USDA Forest Service Duty Respect Integrity

LONG FIRE CA-CNF

ENGINE BURN DAMAGE

Facilitated Learning Analysis
September 23, 2010

Cleveland National Forest

Risk Management

Situational Awareness
Hazard Assessment
Hazard Control
Decision Point
Evaluate

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Executive Summary

On September 23, 2010, at 11:35 AM, the Long wildland fire on the Cleveland National Forest (CNF) ignited a Forest Service Type 3 Engine. The engine was parked within the burned perimeter and unattended at the time of ignition. Several firefighters on the incident watched the apparatus burning as they attempted to contact the engine crew via radio communications. Members of the engine crew returned from the fire line and extinguished the fire. Two firefighters used the pump, hose and water from the burning engine to suppress the fire. There was extensive damage done to the Boise Mobile Equipment Buildup (Box) with extension limited to just behind the cab. A Facilitated Learning Analysis (FLA) was initiated on September 25, 2010 by Randy Moore, Region 5 Regional Forester. The Long incident had many facets to examine including the ignition, medical emergencies and immediate need for employee air extraction. The focus of this FLA is to address issues and lessons learned related to the engine fire.

This is the second incident (1) this summer a wildland fire vehicle has caught fire while unattended and parked in the black. There have been many vehicles over the years burned in a similar fashion. It is the hope that both firefighters and managers will use this report in a learning environment. This FLA could not have been completed without the cooperation and willingness of the engine crew in sharing their story.

(1) http://www.wildfirelessons.net/documents/Plug_Hat_Fire_Damage_Government_Vehicle.pdf

Narrative

On the morning of the incident the four engine crew firefighters reported to their duty station and were notified that the Engineer had called in sick and the Engine Captain had scheduled sick leave. The Assistant Fire Engine Operator (AFEO) will now act as engine captain. The AFEO was qualified as engine boss a few weeks earlier. This will be his first time running the engine module by himself. The next in command is a firefighter type 1(FFT1) with a commercial license acting as the engineer. During the morning physical training hike the engine crew hears the initial report of a fire starting due to fuels treatment, project work. The local hotshot crew was on scene and is managing the fire. An initial request for two local engines is proving unfruitful and dispatch prompts the Incident Commander to request a full brush response. The engine responds and is assigned to assist with the hose lay on Division A. After some time, the engine crew asked the division supervisor (DIVS) if they could move the engine to a better location. The new location will allow the engine crew to have a shorter distance between the hose lay and engine hose packs. The division supervisor agrees with the move and the engine crew bumps the truck up. The area chosen to park was adjacent to a paved road and well within the burned perimeter. The area was considered fresh black as the fire had recently passed through the area. The fire perimeter is still very active as the crew parks. They removed several hose packs from the engine and quickly returned to the fire line. The engine is left running with the air conditioner on. The crew thought that if a crew member suffered heat illness the individual could be cooled rapidly upon returning. This is not a recognized practice. Sometime later there were radio transmissions to the crew notifying them their engine is on fire, the crew returns, moves the engine approximately 24’ forward and extinguishes the fire. The engine was moved because the crew believed that a small oak tree next to it was contributing to the fire. The IC orders a tow truck for the engine and then cancelled it to preserve the scene. Later in the day, the Forest and District duty officers observed smoldering in the duff under the oak tree. The ignition source of the engine fire was inconclusive as the area was very disturbed while attacking the fire and the engine had been moved. However the area of ignition was in the area of the right rear duals.

Setting

The Trabuco Ranger District is located on the north end of the CNF. The vegetation in the area of the Long Incident is High load, Dry Climate Shrub. The fuel type near the Long Incident is chemise, chaparral and coastal live oak. Local fire staff believes the area has not burned in over 50 years.

Initial attack responses in the Long Canyon area have a strong potential to become a high complexity wildland fire. The area is divided up into three response areas including the CNF, Cal Fire and the local county. The air and ground resources on a first alarm during high fire danger can exceed three fixed wing and two rotor wing aircraft as well as ten engines (Self Contained Breathing Apparatus, Turnouts and Foam Unit equipped), two hand crews and two chief officers. The Emergency Communication Center (ECC) provides incident support to several federal, state and county partners. The fire weather forecast on September 23rd for the area was Temperature 86 degrees with a predicted high of 90. Relative Humidity 15%, winds out of the east at 6 mph and with gusts to 10mph. Fuel temperature was 104 and 10 hour fuel stick was a 7.

