

WILDFIRE GUIDE

Preparation And Recovery For Underground And Aboveground Storage Tank Systems

EPA United States Environmental Protection Agency

Wildfire Guide: Preparation And Recovery For Underground And Aboveground Storage Tank Systems

Disclaimer

The U.S. Environmental Protection Agency (EPA) developed this guide to provide information for underground storage tank (UST) and oil aboveground storage tank (AST) owners and operators in the event of a wildfire. This guide does not replace existing federal or state laws or regulations, nor does this impose legally binding requirements. The word *should* as used in this guide, is intended solely to recommend, or suggest and does not connote a requirement.

For regulatory requirements regarding UST systems, refer to 40 CFR Part 280 and corresponding state regulations. For regulatory requirements regarding oil AST systems, refer to 40 CFR Part 112, corresponding state regulations, and local fire codes.

CONTENTS

Disclaimer ii

About This Guide 1

Preparing For And Recovering Your Facility From Wildfire 1

What To Do As The Fire Approaches Your Facility 1

Recovery From The Fire 1

Are Wildfires An Issue For Underground Storage Tank Systems? 2

UST Finder—National Underground Storage Tank Web Map And Applications For Wildfires 2

UST Finder: Proactive Applications 3

Case Studies Of Wildfire Impacts On UST Facilities 5

Being Ready 8

Key Points To Consider In Case Of Wildfire 10

Wildfire Preparation 12

UST Finder: Near Real Time Fire Conditions 12

What To Do As The Fire Approaches Your Facility 13

Recovery 14

UST Finder: Post Event Screening 14

Debris Flow Fields—Post Wildfires And Precipitation 17

Are Wildfires An Issue For Aboveground Storage Tank Systems? 18

Being Ready 18

Wildfire Preparation 18

What To Do As The Fire Approaches Your Facility 19

Recovery 21

Financial Assistance Available To UST And Oil AST Owners And Operators 23

Resources And Links 25

About This Guide

Wildfires can begin suddenly and spread quickly, moving up to 14 miles per hour and causing significant damage to the environment and impacted communities. EPA developed this guide as a resource for UST and oil AST owners and operators in the event of a wildfire. This guide may help UST and oil AST owners and operators prepare for and respond to the catastrophic effects and environmental harm that may occur as a result of partial or fully burned UST systems or oil ASTs and associated piping and appurtenances. Information in this guide may help owners and operators return their facilities to service as soon as possible. State, local, and tribal UST and oil AST program implementers may also find this guide useful.

This guide consolidates federal, state, non-governmental, and UST and oil AST industry resources. However, many communities develop their own strategies and resources to reduce the effects of wildfire on their citizens, businesses, and environment. Although this guide addresses USTs and oil ASTs affected by wildfire, some elements of the checklists may apply to other natural disasters as well.

This guide does not address ASTs containing other fuels such as propane, liquefied propane, or compressed or liquefied natural gas. However, below are a couple resources regarding other fuels that might be helpful.

- Propane 101 Propane, LP Gas Tanks and Wildfires – How To Prepare
- National Fire Protection Association (NFPA) Vehicular Natural Gas Fuel Systems Code, NFPA 52

Preparing For And Recovering Your Facility From Wildfire

In addition to providing information and a broad array of resources, one of the central features of this guide is a listing of actions to help UST and oil AST owners and operators prepare should a wildfire approach their facility as well as steps to recover from potential impacts to their facility.

What To Do As The Fire Approaches Your Facility

- **Recommended Actions For UST Facilities**
- **Recommended Actions For AST Facilities**

Recovery From The Fire

- **Steps To Take When Returning To Your UST Facility**
- **Steps To Take When Returning To Your AST Facility**

Are Wildfires An Issue For Underground Storage Tank Systems?

According to data posted by the National Interagency Fire Center—for each of the years 2015, 2017, and 2020—over 10 million acres of land burned in the United States. In addition to the loss of lives, homes, and communities, these fires contribute significantly to air pollution, adding fine particulates, carbon monoxide, nitrogen dioxide, formaldehyde, and acetaldehyde to the environment. As climate change brings hotter weather and water deficits, impacts from wildfires will likely be amplified in the future.



Wildfires extents in 2015, 2017, and 2020. Data from the National Interagency Fire Center. While there are wildfires in the eastern portion of the United States, the severity of the wildfires in the West dwarf the impact of those in the East. Credit: EPA



Farm equipment is seen through heavy smoke on September 2020, in Molalla, Ore. Credit: Nathan Howard/Getty Images

While citizens are familiar with footage from areas devastated by wildfires showing dense smoke obscuring the sky, they may be less familiar with the impact these fires can have on gas stations or other UST systems. Gas stations provide critical infrastructure in terms of gas, food, and emergency supplies and, as such, it is important for those facilities to be prepared for all natural disasters, including wildfire.

UST Finder—National Underground Storage Tank Web Map And Applications For Wildfires

As of March 2021, there are over 540,000 federally regulated petroleum underground storage tanks in the United States. Knowing where USTs are located is critical to understanding how these systems are affected by wildfires and other extreme weather events and to assessing the potential impact to human health and the environment. To identify USTs and their proximities to populations and drinking water sources, EPA developed UST Finder—a national geospatial database providing the attributes and locations of active and closed USTs, UST facilities, and UST releases from states as of 2018-2019 and from tribal lands and U.S. territories as of 2020-2021.

UST Finder can identify USTs that are potentially vulnerable to, or have been impacted by, wildfires. The three sections below—Proactive Applications, Near Real Time Fire Conditions, and Post Event Conditions—discuss how UST Finder applications can help.

