

# Rapid Lesson Sharing

**Event Type:** Fuel Geyser Incident

**Date:** April 27, 2020

**Location:** Grizzly Peak Module  
Dolores, Colorado

*"I share this incident to remind us all that caution needs to be taken as non-COVID threats still exist in our fire world."*

## Insights and Lessons from a Fuel Geyser Event

by  
**Logan Davis, Assistant Captain**  
**Grizzly Peak Module**  
**Colorado Division of Fire Prevention  
and Control**

### Background

Our Grizzly Peak Module recently received a new fleet of STIHL MS-462 R C-M chainsaws. Overall, this seems to be a lighter saw with ample power. They have been running well, with minor issues related to operators learning the nuances associated with the electronically controlled carburetors.

Then, this Monday, an experienced sawyer on our module had the first geysering incident—thankfully with minimal consequence.



**The sawyer's gloved hand and chaps were soaked in saw gas from the fuel geyser incident.**

### The Story

Events leading up to the event were what I would consider to be normal operations on a warm spring day at moderate elevation.

After approximately one hour of cutting brush, the sawyer turned off his saw to take an additional bump down the line. This was the second tank of fuel to be run in his saw that day. It was 91 octane fuel with ethanol (because "clear" [non-ethanol] 91 octane was not available at the fuel station), mixed with STIHL HP Ultra 2 stroke mix at 50:1.

Next, when he attempted to restart the saw, he was unsuccessful—getting nothing more than a sputter. He momentarily set the saw down to cool.

He then once again attempted to restart the saw—but couldn't. Suspicious of a vapor-locked condition, he set the saw aside for continued cooling and engaged in casual conversation.

Several minutes later, the sawyer cautiously opened the saw's fuel tank—only to be greeted with a geyser of fuel. Because this is exactly what he had anticipated [see sidebar on right], he was able to reduce the geyser's volatility by careful placement of his hand over the fuel cap as he opened it.

Even so, this incident still resulted in his (gloved) hand and chaps becoming soaked in saw gas (see photo). While looking into the tank we were able to see the fuel actively boiling within it. I was able to capture the fuel boiling condition in this video clip:

### Video of Boiling Fuel Inside Tank



<https://youtu.be/ojKrZ3zE-Ak>

### Weather Conditions

The following weather conditions were recorded approximately 15 minutes after the geysering incident occurred:

**Time** – 1400

**Dry Bulb** – 67

**RH** – 23

**Winds** – Light 1-5 SW

**Cloud Cover** – <30%

**Elevation** – approx. 7,950 feet

**Slight southern/flat aspect**

### From the Sawyer's Perspective

*[To help our overall learning from this incident, the sawyer has taken the time to write down the following account for this RLS.]*

**By Adam Hanson, FAL2  
Sawyer, Grizzly Peak Module**

My anticipation of possible fuel-geyser occurrence in April 2020 was informed by several factors:

1. Use of and familiarity with modern Stihl Professional series chainsaws since 2005.
2. Use of Stihl chainsaws in wildland fire conditions.
3. Learning about fuel-geysers through the U.S. Forest Service and the Wildland Fire Lessons Learned Center (LLC).
4. Personal experience of a fuel-geyser during the 2017 season.

When my 462C did not readily start after manual shutdown, and knowing there was still ample fuel in the tank, I suspected vapor lock. After checking the other common culprits for difficulty in starting, this seemed to be confirmed. In addition, my familiarity with Stihl chainsaws suggested that the saw may continue to not start until it had cooled.

Because this was not an urgent project, I chose to let the saw cool, noting that this was not a particularly warm day for this type of behavior to be occurring. When I eventually chose to open the fuel tank with the intention of inspecting both the fuel and the filter, I was cognizant of the potential for a fuel-geyser.

This awareness was due to repeated discussions of this hazard over the last few years. Specifically, these similar symptoms were present when I experienced a powerful geyser on the fire line in 2017—although, those conditions were much more extreme (ambient temperature of 105 degrees or more). Thanks to the repeated LLC discussions, I have developed a habit of covering the fuel cap with a gloved hand when opening.

This action deflected the spray of fuel (off my palm, into my chaps) as I slowly opened the tank, and then immediately closed it again. The saw was held level throughout, and the remaining pressure was relieved with substantially less spray upon a second careful opening. Inside the fuel tank, the fuel was boiling constantly.

### Lesson

I share this incident to remind us all that caution needs to be taken as non-COVID threats still exist in our fire world—even though our current focus seems to be directed on these pandemic hazards. Geysering in our saws can and will still happen in conditions that are far from the extreme end of the spectrum.

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**This RLS was submitted by:  
Logan Davis, Assistant Captain  
Grizzly Peak Module**

The reporting of this incident was coordinated with the U.S. Forest Service National Technology Development Program (NTDP) and reported via the [National Fuel Geysers Awareness Campaign](#) webpage.

*[If you experience a fuel geysers, please report it.](#)*

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### **More Information and Tips on Fuel Geysers**

- ❖ **How to Avoid a Fuel Geysers:** <https://www.wildfirelessons.net/viewdocument/how-to-avoid-a-fuel-geyser>
- ❖ **National Fuel Geysers Awareness Website:** For more information—or if you experience a fuel geysers—go to the National Fuel Geysers Awareness website: <https://www.nwgcg.gov/committees/equipment-technology-committee/national-fuel-geyser-awareness>
- ❖ **Here's what can happen when a geysers happens on the fireline:**



<https://youtu.be/MgWgVDN8e5s>

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