duration flows from their own small water tanks (enough for embers and even short-term cooling) that could be owned by a corporation or cooperative, and then deployed to sites threatened by an oncoming fire. It should be noted that deployment requires either tractor trailers and heavy lift forklifts or trailer mounted units.

Likewise, private contract firefighting services can be used. Depending on how close these yard ignition targets are to natural cover fuel sources, they could be threatened by radiant heat or even direct flame exposure. These are of course more severe threats than ember ignition and require even stronger protection.

## The Building Itself

This represents the most severe threat because ignition of the building directly threatens the facility. It is no longer an exposure fire to the building; it IS the building!

The best protection is to use noncombustible construction. Roof covering should be UL Class A rated (which is designed to resist ignition by large embers). Note that Class A roof ratings may no longer apply when solar panels are installed. This is because the solar panels can trap embers and cause re-radiation of the convective heat from an ember back to the roof.

Some commonly overlooked combustible loading at industrial facilities include openings in sandwich panel walls (especially expanded polystyrene insulation commonly used at refrigerated facilities), plastic skylights, combustible air filters, and combustible debris buildup under solar panels. A thorough inspection should be made, followed by debris cleanup and repair of metal coverings on sandwich panels.

To get an idea of the kind of ember assault that might be expected, visit Insurance **Institute for Business & Home Safety**. Although this web page is geared toward residential and small commercial exposures, the concepts can easily be scaled up to large industrial plants.

For both yard storage protection and protection of the building itself, a private fire protection water supply independent of the municipal supply would help ensure self-reliance. A private supply will also help reduce risk all the time, not just during wildfire season.

As with yard targets, radiant heat exposure or direct flame contact require greater safeguards. These threats depend on proximity to natural cover fuel sources.

## Smoke Odor Infiltration

For this article, we are discussing smoke odor from a distant fire where the authorities deem it safe for operations to continue in the building. The methods can be strengthened for exposure to smoke that requires evacuation of the facility.

It is easy to underestimate the distance light haze can travel. It can travel many miles from the actual fire and reach areas that do not seem to be exposed to wildfire. With increasingly stringent quality controls, some occupancies can tolerate no infiltration. This may also be the hardest threat to protect against because there are so many infiltration points.

Facilities that normally use standard air filters can use HEPA filters with a UL 900 fire rating. The fire rating ensures that the filters do not become additional fuel in cases where embers or the fire itself becomes a threat. At some point it may be necessary to shut down the system and local authorities may even order the facility to be evacuated. Facilities that already use HEPA filters may be able to operate in full recirculation mode rather than drawing in outside air. Portable industrial scale air purifiers are also available.

Sealing openings can introduce other issues with ventilation, egress, etc. Likewise, covering goods with plastic can create a situation which can overwhelm a sprinkler design. The site's insurance loss control representative can be the best source of advice because they consider the myriad of factors involved.

Human smell may be desensitized to smoke odors because of outdoor exposure to the odor, thus sensitive sensors may also be needed for air quality monitoring.

## Conclusion

Wildfire is a growing threat due to the increased frequency and severity of these fires. During a large wildland fire, all the above situations discussed could happen simultaneously. The situation could be further aggravated by unavailability of workforce and contractors who might not be able to get to the site for a variety of reasons. The better the planning, the better the facility will be able to cope with any wildfire threat that might materialize.  
brewer's property coverage or as stand alone coverage.