EPA's UST Finder

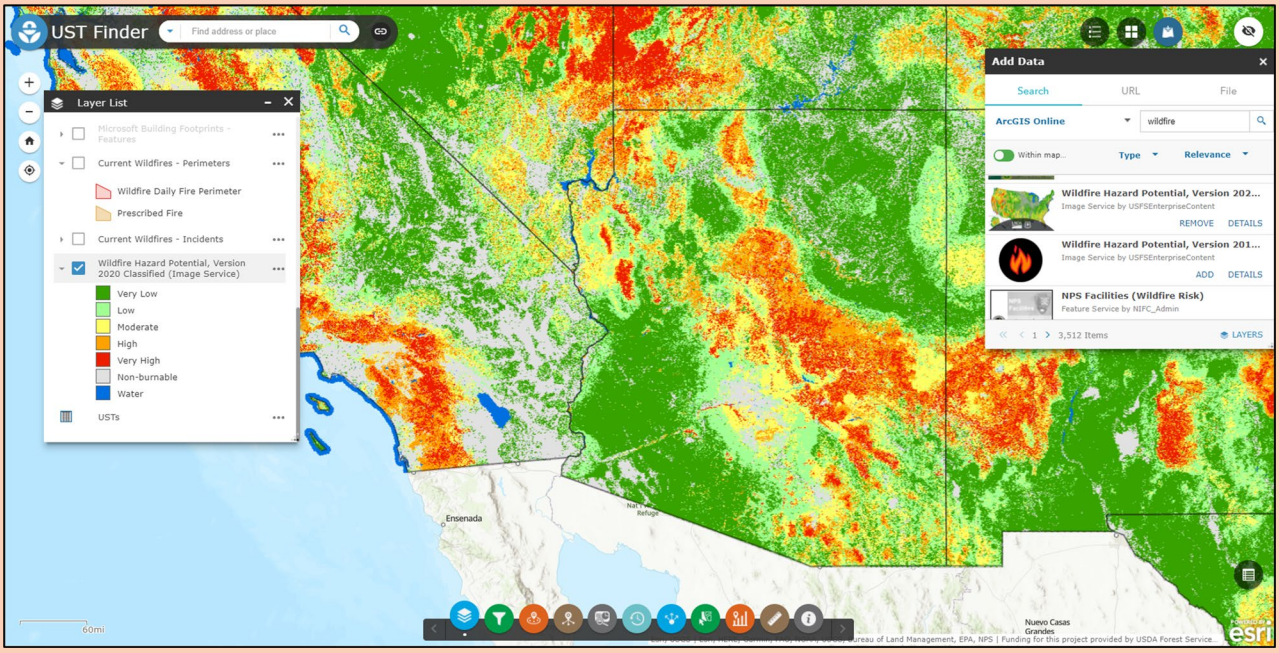
https://gispub.epa.gov/ustfinder

UST Finder: Proactive Applications

The U.S. Forest Service's (USFS) Wildfire Hazard Potential dataset depicts the "relative potential for wildfires that would be difficult for suppression resources to contain, based on wildfire simulation modeling."[1] You can import this dataset into UST Finder to co-locate areas of burn potential with USTs.

How To Import Wildfire Hazard Potential Into UST Finder

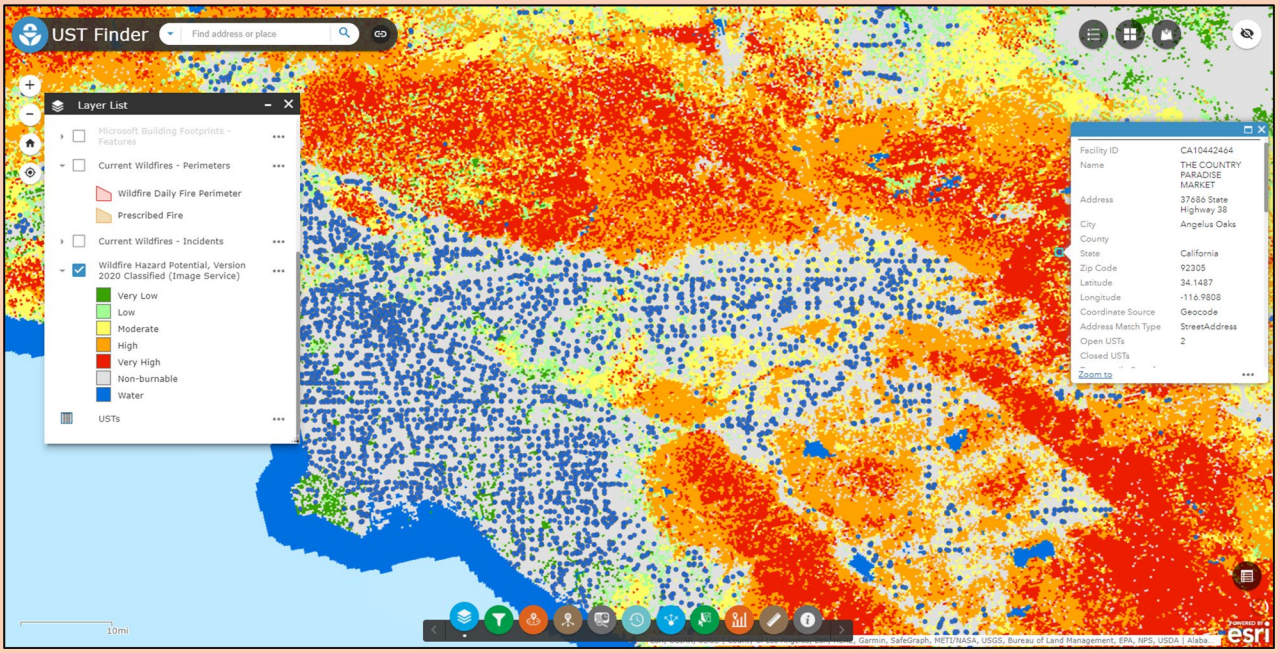
Within UST Finder, select the Add Data widget at the top right of the application. Search ArcGIS Online for *Wildfires* and find and add the *Wildfire Hazard Potential* service; or enter the following URL into the URL table within the *Add Data* menu, per screenshot below https://apps.fs.usda.gov/fsgisx01/rest/services/RDW_Wildfire/RMRS_WildfireHazardPotential_classified_2020/ImageServer



Screenshot showing how to import the Wildfire Hazard Potential dataset into UST Finder

[1] https://epa.maps.arcgis.com/home/item.html?id=55226e8547f84aae8965210a9801c357

This dataset allows users to assess, at national and local scales, the relative wildfire hazard potential—from very low, depicted as green, to very high, depicted as red. You can activate the UST facility layer and overlay it with the burn potential layer. As an example, the graphic below shows UST facilities, depicted as blue points, near Los Angeles inside and outside of high burn potential areas.



Overlay of the wildfire hazard potential layer with UST facilities near Los Angeles, CA

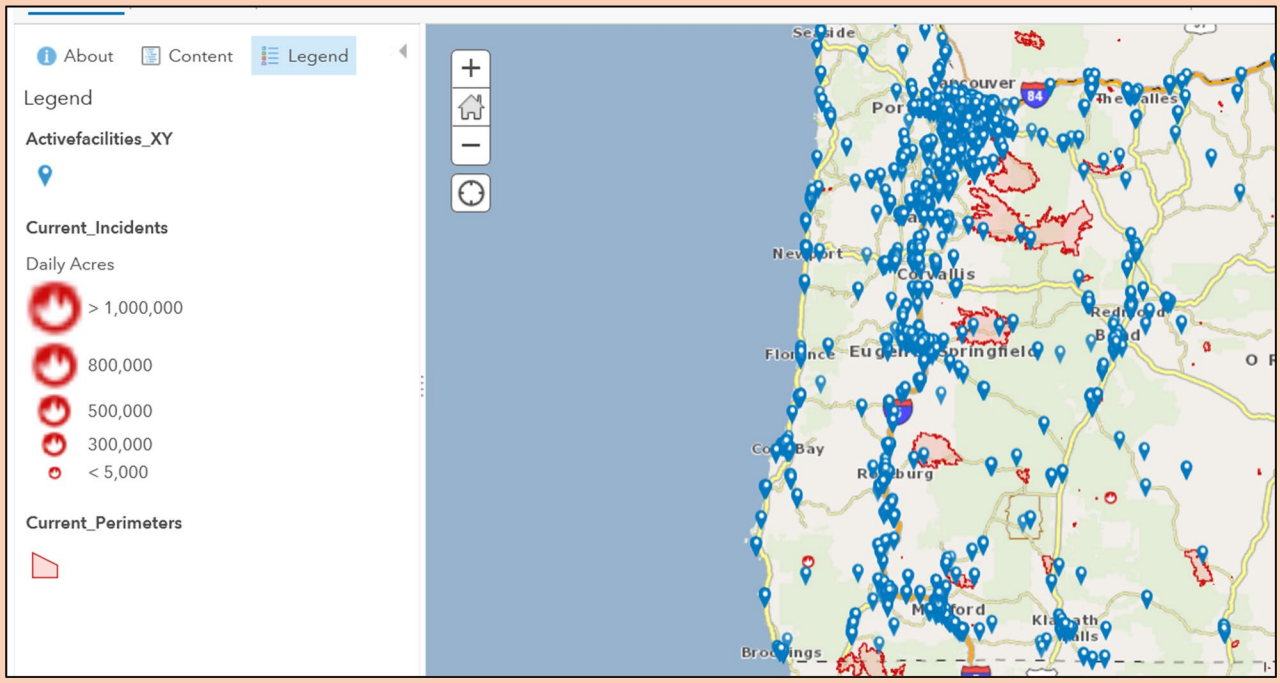
UST Finder data, in conjunction with USFS's Wildfire Hazard Potential, can make UST owners, operators, and other stakeholders aware of wildfire potential so they can take proactive steps to prepare for and mitigate damage from wildfire as described in this guide.

