Date: July 25, 2010

To: Ken Kerr, State Fire Management Officer

From: Barry Oelrich, Chief Investigator, Non-Serious Accident Investigation Team

Subject: Plug Hat Fire, Damage to a Government Vehicle

As requested by Delegation of Authority from you, I have completed a Non-Serious Accident Investigation in accordance with Interagency Standards for Fire and Aviation Operations; Chapter 18 (Non-Serious Wildland Fire Accident Investigation Process, Ch. 18-11 thu 13).

Barry Oelrich

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Plug Hat Fire / Damage to Government Vehicle

Date: June 6, 2010

Executive Summary:

On Monday, June 6, 2010 at approximately 1745 hrs, an Initial Attack (IA) Squad Vehicle sustained burn damage. The IA vehicle was on site to support wildland fire suppression operations while assigned to the Plug Hat fire, located on lands managed by the BLM White River Field Office in Northwest Colorado. The vehicle was parked in the black while the crew was engaged in suppression operations.

Narrative:

The Plug Hat fire was a lightning caused fire, reported at approximately 1500 hrs on June 6, 2010. The fire was located north of the Dinosaur National Monument Headquarters. At 1710 hrs the IA vehicle arrived on site, after completing an initial size up of the scene, the decision was made to park the vehicle in the black, facing out towards a two track road. The path into the black was cleared of debris and searched for any hazards by the crew members. Upon the vehicle being parked and chocked, both the driver and the incoming Incident Commander (IC) conducted a 360 degree search around the perimeter of, and under the vehicle, searching for any hot spots or hazards. At 1717 hrs the Squad was briefed by the transitioning IC. Command was transferred and the Squad was assigned tasks on the fire. At 1745 hrs the Incident Commander Type 4 Trainee (ICT4t) discovered the IA vehicle was on fire, burning from the rear passenger side duel tires, he notified the IC at this time via two way radio. ICT4t had a charged line from the Type 6 engine in close proximately and used this to spray a mixture of mud and water onto the point where the vehicle was burning.

The below log was created by the IC at the time of the incident.

1710 - Arrived on scene of Plug Hat fire. After Initial size up of the scene the decision to park in the black facing out was made. At that point a passenger exited the vehicle to clear the path of debris and signal to the driver for backing the vehicle into safe parking spot.

1715 - Upon exiting the vehicle myself and the driver preformed a 350 degree walk around of the vehicle for any hazards such as hot spots under the vehicle.

1717 - The crew was given the order to gear up and I was going to receive a briefing from the IC.

1722 - After a discussion with the IC it was decided that I would assume command of the fire with an ICT4t working under my supervision. The Squad was then given a briefing shortly after.

1735 - The crew of E681 was working the west side of the fire putting in hand line and some clean up with a saw. The Squad was constructing saw line on the south side of the fire working east. I was walking around the fire for the first time to see what work needed to be done.

1740 - I worked my way to the west side of the fire and checked In with the crew of E681. I walked past the Squad vehicle at this time and it looked fine. I then continued down the south flank and met up with my assistant. The ICT4t was talking to his folks on the radio about getting in their vehicles due to lightning. I told him that we had a couple minutes to go and we would be tied in then we would also go to our vehicle and wait for the storm to pass.

1745 - The ICT4t then called on the radio saying I needed to come to his location, in a second transmission he added ASAP. I was moving quickly to the location I had last seen him. It was at this time I heard a tire pop. My Assistant Captain called on the radio and said he thought he knew what that sound was, my response was I didn't know what was going on but I thought it would be a good idea to disengage and regroup at the vehicles.

1748 - When I arrived at the vehicles E681 had hose out and I met with the ICT4t and he told me that he had looked over at the squad vehicle and it was on fire putting up black smoke and he had taken action.

1749 - I then told the ICT4t that he should concentrate on the fire and I would start the reporting process on the vehicle fire and see what I could do to get the process moving by changing out an outside tire with a spare.

1800 - I phoned dispatch to tell them the nature of the accident and to try and arrange a transport for four people.

1840 - We had put a spare on incase we had to drive the vehicle to Dino HQ or at least to pavement for a tow truck. I was informed several different ways to not drive the vehicle and to leave it at the fire.

1845 - It had rained hard the whole time we were fixing the tire and the fire activity had died down. Our new plan was for DIV 1-S to resume control of the fire and Squad 1-1 would be released and shuttled to Maybell Park then on to Craig from there.

1915 - Released from Plug Hat en route to Craig.

Investigative Process:

A three person BLM Investigation Team conducted the investigation. The investigation included an analysis of human, material and environmental factors. The process included interviews, verification of documentation, visit to the accident site, examination of Squad 1-1 Vehicle and timeline review.