The review team examined key decisions made by the engine crew and applied the Risk Management process. (Shaded boxes)

Time	***Event***
0930	Engine crew comes on duty.
	Decision Point - Engine Captain and Engineer are off due to sick leave. The crew decides to accept the risk of moving up two positions in organizational structure.(in concurrence with R5 Policy) To gather **Situational Awareness** the AFEO prepares himself mentally to assume command, he leads a hike to new area and they continue with normal daily operations such as reviewing the fire weather forecast, six minutes for safety and the daily situation report.
1135	Reported vegetation fire, 10 X 10 spot.
1140	Incident Commander reports, fire is now .25 acres and requests a full response.
1148	Engine is responding.
1149	Forest Service Law Enforcement (LEO) notifies dispatch they are working near the head of the fire.

Time	*Event*
1152	IC notifies dispatch power lines down.
1155	LEO requests a retardant drop for workers, also requests helicopter emergency extraction, reports, “fire is now within 150 yards”.
1210	Engine arrives on scene of the Long Incident.

Decision Point - The incident is escalating in activity and complexity, the engine crew engages the left flank of the fire. **Hazard Assessment-** They have been listening to the radio communications of power lines down and air extraction. Crew is familiar with the fuels, topography and local terrain. **Evaluate** – hose lay is progressing quickly, tactics of moving hose from bottom of the lay are too slow.

1215	Fire is now five acres with a rapid rate of spread.

Decision Point - Crew moves the engine to new location, notifies leadership and adjoining forces. **Hazard Control/Human Factors – The crew parks in the black, does not chock the wheels, leaves vehicle running and unattended as they return to the hose lay (engine is not engaged in pumping or shuttling water). There is a sense of urgency to return to the fire line approximately 1,000 feet away.**

1238	Report of Engine burning.

Decision Point – **The crew does not believe that an incident within an incident is being acted on. (Fire Suppression Doctrine allows for resources to engage when they are trained, equipped and qualified for the task at hand.)** The crew engages in a vehicle fire equipped with wildland PPE. The engine is equipped with SCBA and turnout gear. The AFEO considers his turnout gear but it is in a compartment near the flames. **Hazard Assessment** – The engine was burning petroleum products, releasing hazardous gases and there was potential for compressed gas cylinder explosion (oxygen bottle in lower right compartment).

Lessons Learned From Participants'

- I want to tell any up and coming driver to just slow down and take the extra time to check around when you are parking.
- Our crews need to be more careful about the tire treatment/ dressing we use, some of the ones we use are flammable.
- If you are ever in doubt about whether the black is still hot or not, check it with your hand.
- I used to be able to hear all aspects of the fire activity over the radio. Now with cell phones it seemed key information was missing and it affected my situational awareness.
- Moving crew members to cover other stations (10-20 times this summer on this engine crew) can affect crew cohesion and training.
- When there is a significant accident we should remember to leave the scene undisturbed.

Lessons Learned From Facilitators

- Regional Leadership and Incident management teams in the region have addressed **Incident Within an Incident (IWI)** issues at great extent and even used a break out session at this year's team meetings to create an emergency response template. Poor planning in this area can prove to be costly on many levels and does deserve some dialog here. An incident within an incident is loosely defined as, **"**An unexpected event occurring during an ongoing incident to the degree that it takes tactical resources away from their primary mission to focus on the new incident**."** This IWI can assume many forms ranging from a

hazardous material spill, medical aid to a Type III engine burning in the black. At a minimum, the following duties would fall to the Initial Attack IC or when a command structure is in place, the Division Group Supervisor:

DIVISION GROUP SUPERVISOR

- ☐ Responds to scene and **takes control of the incident within the incident** until relieved by a higher authority.
- ☐ Notifies Communications/Dispatch, gives location, type of event, number of injured people, severity, and the resources required for emergency.
- ☐ When available, directs line EMT's to respond and assist with care and planning of the evacuation.

