Keg Fire Rollover

Bureau of Land Management
Utah BLM
West Desert District
Fillmore Field Office
Little Sahara Fire Station

6/17/2012

EXECUTIVE SUMMARY:

At approximately 1734 on June 17, 2012, Engine 5429, with three occupants, was involved in a rollover incident while responding to a smoke report in the area of the Keg Mountains. The vehicle was traveling west bound on a narrow dirt road called the Weiss Highway. The vehicle was proceeding into a blind corner (reference photo #1) when a pick-up heading east bound came into view, at which time both vehicles were near the center of the Road. The driver of Engine 5429 steered the vehicle to the right onto the soft shoulder on the north side of the road and applied the brakes. The engine and the pickup cleared each other without contact. On exit of the corner, the engine started to fish tail (reference photo #3) as the vehicle began to come back onto the road. The driver stated that he felt he could not safely correct the vehicle's direction of travel on the roadway and opted to aim for a small clearing on the south side of the road. The engine went over a small 2-3 ft. embankment, slid, and proceeded to slowly roll over onto the driver's side (reference photo #4). No injuries resulted from the incident; all passengers were wearing their seatbelts. The vehicle was left in this position until the fact finding team was able to arrive Monday, June 18, 2012.

NARRATIVE:

6/17/2012

17:05 Richfield Interagency Dispatch receives report of smoke in the Keg Mountains

17:10 Smoke report gets relayed to the Little Sahara Fire Station

17:16 Engine 5429 goes en-route to the smoke report, traveling east on the Weiss Highway

17:34 Engine 5429 rolls over on the Weiss Highway, northwest of the Little Sahara Fire Station

17:35 Richfield Interagency Dispatch is notified of the engine roll over (no injuries) and dispatches Law Enforcement and second engine to respond to accident site

17:45 Utah State Office is notified and Non-Serious Accident Investigation Team is organized

All times are approximate, information was derived from the WildCAD Logs

INVESTIGATIVE PROCESS:

A six person Fact Finding Team (Team), delegated by the BLM State Director, assisted by the Fillmore BLM Law Enforcement Ranger conducted the investigation. The investigation included an analysis of human, material, and environmental factors. The process included group interviews with the Engine Captain (driver) and two crewmembers, a site visit to the accident

scene, analysis of physical factors at the incident site, examination of Engine 5429, and a review of the timelines established by the Team.

The fact finding team consisted of the following individuals:

- Chris Delaney (Team Lead), BLM Utah State Office, Deputy State Fire Management Officer
- Randy Turrill, BLM Color Country District, Fire Operations Supervisor
- Ron Rodrigue, BLM Utah State Office, Division of Support Services, Safety Manager
- Wanda Grey, BLM West Desert District, Division of Support Services, Safety Officer
- Camm Stephensen, BLM West Desert District, Law Enforcement Ranger
- Brent Higbee, BLM National Interagency Fire Center, National Fire Equipment Program

FINDINGS:

Finding #1: All Engine 5429 crewmembers were in compliance with BLM work/rest and incident operations driving duty day policies.
Discussion: When questioned, none of the crewmembers believed that fatigue played a role in the incident. All crew members had started work at 09:30 and 12:00 on 6/17/2012 and all had days off within the last week.

Finding #2: All engine crewmembers of Engine 5429 were wearing their seatbelts at the time of the incident.
Discussion: Three crewmembers remained seat belted throughout the incident. Without exception, seat belts must be worn at all times by motor vehicle operators and passengers, regardless of the distance to be travelled or the time involved per the Interagency Standards for Fire and Fire Aviation Operations, 2012 ed., page 07-6. This is a major reason that there were no injuries to the crew on this incident.

Finding #3: Engine 5429 headlights were on.
Discussion: Engine 5429 Engine Captain states that they always drive with their headlights on, day or night. This is in accordance with the Interagency Standards for Fire and Fire Aviation Operations, 2012 ed., page 14-2. This potentially could have made the engine more visible to the civilian vehicle, thus helping avoid a head-on collision.

Finding #4: Engine 5429's Gross Vehicle Weight was within limits and the certified weight slip was current.