> ***The Federal Emergency Management Agency (FEMA) National Risk Index spotlights hazards and highlights social vulnerability and community resilience. The index helps users better understand the natural hazard risk of their respective areas or communities. Users include planners and emergency managers at the local, regional, state, and federal levels, as well as other decision makers and interested users. Improved understanding of natural hazard risk can lead to steps to reduce it.***

Case Studies Of Wildfire Impacts On UST Facilities

Oregon

The 2020 Oregon wildfire season was one of the most destructive in the state. During that season, an estimated 1.2 million acres burned; over 4,000 homes and 1,400 structures were destroyed; and 9 people died. The most destructive wildfires began on Labor Day weekend. The fires spread rapidly due to easterly winds forcing warm dry air down the Cascades and pushing the fire boundaries towards the center of the valleys. More than 7,500 personnel from across the United States and Canada responded to those fires.



Map of Oregon wildfires in red with active UST facilities pinned in blue

Using geographic information system (GIS) applications, Oregon's Department of Environmental Quality (DEQ) created a list of 40 UST facilities with a high potential of impacts from wildfires. Approximately 12 were impacted by the wildfires, either by power loss, minor fire damage, or complete destruction.

Fires destroyed the two facilities discussed below, including the loss of building structures, dispensers, tank venting, and ability to conduct release detection.

The **Rivers Run** facility was located in Detroit, Oregon within the boundaries of the Lionshead fire near the convergence of the Lionshead and Beachie Creek fire borders. See below for an image of this facility post fire. At the time of the fire, the Rivers Run facility held approximately 10,000 gallons of fuel in two multi-compartment underground storage tanks. The Oregon DEQ coordinated with the facility's owner to safely remove fuel, with disposal handled by the facility's fuel distributer.

With the help of a state emergency response coordinator and EPA, Oregon DEQ was able to empty several other tanks in Detroit, helping to ensure no fuel released into the environment.

The **Blue River Gas** facility in Blue River, Oregon was located within the boundaries of the Holiday Farm fire. At the time of the fire, Blue River Gas held approximately 600 gallons of fuel in a single multiple compartment UST. Oregon DEQ coordinated with EPA to remove and dispose of the fuel. DEQ worked with the Debris Removal Task Force, made up of several state and federal agencies, to remove burned material, including hazardous waste, from the over 4,000 properties impacted by wildfires.



The Rivers Run facility after it was destroyed by the Lionshead fire



EPA contractors removing fuel from the USTs at Rivers Run Facility

Takeaways

- Early action is key. Having the ability to gather information on the fire zones in relation to UST facilities helped Oregon DEQ determine quickly which facilities were a priority to contact and start triage.
- Patience is important. Prioritize the work but realize that wildfires are unpredictable and issues such as road closures, power outages, and overall safety of locations will slow response.
- Plan for fuel removal. Fuel is valuable to UST owners and operators and coordinating fuel removal quickly and efficiently is important. The money a facility receives for fuel can help operators and removing the fuel can help limit liabilities.

California

Wildfires burned an estimated 4.2 million acres across California in 2020, destroying or damaging 10,488 structures. This followed 1.9 million acres burned in 2018 and 1.5 million acres burned in 2017. Wildfire season can now last half of the year, evidenced by 50,000 acre or larger fires that started as early as June and as late as December. At the peak of wildfire season in August 2020, firefighters in California simultaneously battled as many as 367 wildfires, most started by lightning strikes.

The third largest fire—the Camp Fire in November 2018—stands out as one of the most tragic and destructive wildfire in modern California history. Faulty electrical transmission lines ignited the Camp Fire, and winds quickly spread the fire downhill and into the town of Paradise, then home to 26,000 residents. Within two hours of the fire entering Paradise city limits, fleeing residents began abandoning cars on the main road out of town because of gridlock and approaching flames. In total, the fire killed 85 people in Paradise and surrounding communities. The fire destroyed more than 18,000 structures, including six of the nine retail gas stations serving Paradise.

Be Aware And Prepare

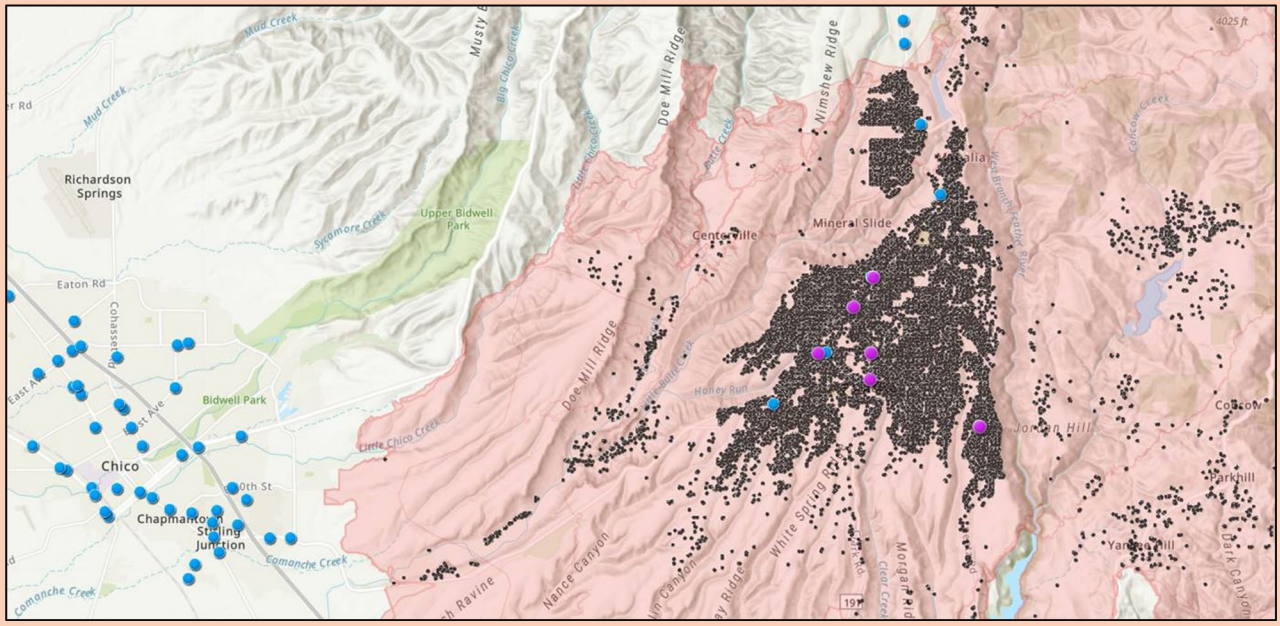
You should use one or more of these alert notifiers.

