Ridge Top Fire Entrapment

Accident Investigation Report

Fort Hall Indian Reservation

Bureau of Land Management, Idaho Falls District

7/28/2012

Investigation Team
Ridge Top Fire Entrapment

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8/14/2012
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8/15/2012
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8-15-12
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8/17/12
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Executive Summary

At approximately 1822 hours on July 28, 2012, an entrapment occurred on the Ridge Top Fire, Fort Hall Indian Reservation, Blackfoot Idaho. A Bureau of Land Management firefighter sustained first and second degree burns while assisting dozer operations in Division X. At the time of the entrapment, the firefighter was utilizing an All-Terrain Vehicle (ATV) to scout line and coordinate dozer activities. The injured firefighter was rapidly transported from the fireline to emergency care and then to a local hospital. The injured firefighter was subsequently referred to the University of Utah Burn Center in Salt Lake City. The firefighter was released from the burn center on July 29, 2012.

The Bureau of Indian Affairs has statutory responsibility as trustee for the protection of the forest and range resources on lands held in Trust for the Fort Hall Indian Reservation. This protection is contracted to the Bureau of Land Management, Idaho Falls District through a cooperative fire protection agreement. The Superintendent, Fort Hall Agency retains all administrative jurisdiction on Fort Hall Indian Reservation Lands.

Narrative

7/27/2012

- At 1547 three new fires are reported on the Fort Hall Indian Reservation. The three fires, East, Ridge Top, and Steven's Peak are reported to Eastern Idaho Interagency Fire Center (EIIFC).
- The Steven's Peak Fire receives first priority due to structure and property threats. The East Fire receives priority two and the Ridge Top priority three. Aggressive initial attack on the Steven's Peak Fire results in containment by nightfall.
- At 2037 the Ridge Top Fire Incident Commander reports fire size at 750 acres and pushing hard to the south with two heads.

7/28/2012

0644

- The decision to combine the East and Ridge Top Fires into a single incident is put into motion.
- The operational plan is to construct dozer line along a combination of ridges and roads and secure by firing along Division R and Division X.

1124

- IC(T) reports operations normal and firing operations are beginning and estimates final fire size to be 10,500 acres.
- Upon completion of operations at the Division R and Division X break, DOZ1 proceeds south to assist DOZ2 in direct line construction in Division X.

1745

- DZSW1 requests to DIVX to work both dozers in tandem.

1755

- DOZ2 is improving East Cemetery Road to be used as fireline and has progressed approximately 0.6 miles south past the safety zone.
- DZSW1 contacts DOZ2 and request to work back towards DOZ1 to work in tandem.
- DZSW1 observes multiple spot fires behind and above DOZ2.
- DOZ1 precedes down East Cemetery Road towards DOZ2, and begins line construction at a point far enough south to encompass all spot fires above East Cemetery Road. This starting point sits physically near the top of a broad side drainage.
- DOZ1 begins to construct a combination of indirect and direct fireline uphill to the northeast. The indirect portion leaves an approximately one acre section of unburned fuel between dozer line and East Cemetery Road.

1757

- DZSW1 proceeds south along East Cemetery Road on an ATV from the safety zone to evaluate fireline effectiveness and turns uphill following DOZ1.

1800

- ENG1 drives south along East Cemetery Road to secure fireline behind the dozers.

1815

- DOZ1 completes dozer line to a large aspen stand east of the safety zone. DOZ1 and DZSW1 meet at this location and discuss having DOZ1 add an additional blade width to the newly completed line from the aspen stand back to East Cemetery Road.

1820

- DZSW1 leaves DOZ1 and proceeds down the dozer line toward East Cemetery Road to assess fireline and meet DOZ2.
- At some point between the aspen stand and East Cemetery Road, fire intensity increases rapidly in the unburned section and below East Cemetery Road.
- DZSW1 is overheard saying “I need to get out of the smoke.”
- DZSW1 attempts to turn-around on the ATV and escape back up the dozer line towards the aspen stand, but is prevented from making the turn due to thick smoke and dozer berms.

1822

- DZSW1 decides to attempt an escape by continuing down dozer line on the ATV to East Cemetery Road and then turn north into clean black. As DZSW1 continues down the line, the ATV becomes inoperable due to undetermined reasons. The ATV stops against the dozer berm facing the unburned section. DZSW1 recognizes imminent entrapment, takes a deep breath, curls up on the ATV and is hit by the first blast of radiant heat.

- DZSW1 recognizes the first blast has passed and drags the ATV uphill away from the dozer berm. DZSW1 considers deploying fire shelter but is concerned about exposure by standing up. DZSW1 crouches low and under the ATV and prepares for another heat blast.
- As DZSW1 is sheltering behind the ATV, the Operations Section Chief (OPS) directs resources to disengage, but is unaware of entrapment. The message is heard by ENG1 and DOZ1. ENG1 starts to turn around on East Cemetery Road and proceed back to the safety zone. DOZ1 stops line construction and proceeds through the black towards East Cemetery Road.

1824

- DZSW1 is able to start the ATV and proceeds down the dozer line to East Cemetery Road and turns north towards the safety zone.
- DZSW1 recognizes ENG1 and says "Hold up '62" after traveling approximately 300 feet up East Cemetery Road.
- ENG1 stops as DOZ1 also proceeds onto East Cemetery Road.