Front Axle: actual 10, 620 lbs/rated 12,000 lbs
Rear Axle: actual 17, 980 lbs/rated 21,000 lbs
Total GVW: actual 28,600/rated 33,000 lbs.
Vehicle miles: 60,653 Vehicle hours: 2,278

Discussion: Each engine will have an annually certified weight slip in the vehicle at all times. The weight slip will show individual axle weights and total GVW, per the Interagency Standards for Fire and Fire Aviation Operations, 2012 ed., page 14-2.

FINDINGS THAT REQUIRE ACTION:

Finding #5: BLM Law Enforcement Ranger determined that the estimated speed of the vehicle to be 35-40 MPH based on tire patterns in the road. Occupants of the vehicle confirmed this by stating they believed their speed to be 40-45 MPH.
Discussion: The speed limit for the road is 45 MPH. By definition they were operating in accordance with speed limits. However, Utah Administrative Code States "A person may not operate a vehicle at speeds that is greater than is reasonable and prudent under the existing conditions, giving regard to actual or potential hazards then existing, 41-6-46(1)" The Interagency Standards for Fire and Fire Aviation Operations, Chapter 7 - Fire Vehicle Operation Standards states "Operators of all vehicles must abide by state traffic regulations".
Recommendation: Employees should evaluate what speed is reasonable and prudent for the type of vehicle they are operating and what type of road that vehicle is being operated on. Even though the vehicle may be driven slower than the posted speed limit, it may be prudent for the operator to drive even slower and move farther over to one side based off numerous factors.

Finding #6: Cab of Engine 5429 was clean.
Discussion: Having a clean cabin helped prevent injuries due to flying debris during the incident. This is in accordance with the Interagency Standards for Fire and Fire Aviation Operations, 2012 ed., page 07-5.
*One notable exception is that the Captain stated that he keeps fencing pliers secured in the cab. During the evasive maneuvering and rollover the pliers became "unsecured" and could have injured the crew.
Recommendation: Move the fencing pliers into another compartment or more positively secure them so they cannot be jarred loose.

Finding #7: Last documented apparatus safety and operational check in the Fire Engine Maintenance Procedure and Record (FEMPR) for Engine 5429 was dated 06/11/2012.
Discussion: The engine crew moved over to Engine 5429 in the afternoon after staffing a Type 6 engine in the morning. No documented apparatus safety and operational check was found for either engine on 06/17/2012. Apparatus safety and operational inspections will be performed at the intervals recommended by the manufacturer and on a daily and post-fire basis as required per the Interagency Standards for Fire and Fire Aviation Operations, 2012 ed., page 02-39.
Recommendation: The FMO needs to ensure that engine crews are conducting and documenting daily and post-fire apparatus safety and operational checks in the Fire Engine Maintenance Procedure and Record (FEMPR).

Finding #8: No documented 2012 Annual Vehicle Inspection for Engine 5429 was conducted.
Discussion: Guidebook G-1525-1, Fleet Management and Requisitioning Requirements, page 28, dated February 29, 2012, states, "BLM vehicle/equipment units must be inspected at least annually using either BLM Form 1520-35, or BLM Form-35a, as appropriate. These maintenance/safety inspections must be performed by an ASE certified mechanic whenever possible. Copies of the completed inspection forms must be retained in the appropriate Vehicle/Equipment Historical Folder."
Recommendation: The Fire Management Officer needs to ensure that Annual Vehicle Inspections are completed on all District Fire Vehicles.

Finding #9: The left rear axle assembly had shifted prior to the accident occurring (reference photo #7). The mounting area for the alignment spring and mounting block had shifted, rust and dirt was visible where the correct axle alignment should have been.
Discussion: A diesel mechanic from the Nation Fire Equipment Program traveled to the International Dealership and inspected the fire package, baffles and pump package for damage that the chassis dealer would not have the expertise to identify and diagnose. There was not an Annual Vehicle Inspection completed for 2012 nor was there a documented apparatus safety and operational check in the Fire Engine Maintenance Procedure and Record (FEMPR) within the last week. If either one of these were completed, the axle alignment issue could have been identified and the engine could have been taken out of service until the problem was fixed.
Recommendation: The engine crew needs to ensure that the documented apparatus safety and operational check is completed and documented in the Fire Engine Maintenance Procedure and Record (FEMPR). The engine crew should also take the time to crawl under the vehicle, look for maintenance issues, ensuring that all the mechanics of the engine are in good working order prior to daily operations. Engine crews need to ensure that the vehicle receives an Annual Vehicle Inspection and that the vehicle meets Bureau policy for vehicle safety inspections and maintenance.