- The FEMA mobile app provides real-time alerts from the National Weather Service. Other commercial mobile apps also provide information about emergencies.
- Free weather radar apps use the National Weather Service radar and provide updates every few minutes.
- NOAA Weather Radio All Hazards broadcasts weather warnings, watches, and forecasts, and other types of hazard information 24 hours, 7 days a week from the nearest National Weather Service office.
- Outdoor community warning systems sound a 3 to 5-minute steady blast on a horn or other device to get the attention of residents.

For more information see the National Association of Convenience Stores brochure: www.convenience.org/disasterplan

Camp Fire—Damaged UST Facilities

Prior to November 2018, 10 businesses operated UST facilities in Paradise, located in Butte County, including nine retail gas stations and one AT&T facility with an emergency generator UST. As the Camp Fire quickly burned through the town, structures were destroyed at six of the nine gas stations. The other three gas stations and the AT&T facility lost power but did not suffer any serious damage. Interestingly, one station that burned was located directly across the street from another that was undamaged. See screenshot below for an UST Finder map of all ten locations.



Blue Dot: Facility Location, UST Finder *Purple Dot: Damaged Facility* *Pink Area: Perimeter of Camp Fire*

When evacuation orders were lifted, Butte County UST inspectors visited each facility and found similar damages at the six affected gas stations. Tanks, product piping, and dispenser islands appeared to be unaffected. However, vent piping designed to prevent flammable vapors from accumulating in unsafe locations were destroyed and possibly melted, pulled down by the weight of collapsing structures. Leak detection monitoring systems located inside convenience stores were also destroyed.

For up to six months, the Butte County Environmental Health Department worked with facility owners to remove fuel from all USTs at the six damaged facilities. Contacting UST owners in the days and weeks after the fire was difficult. All UST facility owners arranged for fuel removal themselves, although California was prepared to remove fuel at one site where the owner initially requested assistance.



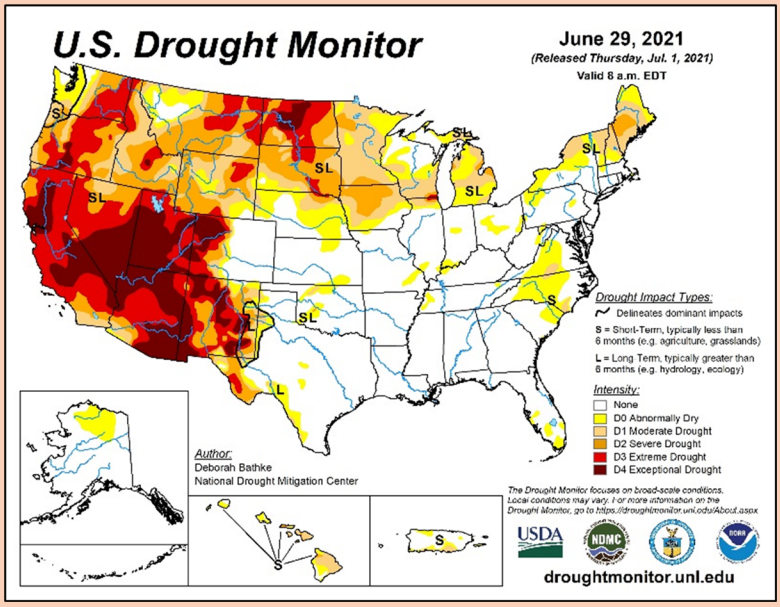
Image of impact of the Camp Fire on an UST facility

Takeaways

- In a quick-moving wildfire, UST owners and operators may have very little time, perhaps minutes instead of hours or days, before evacuating for their own safety.
- Removing fuel from unmonitored, disconnected UST systems is a top priority for UST regulators after evacuation orders are lifted. Uncertainty about the logistics of selling fuel back to distributors or recyclers complicates the decision for some UST owners and causes delays about how to proceed.
- If UST owners do not have sufficient property insurance—which may be difficult to obtain in wildfire-prone areas—owners of damaged facilities will likely be slower to decide if and how to resume operations.
- Even for UST owners with sufficient insurance, the time allotted by some states for UST temporary closure may be insufficient for an UST facility destroyed by wildfire. The steps needed to resume operations include more than testing, re-permitting, and potentially rebuilding UST systems. Debris removal and the construction of new facilities, such as gas stations or convenience stores, can take a significant amount of time after a natural disaster. Contact your state implementing agency.

Being Ready

To understand the potential risk for wildfires, explore the U.S. Drought Monitor, which provides weekly updates monitoring drought in the United States; see screenshot on the next page. The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration (NOAA). It provides comprehensive and timely analysis for monitoring drought to assist in assessing conditions conducive to wildfires.



The U.S. Drought Monitor provides a series of maps depicting current drought conditions.

To prepare for wildfires, the National Fire Protection Association developed Wildfire Preparedness Tips. The tips generally focus on private homes, but the information also applies to UST facilities. Information on a broad range of prevention and recovery topics, which may be of interest to UST owners or operators, is available on the National Association of Convenience Store's website. The US Forest Service and NASA's Fire Information for Resource Management System provides direct alerts for specific areas of interest, and you can tailor notifications for near real time, daily, or weekly. Direct fire protection questions to your local fire professionals or state fire marshal's office.

As useful as the currently available fire protection resources are, they do not cover what an UST facility owner or operator should consider as a wildfire approaches or what to consider as personnel evacuate the facility.

There are certain actions that, if taken prior to leaving the facility, could minimize impacts to the UST system and result in a more rapid re-start after the fire has passed and it is safe to re-enter the impacted area. As a first step, consider developing a contingency plan that includes, but is not limited to:

- A facility diagram identifying all UST locations and active remediation systems
- Emergency contact information and notification procedures
- Facility geospatial data, if not already contained in UST Finder
- Checklist and inventory of items needed to maintain a minimum level of service after a wildfire
- A list of UST contractors and testers
- A list of money available for facility restoration
- UST fire preparation and facility restoration checklists
- Familiarity with operating emergency shutdown equipment, such as emergency stop switch, pump control boxes, circuit breakers, and shear valves

An UST system consists of the underground tanks, associated piping, and fittings up to and including the under-dispenser area. Most of an UST system is underground and more protected from impacts of fire than other structures, such as fuel dispensers, which are aboveground. However, if aboveground system components are damaged by wildfires, water from firefighting operations may enter the UST system. That invasive water could have a corrosive effect on UST components. Additionally, with open ports to the system, such as vents, there may be temperature fluctuations in the system. Corrosion is accelerated by the presence of water and increases in temperature; a 9°F increase doubles the corrosion rate. UST system corrosion may not be immediately evident.

The most visible and significant impacts of fire damage to UST systems are the aboveground parts of systems. This includes dispensers; even though they are not part of UST systems, damage to dispensers may indicate there has been damage to under-dispenser areas, which are part of UST systems. Vent piping is another aboveground component that can be impacted by fire.



A defensible space is an area around a building in which vegetation, debris, and other types of combustible fuels have been treated, cleared, or reduced to slow the spread of fire to and from the building. Defensible space is the buffer you create between a building on your property and the grass, trees, shrubs, or any wildland area that surround it. This space is needed to slow or stop the spread of wildfire and it helps protect your facility from catching fire—either from embers, direct flame contact, or radiant heat. Proper defensible space also provides firefighters a safe area to work in and defend your facility.

Key Points To Consider In Case Of Wildfire

Emergency Stop Switch Or Emergency Shut-Off

If the emergency stop switch is activated, it shuts down power to the fuel dispensing system. National fire codes require this switch, which can quickly and easily be activated as personnel evacuate the premises. With no power to the pumps, fuel cannot be dispensed from the USTs. Understanding the correct operation of the emergency stop switch is a key part of the required Class C operator training.