- The region is experiencing a gap in fire leadership positions. Supervisors should consider experience level, and not exclusively minimum qualifications, when giving daily assignments as firefighters are assuming greater responsibility earlier in their careers than in the past.
- The parking location at first glance looked appropriate. Employees should examine parking areas before and after parking.
- Rubber tires are made from petroleum products and can ignite at relatively low temperatures. This combined with flammable tire dressings can significantly increase risk of ignition.
- Chocking vehicle tires is a requirement, not an option. (Health & Safety Code Chapter 12.4.5)
- After serious accidents, employees experience a wide range of emotions that often affect them negatively for some time. Supervisors should consider the need for after action reviews, critical incident stress management and the employee assistance program.
- Documentation is an area that will always be reviewed when an accident occurs. In this case the crew had a Driving Job Hazard Analysis at the station, however, it was not specific to the unit, was not current and had not been signed by the crew members.

Lessons Learned From Managers/Leadership

- Promote a learning, informed and just safety culture. Taking adverse actions on well-intentioned employees who made errors in judgment will likely hinder the willingness of employees to take responsibility, as well as to learn and share with others from these experiences.
- When there are gaps in module leadership or supervision, managers and leaders ultimately bear the responsibility to engage in determining whether or how these gaps are addressed. Management needs to be engaged in the proactive management of module leadership gaps.
- Even though employees may be fully qualified for their assignments, experience is highly valued. We need to be mindful of how assignments are made and

ensure employees are matched to their levels of experience, despite being fully qualified for their assignments.

- Managers and Leadership need to ensure that lessons learned are shared. Ultimately, recommendations and corrective actions need to be implemented and institutionalized into work activities.
- Do not assume operational Standard Operating Procedures (e.g., chock blocks, fire engine positioning, PPE, Golden Circle, etc.) are a given, as under varying conditions and circumstances, employee's can react differently resulting in forgetting or modifying SOP's. Reinforcing the value of readiness and preparation is essential in all phases of operations.
- Escalation of incident complexity requires immediate responses from supervisors, managers and leadership.

Factoid:

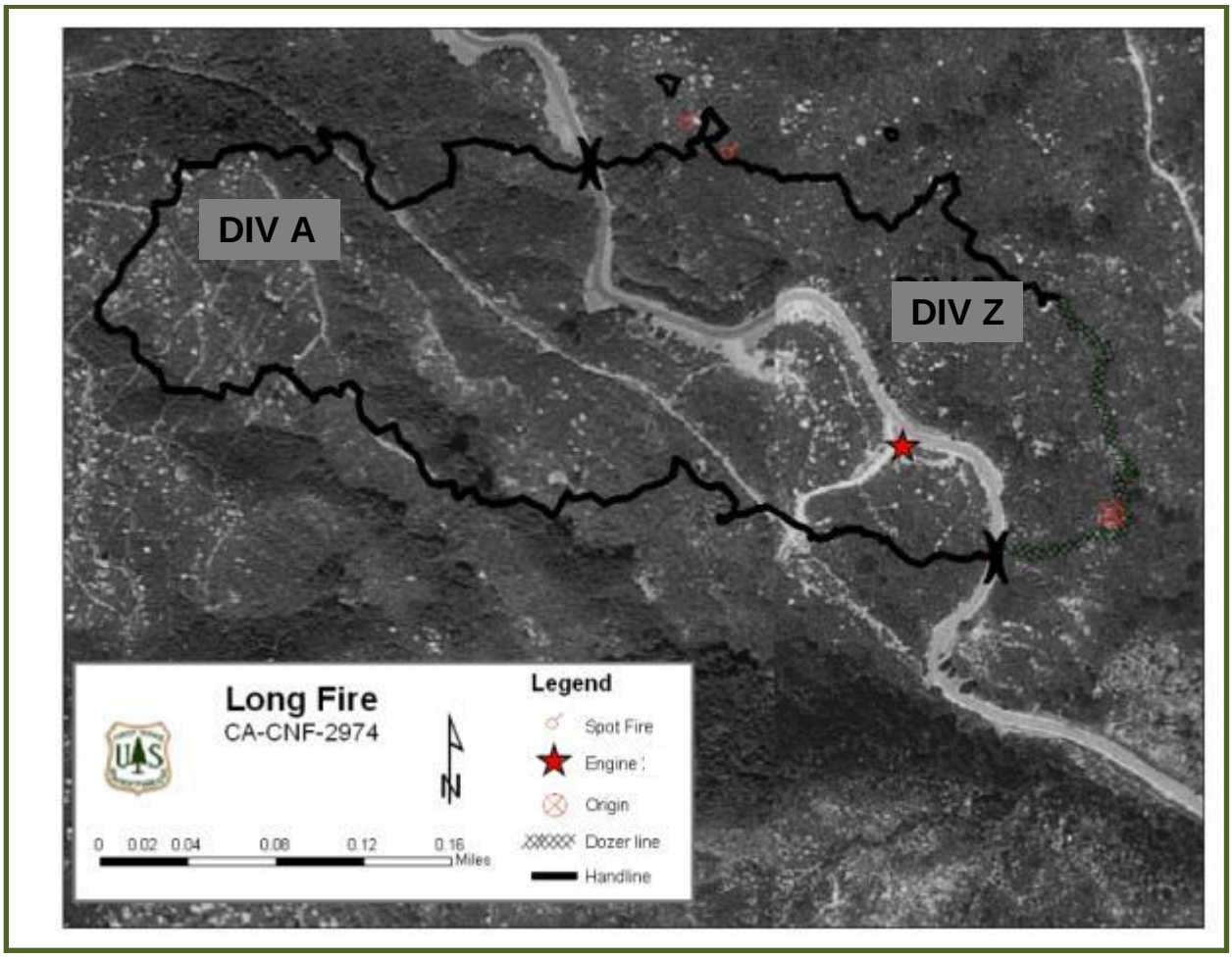
Tires begin to melt "Vulcanize" at 250-320 degrees and may ignite at 392 degrees. Sustained combustion will occur at 550-600 degrees Fahrenheit.

