Rapid Lesson Sharing

Event Type: Fuel Geyser

Date: April 3, 2026

Location: Washington & Jefferson National Forests, Virgina

Virginia Fuel Geyser

"We hadn't talked about it yet this year…but we need to get people thinking, when that saw stops, don't just pop the top." —Sawyer

Photo 1: A fuel geyser is demonstrated in a laboratory.

Background

"*I knew better,"* remarked the experienced Faller 2 (FAL2) as he reflected on his recent chainsaw fuel geyser incident. In his 12 years as a certified sawyer, he's engaged in numerous safety briefings about the dangers of fuel geysers. Reminders about these hazards do seem to have fallen off the radar lately however, he noted.

It had been a slow spring for wildfire, but crews had been busy with prep work for the Forest's active prescribed fire program. By the time the season's first real wildfire was reported on that early April afternoon, he had been working for eight days straight. He reflected *"we're kind of understaffed…I'll admit I was tired."* He headed to the fire with the initial attack (IA) module and his trusty chainsaw, "Blueberry," a well-maintained one-year-old Stihl MS 462. Despite experiencing some fatigue, he had the situation well in hand.

Narrative

The lightning-sparked fire was about 36 acres and temperatures hovered close to 80 degrees when the module arrived. After receiving a briefing, the sawyer and his partner anchored into the creek and traveled up the right flank of the fire. They built line as a team of two, while crews from two four-person engines worked this same flank. His partner trailed him using a leaf blower, as is typical in this fuel type. This left the sawyer to both cut and swamp by himself. The work was strenuous, but "Blueberry" was running well as the sawyer brushed, cut hot line, and swamped fuels for about two hours.

After felling a 16-inch diameter-at-breast-height (DBH) burning snag and bumping up the line, he was unable to restart his saw. He moved about 20 feet away from the fire to investigate the issue. Unsure of how long it had been since he last refueled, he popped the cap off the saw, notably failing to first check the fuel window. Fuel immediately sprayed out of the saw, splashing his chaps, leg, chest and arm.

He informed the Incident Commander (IC) that he was hiking down to his vehicle to clean himself off from a fuel geyser incident. Down at the truck, he changed his Nomex shirt, washed his skin, and did his best to clean the fuel off his Nomex pants. After allowing his pants to dry, he returned to the fireline and resumed work.

The next day he noticed a small blister had developed on one of his wrists and filled out a precautionary federal report of work-related injury (an OWCP Form CA-1).

Photo 2: A sawyer cuts a large diameter tree on a hot fireline.

Contributing Factors

After a saw has been running hard in high-ambient temperatures, the fuel and vapors inside the tank can heat up and expand. Fuel geysering happens when this built-up pressure is released before the tank has had time to cool. In this situation, the temperature was around 80°F, and the saw had just been used to cut a large, burning tree. Heat from the burning tree and the friction of the blade, compounded by a motor running with a lack of cool airflow, was further trapped inside the saw by its plastic housing. The fuel was then agitated as the sawyer carried the saw down the line to the next area.

The National Wildfire Coordinating Group (NWCG) recommends the following steps to mitigate the hazards of the combination of fuel, heat and pressure:

- Always assume fuel tanks and fuel containers are pressurized.
- Ensure the cap is correctly secured.
- Always check fuel levels before opening the fuel tank or filler cap. Fuel levels greater than ½ tank may geyser.
- Move at least 20 feet or more from any heat source.
- For safety cans with pour spouts, direct potential spray away.
- Cover the cap with a rag to contain potential fuel geyser spray.
- Be extra vigilant when equipment is running poorly with fuel levels above ½ tank.
- Start the saw at least 10 feet from the fueling area.
- Do not use fuel older than one month.

If the equipment is running poorly or vapor lock is suspected:

1. Do not open fuel cap. Relieving the pressure does not alleviate a “vapor lock” equipment.
2. Check fuel level through the tank or use the bar oil level to gage fuel level.
3. If fuel level is over ½ full, DO NOT open the tank.
4. Allow the equipment to thoroughly cool. This could take over 45 minutes.
5. When the equipment is cool, restart the equipment.