Shear Valve

Generally, a shear valve is thought of as a safety feature to protect against the risk of impact on the fuel dispenser. The energy from an impact to the fuel dispenser causes a shear valve placed in line to the fuel supply conduit to engage if there is a possibility that such impact could cause a leak of fuel to the environment.

Another use of the shear valve relates to fire. When tripped, piping will be capped at two points and limit the potential of fuel feeding the fire. Some shear valves are manufactured to trip in the event of fire. Others need to be manually tripped. In the event of wildfire, when leaving your UST facility, ensure the shear valves are tripped. This helps protect your inventory of fuel and prevent it from contributing to fire damage.

Have A Plan If Assistance Is Delayed

Because wildfires can impact large sections of infrastructure, be aware that emergency services may not be immediately available in your area due to other priorities. Consider preparing a checklist of what could be done as you wait for assistance to arrive.

Inventory

A wildfire of enough intensity and duration can affect portions of an UST system and result in a release of product. The only way to check if there has been a release of product from an UST is to regularly check the level of fuel in the tanks. Prior to leaving your UST facility, inventory and record the fuel levels in your tanks so that when it is safe to re-enter the site, you can determine if there was a loss of fuel, which may indicate an impact to your tanks.

Shut Off Power

During certain high-risk situations such as wildfires, a locality or electrical company may determine the best course of action to prevent further spread of fire is to shut off power for a time. Any electric spark could ignite combustible materials. Electrical current also produces heat and, if it produces enough heat, could combust, and further add to the impending wildfire threat. When power is shut off, some elements of an UST system will be inactive. These include your automatic tank gauge and some corrosion protection systems for steel tanks. While the duration of this shut off could be minimal, it may take some time post fire for you to receive permission to safely re-enter your property.

Consider these points if your system is equipped with an external turbine pump interface. The standard control box interfaces between the fuel dispenser and turbine pump and indicates via a signal light when a customer begins fueling. It is also designed as a lock-out-tag-out device to ensure safety during maintenance. The benefit to de-energizing the standard control box is that if you throw the main breaker to shut down everything, when returning and re-engaging the main breaker, the control box remains the cut-off point of power to the pump on top of the tank. That acts as an additional safeguard and control point to avoid sending electricity to a sump, dispenser pan, or other low point in the tank system that could contain an explosive environment.

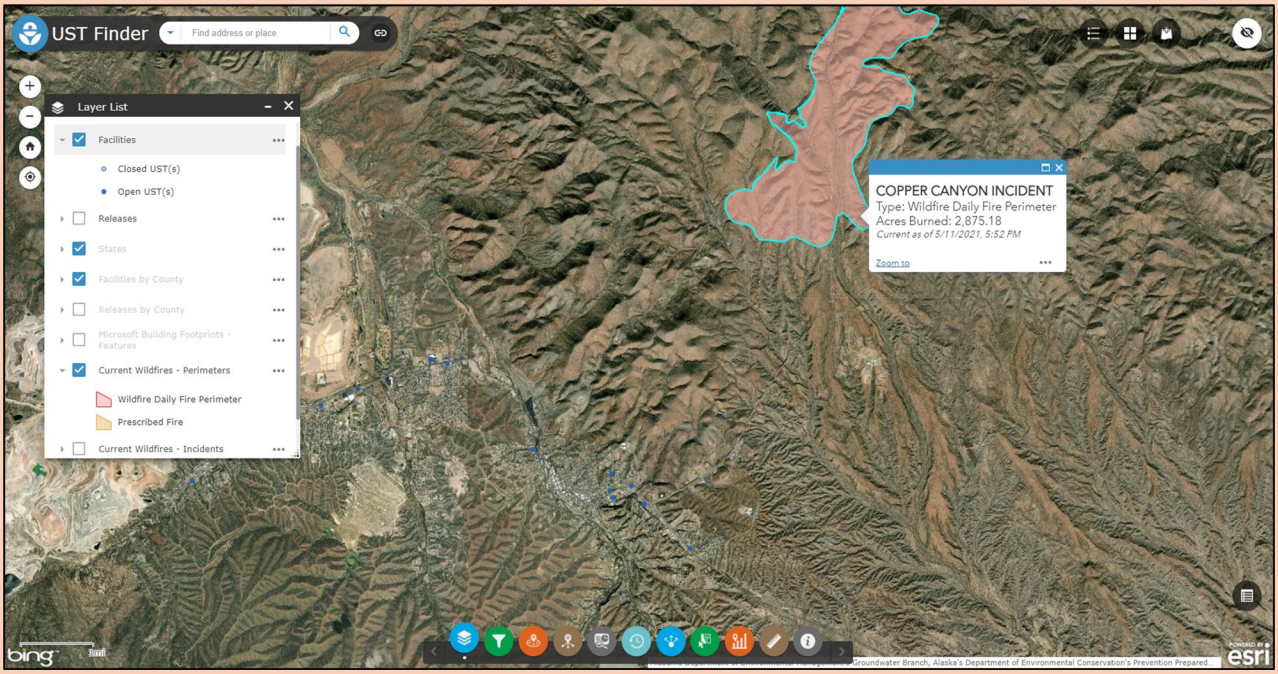
Wildfire Preparation

In addition to general fire preparation, there are some additional steps you might consider.

- Ensure combustible debris is removed prior to every fire season and during high fire risk index days.
- Regularly check the Fire Danger Forecast developed by the US Geological Survey to assess the current risk potential for wildfires in your area.
- Ensure the vent valve is freely operating, not corroded, or stuck leaving a direct opening into the tank. Visually inspect the elastomeric seals each season to ensure they are in good condition.

UST Finder: Near Real Time Fire Conditions

The Integrated Reporting of Wildland-Fire Information and National Interagency Fire Center provide data that inform map layers of the "best-known point and perimeter locations of wildfire occurrences within the United States over the past 7 days."[2] Information on where wildfires are in near real time is important to knowing whether an UST facility is vulnerable or not. This dataset is innate in UST Finder and users can leverage it to identify facilities in or near active wildfires. With UST Finder open, select the Layer List on the bottom left most widget. Within the layer list there are two wildfire datasets available—perimeters or polygons and incidents or point locations. Turn on the wildfire layers and facility layers to explore facilities near or within wildfire areas; see screenshot below.



Near real time fire parameter and nearby UST facilities

[2] https://epa.maps.arcgis.com/home/item.html?id=d957997ccee7408287a963600a77f61f

What To Do As The Fire Approaches Your Facility

Above all, personal safety is always of primary importance. However, if possible, the following table lists recommended activities depending on how far away the fire is when the facility is evacuated.