The investigation team consisted of the following individuals:
Barry Oelrich, Chief Investigator, State Safety Manager
Don Miller: Law Enforcement Officer, White River Field Office
Kyle Cowan: Technical Specialist (Fire Operations), State Fire Management Specialist

Findings:

Finding #1: The Squad vehicle was transporting flammable liquids in the bed of the truck. Per PMS 442, Interagency Transportation Guide for Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel, the vehicle was displaying the correct placard. The ICT4t did not see the placard as he was extinguishing the fire, he did not realize that flammable liquids were present in very close proximity of an active vehicle fire.

Discussion:
The ICT4t did recognize the hazards associated with a burning vehicle and stated he stayed up wind of the vehicle and approximately 30 feet away.

Recommendation:
Ensure all firefighters receive initial or refresher training on the most common types of DOT labeling used on Interagency fire apparatus.
Regarding vehicles, if it's not in place, there may need to be discussion about an incessant fire versus fully involved vehicle fire. Our firefighters can generally suppress an incessant fire, but they are not equipped with the proper PPE to attempt extinguishing a fully involved vehicle.
www.nifc.gov/wfstar/archives/Vehicle_Fires_PPP_rev-WFSTAR.ppt

Finding #2: Employees appear to be unaware of the administrative processes for Accident Investigations. This resulted in loss of site preservation, disturbing the accident scene, and not allowing for conclusive findings of the ignition source.

Discussion: Upon the squad arriving at the vehicle and after the IC having turned suppression duties over to the ICT4t, the first action ordered was "to start the reporting process on the vehicle fire and see what I could do to get the process moving by changing out an outside tire with a spare. We had put a spare on incase we had to drive the vehicle to Dino HQ or at least to pavement for a tow truck". A Squad crew member drove the vehicle onto the two track road which had a more compacted and solid surface. The IC was informed by the Craig Interagency Dispatch Center and the unit FMO to shut the vehicle down and leave it on site.

Recommendation: With the increased emphasis on High Reliability Organization (HRO) training, the need for firefighters to better understand the accident investigation process increases as does the clear understanding of what those triggers are.

In order for our firefighters to develop a more effective "Learning Culture", they need to develop the constraint to take a step back after an incident and identify the possible need for further review of what's just happened. In order to learn from our accident or incidents, an Investigation Team must be able to obtain accurate and clear finding. Hopefully through this process, it will come to light that an investigation is not attempting to place blame, but bring a learning experience to the forefront.

Commendations:

Commendation: #1: The firefighters on scene did not become overly focused on the vehicle fire. A seamless transition of suppression duties occurred between the IC and ICT4t, to focus on the incident within an incident.

Commendation: #2: The North West Colorado Fire Management Unit should be recognized for fostering a reporting culture. By reporting these incidents and lessons learned, they are practicing good risk management and reinforcing many of the HRO principles:

· **Reporting Culture -** Safety cultures are dependent on knowledge gained from near misses, mistakes, and other "free lessons." People must feel willing to discuss their own errors in an open, non-punitive environment.
· **Just Culture -** An atmosphere of trust where people are encouraged to provide essential safety-related information yet a clear line is drawn between acceptable and unacceptable behavior.
· **Learning Culture -** The combination of candid reporting, justice, and flexibility enables people to witness best practices and learn from ongoing hazard identification and new ways to cope with them.

Conclusions and Observations:

The Squad vehicle was inspected, first looking at the fire pattern, then inspecting both the damaged tire still on the axle and the one that had been replaced and was now in the spare tire rack. From the burn pattern and drip marks position of the tires when burned was established. The underside of the axle was inspected to determine that the fire originated from between the two tires and spread upward to the truck bed and shell. The only item which appeared to be damaged in the storage box of the shell was one Nomex shirt where the fire had burned through the outside door.
The original location where the truck was parked was inspected next. Following the tire tracks back showed the truck had drove over some sage brush that was approx. the correct width to lodge between the two tires. What caused the fire had to be picked up between the tires and then have enough fuel & time to generate the heat to ignite the tires and burn the truck. Since the vehicle had been moved and the ground where the vehicle fire had originated was disturbed, the team was unable to determine exactly what was picked up but most likely sage brush.
The location of the fire origin would have been extremely difficult to see unless someone got down on their hands and knees and specifically looked between the two tires. Also in the time it probably took to get their equipment and leave they probably would not have had any indications that the tires were beginning to burn.
If not for the quick actions of the firefighters utilizing the attack line most likely the whole vehicle would have been destroyed along with all gear.

Scene / Site Photos:

Squad Vehicle Damage (spare tire shown)

Flammable Liquids Placard

Squad Members changing the outside tire.

Damages to Outside Dual Tire

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