There is already a substantial body of work about the mechanics and hazards of fuel geysers. For more information, see: https://www.nwcg.gov/equipment-technology-committee/national-fuel-geyser-awareness and https://lessons.wildfire.gov/ (enter “Fuel Geyser” in the “Search for Incidents” “Search Term”).

Photo 3: A sawyer carries a chainsaw, fuel can, tools, and line gear.

1. Fatigue, both mental and physical, is a mighty foe:

The sawyer was well-acquainted with the dangers of fuel geysers. He immediately identified fatigue as a contributing factor to this incident. Not only had he worked eight days straight, but he had also been up at night with two young children at home. And while he understood the steps necessary to avoid fuel geysering, even the most ingrained process becomes more difficult when very tired.

On this fire, the FAL2 was functioning as both sawyer and swamper, which added an additional layer to his already strenuous job. Operating without a swamper means that the sawyer is carrying all the saw fuel along with his chainsaw and IA gear, spotting his own falling, and moving slash off the fireline—all while cutting in a hot, smoky, and often steep fire environment. Although not noted by this sawyer, it should be recognized what an enormous expenditure of physical and mental energy this requires.

2. The rules for trouble shooting a malfunctioning saw are situational:

It's much easier to sit at a computer reading an exact sequence of safe practices than it is to apply them in real-world conditions. Firefighters and other emergency responders train small movements and habits until they become automatic under stress. While we aim to build processes and order of operations into muscle memory, best practices for trouble shooting chainsaw malfunction are highly dependent on the situation and environment. This variability contributes to the prevalence of fuel geyser incidents.

Consider just a few of the many situations a sawyer may encounter. During thinning operations on a fuels project, for example, the distance between cutting and refueling is not important in the absence of an ignition source. Instead, attention may shift to risks such as nearby falling operations or mitigating upslope hazards. In another scenario, a sawyer may be unable to sit down while refueling because doing so would reduce visibility to others in certain terrain or fuel types. Varied conditions such as these make it difficult to consistently rely on a fixed set of ingrained movements and sequences.

In this case, the sawyer noted that he did not check the fuel window. However, this step is not always productive; fuel windows are often obscured by soot, abrasion, or plastic degradation on heavily used saws. As a result, to determine whether the fuel tank is more than half full, sawyers may have to rely on estimating time

since the last refuel—an inherently challenging task in the dynamic environment of a fire. As many emergency responders observe, time perception is often distorted in the busy, stressful situations they encounter.

3. It's time for a reminder:

A decade ago, learning reviews about chainsaw geysers were more common. At the time of this writing, the most recent fuel geyser RLS on the Wildland Lessons Learned website is five years old. Have firefighters gotten safer?

The U.S. Forest Service encourages firefighters to use the NWCG tool for tracking fuel geysers.

It's unclear, however, how consistently these events are reported. The sawyer in this spring incident noted "*I know of more than one [unreported] geysering incident*" already this year.

Link to report of a fuel geyser incident:

https://www.nwcg.gov/equipment-technology-committee/national-fuel-geyser-awareness

Photo 4: A Stihl MS 462 chainsaw. The fuel window (bottom, right) on a heavily used saw often gets dirty or degraded.

4. Little things can get you, especially during busy assignments:

Beyond actively battling the fire, there are always a myriad of things to consider on the fireline: *Are we in tick country? Am I communicating well enough? Does dispatch or the IC know where I am? I wonder if it's "rainbow roast beef" again in my lunch bag?* The primary focus is, of course, still on firefighting. But as tasks pile up, it's easy to let one small thing go. Even in a less strenuous situation, such as when preparing multiple dishes at once in the kitchen, how often do you forget a critical step, like setting a timer after putting something in the oven?

Submitted by:

Keith Hackbarth

Jane Gordon

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(https://lessons.wildfire.gov/submit-a-lesson)

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