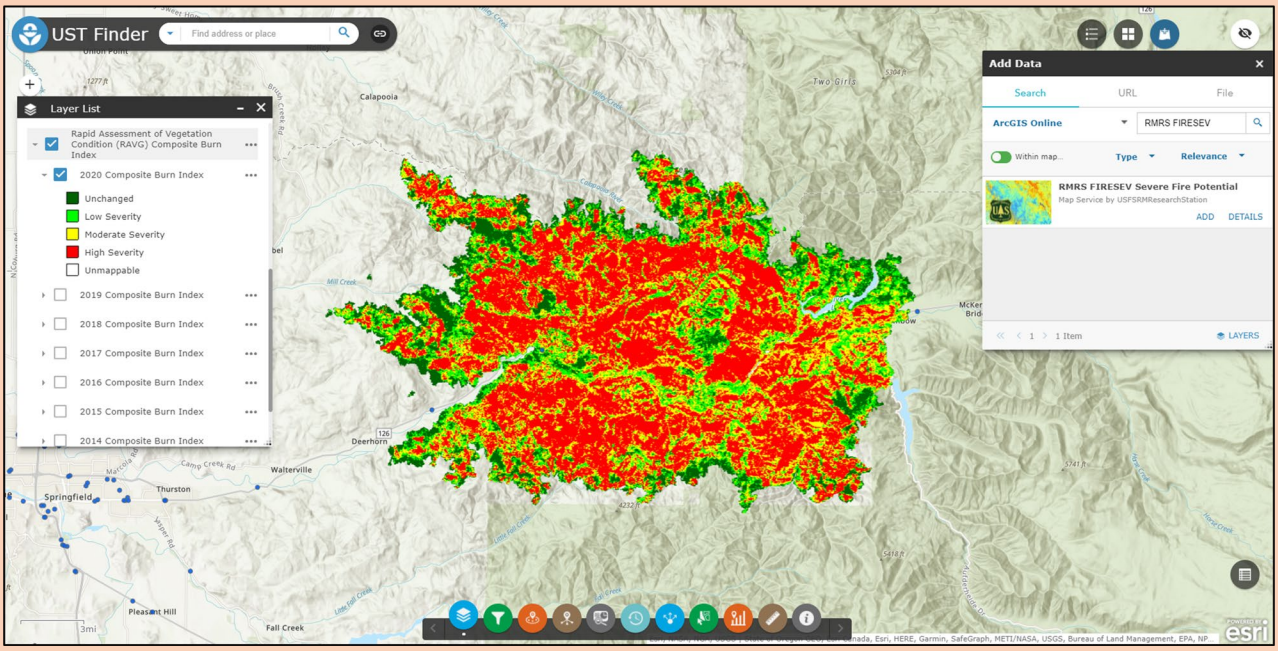
Recommended Actions For UST Facilities

Item	Preparation Every Season	If You Have Days To Prepare	If You Have Hours To Prepare	If Evacuation Is Imminent
Take photos or video of the system.	✓			
Keep valves open on aboveground piping to avoid isolating a section without a relief valve.	✓	✓	✓	✓
Secure power at the electrical panel by turning off the circuit breakers to all dispensers, pumps, and air compressors. If possible, leave the tank monitoring system turned on.		✓	✓	
Turn off the submersible pumps at the standard control box.		✓	✓	
If available, print an inventory and status report from the environmental monitoring system. If not available, note tank inventory.		✓	✓	
Close shear valve (also known as dispenser crash or emergency valve).		✓	✓	
Install signs that facility is closed.		✓	✓	
Depress the emergency stop switch.				✓

RECOVERY

After a major wildfire event, assessing the extent of burn inundation near UST facilities can help screen for a facility that may have been impacted. The USDA Forest Service Rapid Assessment of Vegetation Condition after Wildfire (RAVG) program produces geospatial data and maps of post fire vegetation conditions using standardized change detection methods based on Landsat or similar multispectral satellite imagery.[3] This dataset of burn severity post wildfire can be used in UST Finder to assess the severity of burning which occurred near or on UST facilities. To access this information in UST Finder, select the Add Data widget and type RMRS FIRESEV. Add the layer to UST Finder's Layer List, per screenshot below.

UST Finder: Post Event Screening



Importing wildfire burn severity data into UST Finder

In this screenshot, the burn severity for the 2020 wildfire in Arizona ranges from unchanged or dark green to high severity or red. With the facilities layer on, users can determine the proximity of UST facilities or blue points to burn areas. By clicking on an UST facility, users can find information about both the facility and individual USTs, including proximity to public drinking water intakes, fuels stored, age of tanks, and tank capacities.

[3] https://epa.maps.arcgis.com/home/item.html?id=8a1368a48f90408c917fe26ceba30cbc

Depending on the duration and intensity of the wildfire, damage can range from minor to complete destruction. Carefully performing a visual inspection of your facility is important to document the extent of the damage. This inspection includes elements of the UST system, as well as aboveground components integral to the facility itself. Using accepted industry checklists or your state mandated monthly, annual, and triennial checklists are a good place to start. See the table on the following page for next steps to take for certain situations you might find when you return to your facility following a wildfire event.

Getting The All Clear To Re-enter Facility

You can be notified of an impending wildfire and the potential need to evacuate your facility in different ways. You might see it on local TV, hear about it on radio, or learn about it directly from someone. You also need to be notified of when it is safe to return. Write down the name and number of the coordinator, who is the best contact for answering questions and providing clear instructions on when it is safe to re-enter your facility.

Find that contact through:

Your local fire department. They will connect you with whomever can give you the most current information.

or

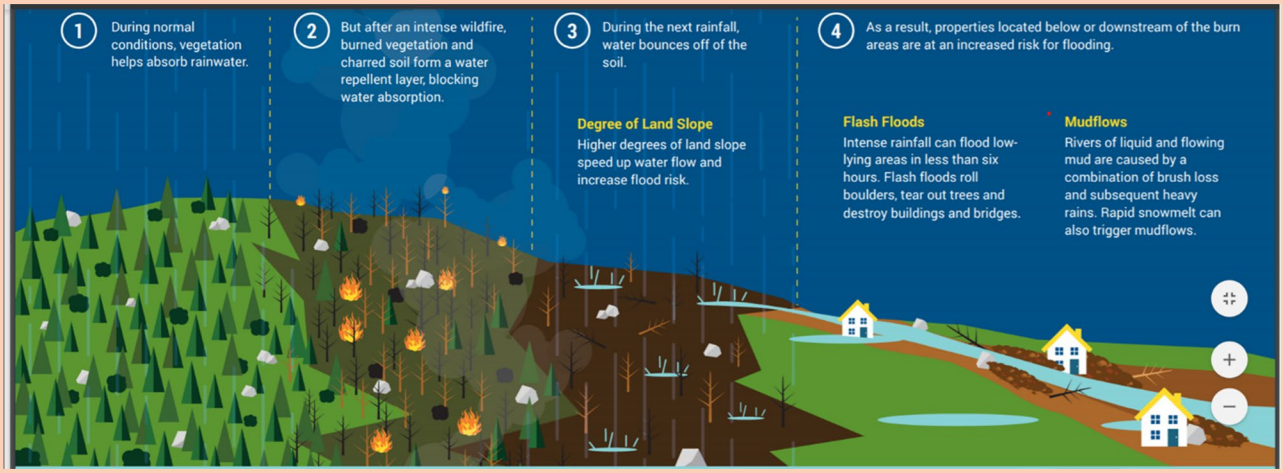
Your state's non -emergency number. They will connect you with whomever can give you the most current information.