Finding #10: The Engine Captain stated that when he drove the vehicle "the rear end felt like it wanted to come around" regardless of whether the tank was full or empty.
Discussion: During interviews regarding the incident the Engine Captain and Assistant had mentioned that the rear end of the vehicle felt "loose" and that other operators of Engine 5429 had mentioned the same concern.
Recommendation: The engine should be placed out of service until inspected by a mechanic and the concern/problem is identified and repaired or dismissed as normal for that type of vehicle. In future instances where concerns arise of stability of the vehicle, precautions should be taken to have the vehicle inspected. See finding #8.

Finding #11: A new mining operation west of where the incident took place has increased traffic on the Weiss Highway.
Discussion: Occupants of Engine 5429 stated that a mining operation had recently opened down the road, west of were the incident occurred. Drivers have noticed an increase in traffic on this road, which increases hazards. During the site visit numerous double belly dump trucks passed the scene. Two large vehicles (i.e. dump truck/heavy engine) passing on this road will place the vehicles in close proximity.
Recommendations: As a result of the increased traffic and increase in large vehicles, speeds should be lowered consistently to allow for more reaction distances in the event of an unforeseen event. Also, the increased traffic should be addressed frequently during tailgate safety sessions.

Finding #12: Required training was either never completed and or certificates/rosters could not be provided.
Discussion: According to BLM policy and outlined in the Interagency Standards for Fire and Fire Aviation Operations 2012, page 02-38, Engine Captains are required to attend BL-300 (BLM Engine Driver Orientation) once and RT-301 (BLM Engine Driver Refresher) annually. No certificates were available and no proof of participation in either course was able to be provided.
Recommendations: The Fire Management Officer should work with the Training Officer to ensure that all required recurrence training is completed annually and that certificates or rosters are recorded and filed in employee's training files.

CONCLUSIONS AND OBSERVATIONS

The crew of Engine 5429 was responding to an initial attack fire, they were within policy requirements for work/rest and driving duty day limitations. They were approaching a blind corner on a narrow portion of the Weiss Highway and encountered an on-coming pickup truck traveling in the middle of the roadway. The operator of Engine 5429 took evasive actions and subsequently rolled the vehicle on its driver's side. There were no injuries as a result of the incident and all passengers were wearing their seatbelts. The following lessons learned should

serve as a reminder to all personnel engaged in driving operations especially involved in fire responses on dirt roads:

- Ensure that vehicle inspections are completed and are within agency timeframes and guidelines.
- Drivers must continually evaluate what is a safe and prudent speed for the type of vehicle and for what type of road surface they are operating on, regardless of posted speed limits.
- Clean chassis cabs and vehicles can drastically reduce the risk of employee injuries during vehicle accidents. Ensuring seatbelts are used and Bureau policy is followed drastically reduces the risk for driver and passenger injuries in vehicle accidents.
- When a vehicle does not handle or operate properly, the vehicle should be taken out of service until it can be given a clean bill of health by a certified mechanic.
- Where increased hazards exist, like increased mining traffic, more frequent hazard/tailgate safety briefings should occur to decrease complacency and increase awareness.
- Ensure that all required training is conducted, completed and documented annually or as directed by Bureau policy and guidance.

Photo #1:The blind corner on the Weiss Road, looking east in the direction of travel that Engine 5429 was traveling

Photo #2: Photo taken from where Engine 5429 had to take evasive action, green paint represents the engine's tire tracks (right side wheels)

Photo #3: Where Engine 5429 began to slide sideways, notice skid marks on road surface