-Bridgestone North America

"THE BLACK"

When parking in *"the Black"* we must insure we do not give ourselves a false sense of security, we must always consider the black to be just that, a combustible that has sustained ignition, burning and a smoldering stage. This material may still in fact contain heat and cause damage to a static object that is introduced into that environment. It is our job to insure *"the Black"* is cold and out when introducing a new static feature into that environment *i.e.* tires, packs, equipment etc.

We as Emergency Responders may not always have the perfect parking areas to park or stage equipment. However it is our responsibility to take the time to *SLOW DOWN* and properly mitigate the situation to enhance the safety of the environment to the best of our ability to provide for maximum protection and safety of our crews, our self and our equipment.


DIV A
DIV Z
Long Fire
CA-CNF-2974
N
0 0.02 0.04 0.08 0.12 0.16 Miles
Legend
Spot Fire
Engine
Origin
Dozer line
Handline

Parking Vehicles- Look Up, Look Down, Look Around

As Emergency Responding Personnel we must first and always provide for our safety, as well as our equipment. **Per Health and Safety Code Handbook:**

12.4 5. **Parking.**

a. Select a location that allows a minimum of a 12 foot width of unobstructed travel area and adequate sight distance in both directions.

b. Assess the intended parking area for soft material, holes, rocks, or other debris that could damage tires/undercarriage.

c. When parking, position the vehicle for forward departure. Avoid backing the vehicle when possible.

d. Shut off the engine, set emergency brake, and place transmission in gear or park.

e. Use chock blocks.

In addition it is the operator's responsibility to park apparatus that is free from any potential overhead obstructions and hazards i.e. power lines, low overhangs, exc. as well as any underground features such as septic tanks, underground utilities, exc. When parking vehicles and apparatus it is our Job to insure the space provided is **Safe, Secure, and free from any potential Environmental hazards.** Part of daily routines for moving vehicles is the ***"Golden Circle"*** this is performed every time a vehicle is put in motion. It is the operator's responsibility to ensure that all doors are secured, bumpers clear of any loose items and wheels are unobstructed of any hazards. This being said it is also the operators responsibility to insure where he or she is parked is 100% free from any hazards or obstructions that may cause damage to tires or vehicle. With this after the vehicle is parked and secured it is once again the responsibility of the operator to perform a ***"walk around"*** the vehicle to once again check that the vehicle is safe and secure and free from any potential hazards.

The Team would like to thank the Pacific Southwest Region and Cleveland National Forest for their willingness to foster a safety culture. By promoting a lessons learned environment, you have paved the way for others to learn in this dynamic field we call the “Forest Service”.

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