Steps To Take When Returning To Your UST Facility

Visually inspect the dispenser, piping and vent piping, and all physical components to look for signs of damage or fire effects. Compare the system to before photos, if available. Compare the tank inventory to the before inventory.	
If:	**Then:**
For vent piping—there is any sign of fire damage such as scorched piping, melted plastic, or any telltale of excessive heat from the fire in or near the facility	• As soon as practicable after the facility is in operation, a qualified person should inspect the vent and vent valve to ensure it is properly working and plastic parts are undamaged.
There is significant fire damage near the dispensers and the piping or equipment is deformed, melted, leaking, collapsed, or showing similar failure	• Closely inspect the under-dispenser area. • Complete a comprehensive electrical test and inspection; replace wiring, conduits, and components as necessary. • Test all sensors, probes, alarms, and safety devices. • Replace all failed components.
There is damaged paint, or other evidence that the dispenser was affected by fire, but the system appears otherwise intact	• Determine if there is any damage by testing the UST system, according to industry standards or manufacturer instructions. • Complete a comprehensive electrical test and inspection; replace wiring, conduits, and components as necessary. • Test all sensors, probes, alarms, and safety devices.
There is unexplained product loss or inventory discrepancy	• Report a release to regulatory authorities. • Complete a comprehensive physical inspection of all accessible portions of tanks, piping, and components.
The system appears intact, and none of the above conditions are present	• Hire a licensed electrician to inspect the electrical system and restore power to the system. • Test all monitoring system probes, sensors, alarms, and the emergency stop switch system. Check operability of impressed current cathodic protection system, if installed. • If at any time a system is functioning incorrectly or anything fails testing, suspend all restart work until you identify and correct the source of the problem. • Turn the submersible pumps back on at the standard control box.
There is fuel remaining in tanks	• Determine the quality of the fuel, check for water ingress. • Determine what to do with that fuel. Are you going to be re-opening with no need for additional repairs? Is damage significant such that you should consider whether to pump out or sell remaining fuel?

Debris Flow Fields—Post Wildfires And Precipitation

Be aware of additional threats even after a wildfire has moved through an area. In some parts of the country, wildfires can cause conditions that create mudslide risks. Wildfires can significantly alter the hydrologic response of a watershed where even moderate rainstorms can produce dangerous flash floods and debris flows. Wildfires leave soil charred, barren, and unable to absorb water, creating the conditions for flash flooding, debris flow, or mudflow as illustrated below. Facilities in proximity to wildfire areas, especially those downgradient, may be subject to developing debris flow fields.



Debris flow fields post-wildfires (https://agents.floodsmart.gov/sites/default/files/FEMA-FAF-Infographic-ENG-web_508_01152021.pdf)

Are Wildfires An Issue For Aboveground Storage Tank Systems?

Aboveground storage tanks, or ASTs, have been used to store multiple substances for years. The evolution of storage tank standard design means ASTs properly respond to outside factors. Storage tanks systems include design elements to allow the tank to withstand exposure to fire without causing a catastrophic failure. As a result, while the material in the AST may be consumed in the fire as the heated vapor is burned off, liquid material should not be released to the environment.

- The tank contents absorb heat as the material boils off, which helps prevent the tank shell from failing while liquid is present.
- The tank emergency vent system serves to release excess pressure generated by the contents exposed to heat and to limit the introduction of oxygen into the tank interior. Insufficient oxygen will help ensure the heated tank vapors will not combust until the heated vapor has left the storage tank.

Proper maintenance of the AST system is important to ensure safety equipment will respond as designed. This includes placement of the tank away from structures and property lines to limit exposure to burning material and allowing access. The AST is also required to incorporate functional and necessary safety equipment to ensure the AST system responds predictably to fire. It is also important to limit the amount of combustible materials and vegetation in the area of the tank system with good housekeeping practices and proper landscape maintenance.

Properly Designated ASTs

A properly designed, built, and maintained aboveground storage tank can withstand limited exposure to fire with limited consequences, and if the exposure is long or severe the tank contents will be forced to boil off from the tank and be consumed by the fire in an area above the tank.

Being Ready

Wildfire Preparation

The first step in wildfire preparation is to confirm that your AST system is designed, installed, and operated according to industry standards, construction standards, and conformity to the local fire codes for the specific storage tank system. If design documentation is unavailable, an evaluation by a qualified tank system inspector can serve to confirm compliance with regulatory requirements and identify possible issues. Critical elements include:

- Properly constructed storage tanks and tank foundations are located away from structures and property lines according to fire code
- Proper tank venting, including emergency vents
- A piping system that includes an anti-siphon mechanism to prevent the release of contents should the piping fail
- A properly installed electrical system
- If the tank system has below grade components, such as product piping, the location of those items should be documented, corrosion protection may be required, and a form of leak detection is recommended
- Tank system should have an emergency power disconnect that can quickly de-energize the tank components and secure the tank contents into the tank
- Performing regular monthly and annual tank inspections per a recognized inspection standard that assures functionality of the important tank system elements
- Area around the tank should be kept free of combustible materials and vegetation including vegetation that overhangs the tank
- Properly labeling the tank and its contents to help emergency responders identify contents
- Tank is registered with either the applicable state, local, or tribal code official or fire marshal
- Reaching out to the fire department, which would be first to respond for your location
- Reaching out to out your Local Emergency Planning Committee, Tribal Emergency Planning Committee, State Emergency Response Commission, or Tribal Emergency Response Commission.
- Identifying the circuit breakers in the facility circuit panel that supplies power to the AST system

What To Do As The Fire Approaches Your Facility

Above all, personal safety is always of primary importance. There are, however, actions you can take that will aid in your post-fire recovery. As the fire approaches:

- Attempt to record tank inventory prior to shutting the system down
- Shut down the tank system using the tank emergency shutdown system and, if possible, isolate the system electrical components by turning off the power to the system at the facility circuit panel by turning the power off at the circuit breakers

The following table lists recommended activities depending on how far away the fire is when the facility is evacuated.

Recommended Actions For AST Facilities

Item	Preparation Every Season	If You Have Days To Prepare	If You Have Hours To Prepare	If Evacuation Is Imminent
Keep the AST area clear of brush, grass and other fire sources. Keep surrounding areas mowed and maintained.	✓			
Inspect tank for key safety device functionality, especially the emergency vents.	✓	✓		
Keep valves open on aboveground piping to avoid isolating a section without a relief valve.	✓	✓	✓	✓
Secure power at the electrical panel by turning off the circuit breakers to all dispensers, pumps, and air compressors. If possible, leave the tank monitoring system turned on.		✓	✓	
If available, print an inventory and status report from the environmental monitoring system. If unavailable, note tank inventory.		✓	✓	
Take photos or video of the system.		✓	✓	
Remove combustibles, stored equipment, drums, and other unnecessary items from the AST area.		✓	✓	
Close shear valve (also known as dispenser crash or emergency valve).		✓	✓	
Install signs that facility is closed.		✓	✓	
If there is a safe means available, relieve pressure from aboveground piping.		✓	✓	
Depress the emergency stop switch.				✓

RECOVERY

Any AST system requires careful evaluation and possibly formal inspection after fire exposure. Below are specific points to consider:

- Allow the AST system to return to ambient temperatures before any evaluation or inspection begins.
- Use an appropriate and published consensus standard inspection checklist as a guide to tank system evaluation. If any components of the system show evidence of damage or heat exposure, a qualified tank inspector[4] or petroleum equipment technician should evaluate the AST system. Signs of damage include melted or heat damaged components, blistered paint on the tank system, or a shifting of tank components.
- Evaluate the AST secondary containment system to make sure it is still intact and can serve its intended purpose.
- Check the quantity of petroleum in the tank, and if there is a significant change in the tank's liquid level of more than 5 percent loss or increase[5] from the last known inventory, have a qualified tank inspector evaluate the tank system.
- Check the primary tank and interstice of a double-walled tank for the presence of water during this evaluation. If a loss of product has occurred, identify the cause of the loss, and correct or repair the cause of the product loss in according to an appropriate consensus standard. Because the loss could indicate some material boil off occurred, inspect the tank system and evaluate the tank product because exposure to heat can degrade products stored.