Photo #4: Where Engine 5429 came to rest, looking to the North from road

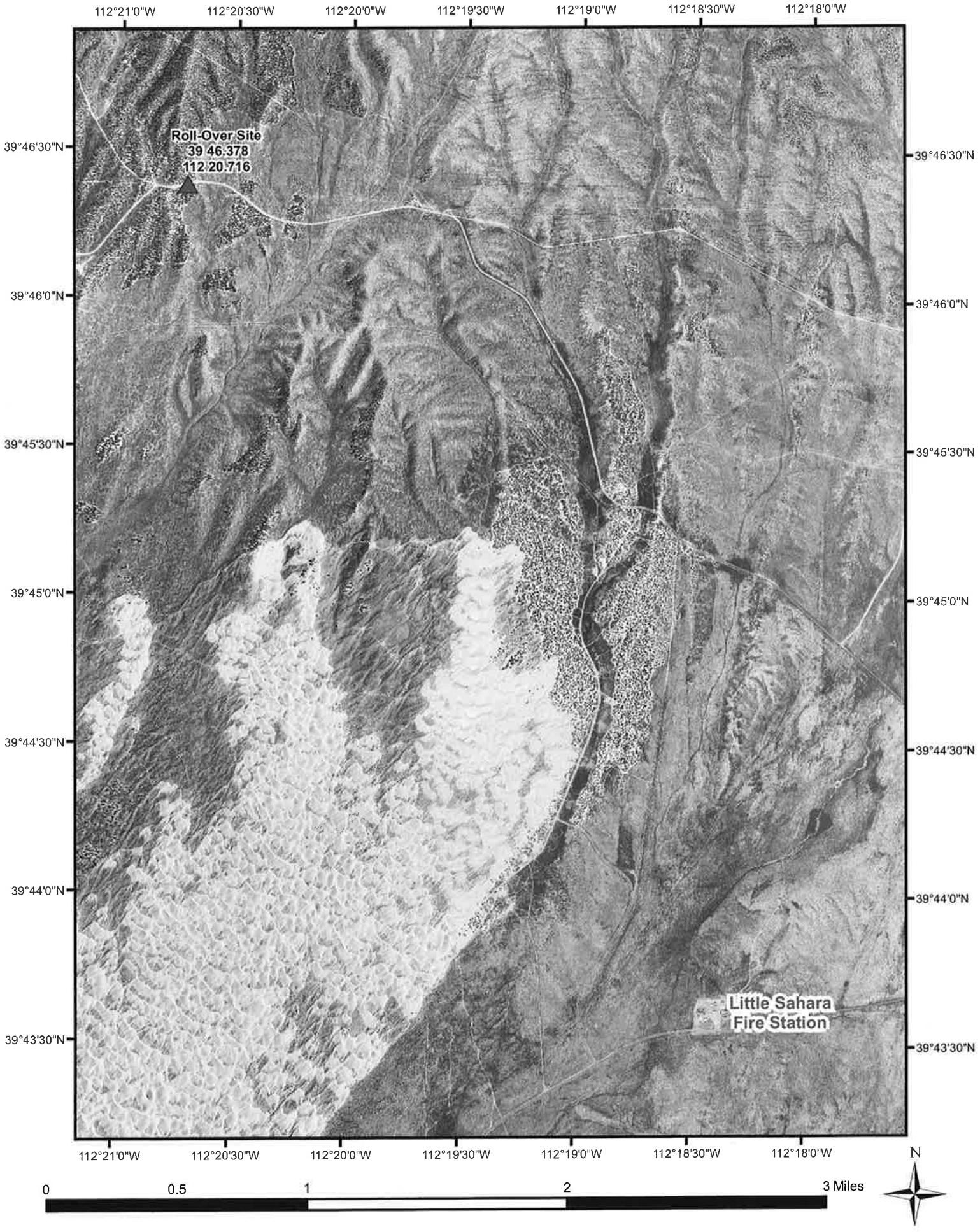
Photo #5: Engine 5429 prior to getting winched back onto its wheels; notice the wheel tracks in the grass

Photo #6: Engine 5429 once winched back onto its wheels, side shown is the side the truck was rolled on

Photo #7: Left rear axle assembly, rust and dirt are present, showing that movement was prior to accident

Photo #8: Shows the axle alignment due to shifted mounting block and axle alignment spring

Vehicle Rollover Investigation - June 17, 2012



Chris Delaney
Team Lead

Date: 16 July 2012

Sheldon Wimmer
State Fire Management Officer

Date: 7/16/12

Juan Palma
State Director

Date: 7/17/12