[4] A qualified inspector will typically be certified under STI SP001 or API 653.
[5] Firefighting water may enter the AST system.

Steps To Take When Returning To Your AST Facility

Visually inspect the AST, piping, and all physical components to look for signs of damage or fire effects. Compare the system to before photos, if available. Compare the post fire AST inventory to the before fire inventory.

If:	Then:
There is significant fire damage, and the tank, piping, or equipment is deformed, melted, leaking, collapsed, or showing similar states of failure	• The system may have failed and needs to be repaired or replaced. • Complete internal tank inspection according to appropriate industry standard if tank and its associated equipment—such as piping, appurtenances, and safety equipment—remains in service. This may include an inspection by a certified AST inspector. • Complete comprehensive electrical test and inspection by a licensed electrician; replace wiring, conduits, and components as necessary. • Test all sensors, probes, alarms, and safety devices. • Replace the affected tank, piping, and equipment. • After new replacement system is installed, test the entire system, including tanks, piping, and equipment according to NFPA 30, manufacturer instructions, applicable requirements under 40 CFR part 112, Spill Prevention, Control, and Countermeasure (SPCC) rule (see note below) if the facility is SPCC regulated or other appropriate industry standards. • If the facility has an SPCC plan required under 40 CFR part 112, amend the plan to reflect changes to the AST.
There is damaged paint or other evidence that the system may have been affected by fire, but the system appears otherwise intact	• Complete tests of tanks and piping, according to industry standards or manufacturer instructions. • Complete comprehensive electrical test and inspection by a licensed electrician; replace wiring, conduits, and components as necessary. • Test all sensors, probes, alarms, and safety devices.
There is unexplained product loss or an inventory discrepancy	• Report a discharge to applicable federal, state, local, or tribal regulatory authorities. • Complete a comprehensive physical inspection of all tanks, piping, and components.
The system appears intact, and none of the above conditions are present	• Hire a licensed electrician to inspect the electrical system and restore power to the system. • Test all monitoring system probes, sensors, alarms, and the emergency stop switch system. • If at any time a system is functioning incorrectly or anything fails testing, suspend all restart work until you identify and correct the source of the problem.

Note: The SPCC Rule at 40 CFR Part 112, requires certain AST facilities to prepare and implement oil discharge prevention plan. The plans may be either professional engineer certified or self-certified by the facility owner or operator. One of the requirements of plan holders is to amend their SPCC plan when there is a change in the facility design, construction, operation, or maintenance that materially affects its potential for a discharge to navigable waters or adjoining shorelines. For more information on the SPCC program: https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations.

Financial Assistance Available To UST And Oil AST Owners And Operators

The availability of money sometimes determines the priority UST and oil AST owners and operators can take for recovering from wildfires and bringing tank systems back into operation. Money may be available for prompt immediate actions that must be taken to protect health, safety, and the environment. Money may also be available for longer term cleanup and site recovery.

For UST And Oil AST Owners And Operators

- Disasterassistance.gov is a joint data-sharing effort between federal, tribal, state, local, and private sector partners. At this website, tank owners and operators can:
  - Find disaster assistance that meets personal needs
  - Learn about more than 70 forms of assistance from 17 federal agencies
  - Apply for disaster assistance online
  - Find a FEMA Disaster Recovery Center
  - Learn about Small Business Administration loans for homeowners, renters, and businesses
- Various sources, including non-profits, private, local, state, and federal, may provide financial assistance for business recovery.
- USA.gov is the federal government's official online guide to government resources and services. For information on receiving emergency individual financial assistance after a disaster, see Disaster Financial Assistance.
- Visit benefits.gov to learn about applying for disaster relief benefits.
- FEMA's Public Assistance Program supports communities' recovery from major disasters by providing grant assistance. Local governments, states, tribes, territories, and certain private nonprofit organizations are eligible to apply.
- The Small Business Administration offers low interest loans for businesses if their insurance and funding from the FEMA doesn't fully cover the needed disaster assistance.
- During some disasters, states may also request that FEMA assign and fund EPA to provide direct assistance with oil and hazardous materials cleanup. This is accomplished under the Oil and Hazardous Materials Response section, that is, Emergency Support Function 10 [ESF-10] of the National Response Framework.
  - Facility owners do not request ESF-10 assistance directly from FEMA or EPA. Only a state may request assistance under this mechanism, and FEMA may require a state to contribute a percentage of the ESF-10 costs. For more information, see National Response Framework and select ESF-10.

For UST Owners And Operators

- State financial assurance programs may provide loans and grants to eligible owners and operators for corrective actions, where applicable. For more information, see UST state financial assurance funds on EPA's UST website.
- State trust funds may reimburse responsible parties or third parties for corrective actions related to UST releases if certain prerequisites for coverage are met.
- In an emergency, states may use Leaking Underground Storage Tank (LUST) Trust Fund money to conduct emergency responses, site assessments, or corrective actions. In non-emergency situations, states may use LUST Trust Fund money to conduct site assessments or corrective actions where the responsible party is unknown, unwilling, or unable to respond.

Resources And Links

General

- U.S. EPA Emergency Response Program
- U.S. EPA Natural Disasters website
- U.S. EPA Wildfires website
- British Columbia, Canada Fire Smart principles
- California Camp Fire
- Federal Register Hazardous Chemical: Community Right to Know: Hazardous Chemical Reporting Thresholds
- National Association of Convenience Stores Gas Stations Contend With Western Wildfires
- National Association of Convenience Stores Emergency Planning Resources

Checklists For Inspecting Underground Storage Tank Systems

- Petroleum Equipment Institute (PEI) Recommended Practice (RP) 900 Annual UST Inspection Checklist
- PEI RP 900 Monthly UST Inspection Checklist
- PEI RP 900 Daily UST Inspection Checklist

Data

- U.S. Forest Service Wildfire Hazard Potential dataset
- University of Nebraska at Lincoln U.S. Drought Monitor droughtmonitor.unl.edu
- National Fire Protection Association Wildfire Preparedness Tips
- U.S. Forest Service and NASA Fire Information for Resource Management System
- U.S. Geological Survey Fire Danger Forecast

Underground Storage Tanks Specific Resources

- U.S. EPA Flood Guide
- U.S. EPA Operating and Maintaining Underground Storage Tank Systems: Practical Help and Checklists

Aboveground Storage Tanks Specific Resources

- U.S. EPA SPCC Oil Spills Prevention and Preparedness Regulations
- U.S. EPA How to Report Spills and Environmental Violations
- U.S. EPA When are You Required to Report an Oil Spill and Hazardous Substance Release?

- U.S. EPA Overview of the Discharge of Oil Regulation (Sheen Rule)
- U.S. EPA Oil Discharge Reporting Requirements Factsheet
- American Petroleum Institute (API) DESIGNATION - API STD 653 5TH ED (E1) (A1) (A2) Tank Inspection, Repair, Alteration, and Reconstruction; for purchase
- Steel Tank Institute (STI) SP001 Standard for The Inspection of Aboveground Storage Tanks, 6th Edition; for purchase
- STI Frequently Asked Questions About SP001
- STI SP031 Standard for Repair of Shop Fabricated Aboveground Tanks, 5th Edition – PDF format; for purchase

Aboveground Storage Tanks: Other Fuels

- Propane and Liquefied Propane Tanks Wildfire
- Vehicular Natural Gas Fuel Systems Code, NFPA 52



United States Environmental Protection Agency
5401T
Washington, DC 20460
EPA 510-B-21-001
September 2021