1830

- DZSW1 is assessed by ENG1 and DOZ1.
- DZSW1 is loaded into CHS1 and departs down Cemetery Road for medical care, Passes DIVX along Cemetery Road and has short conversation.
- DOZ1 calls OPS via cell phone to report injury to DZSW1.
- OPS calls IC(T) to report injury.
- IC(T) contacts Paramedic at the helibase and gives instructions to respond to Cemetery Road to meet DZSW1.

1915

- Paramedic meets DZSW1 along Cemetery Road and assumes care of the patient.

1923

- Blackfoot Ambulance requested by Paramedic and is dispatched one minute later.

1946:

- DZSW1 transported by the Blackfoot Ambulance to Bingham Memorial Hospital in Blackfoot. Arrives at 2005.

2315

- DZSW1 is transported via ambulance to University of Utah Burn Center in Salt Lake City.

Investigation Process

Following the entrapment, the BLM Idaho Falls District Manager and Fort Hall Superintendent requested an accident investigation team. The team was assembled by the BLM Idaho State Fire Management Officer and consisted of:

- Steve Shaw, Team Lead, BLM Idaho Assistant State FMO
- Paul Petersen, Operations, BLM Nevada Deputy State FMO
- Len Diaz, Safety Officer, BIA NWRO, WUI/Prevention Specialist
- Glen Burkhardt, Dozer Operations, BLM Idaho State Fuels Lead
- Todd Gregory, Fire Behavior Analyst, BLM Oregon Crew Coordinator

The team in-briefed with the Idaho Falls District Manager, Fort Hall Agency Superintendent, Idaho Falls District FMO, and Fort Hall Agency FMO on July 30, 2012 at 1500 hours at the Idaho Falls District Office.

Team Lead Steve Shaw received a delegation of authority from the Idaho Falls District Manager and the Fort Hall Agency Superintendent following the in-brief.

The team conducted a site visit, interviewed firefighters directly and indirectly involved with the entrapment, examined ATV and victim PPE, conducted fire behavior analysis, and reviewed all relevant documentation in conjunction with the entrapment.

The team conducted an out-briefing on August 3, 2012 and presented a draft entrapment report.

Findings and Recommendations

Finding #1: All personnel directly involved with the entrapment were qualified for the fireline positions they held at that time.

Finding #2: All personnel directly involved with the entrapment were properly utilizing required PPE for their assigned duties.

Finding #3: All personnel directly involved with the entrapment met work/rest guidelines at the time of the entrapment per Interagency *Standards for Fire and Fire Aviation Operations*.

Finding #4: The accident investigation team was unable to verify that DZSW1 met the required three-year recurrency requirement to operate an ATV.

> **Discussion**: Department of the Interior (DOI) policy requires all operators to be re-evaluated by a certified ATV trainer every three years. DZSW1 completed the ATV Safety Institute course on October 15, 2002. DZSW1 completed ATV Training Certification: Basic, Advanced & Specialized on October 7, 2008. The investigation

team was unable to verify that DZSW1 completed any additional ATV recurrency training between October 7, 2008 and the time of the entrapment. The investigation team was unable to verify the requirements contained within IM ID-2010-036 were implemented.

Recommendation: The District Manager should ensure that a process is in place to document ATV qualifications for all district employees according to IM ID-2010-36 and BLM Manual 1112-1, Chapter 27.

Finding #5: Managers and employees lack a full understanding of current district, state, and national Off-Highway Vehicle (OHV) policies.

Discussion: Current OHV policies are unclear and confusing in terms of the required maintenance and record keeping; training, qualifications, and recurrency; tracking and updating of Risk Assessments; required Personal Protective Equipment (PPE); and licensing of qualified users for motorcycle, ATV, and UTV.

Recommendation 1: An Idaho BLM OHV task-group should be developed to examine current Idaho BLM OHV polices and provide recommendations for an interim policy for all OHV users.

Recommendation 2: The BLM National Office should take steps to ensure that policies as they relate to OHV operations are examined and clarified. An overarching OHV program examination should be undertaken in a manner that includes all OHV users.

Finding #6: DIVX was not properly equipped to perform assigned duties.

Discussion: DIVX was without a vehicle, which limited the ability to supervise the entire length of the division. The length of the division was approximately 4 to 5 miles. DIVX did request a vehicle on 7/28, but it was not delivered by the time of the entrapment. DIVX only had a portable radio that hindered communications due to mountainous terrain.

Recommendation: Incident Commanders must ensure that all assigned line supervisors are equipped to successfully perform all assigned duties.

Finding #7: The Operations Section Chief and DIVX failed to coordinate and continually assess changing fire conditions and communicate changes in strategy to assigned tactical resources through proper established command structure in the hours leading up to the entrapment.

Discussion: Changes in tactics and strategies were not communicated between command and tactical resources. Communication difficulties between DIVX and assigned division resources prevented tactical discussions. ENG1, DOZ1, DZSW1, and Air Attack all expressed a lack of understanding and effectiveness of command structure, strategy, tactics, and LCES in the hours leading up the entrapment.

Recommendation 1: The District Fire Management Officer should develop operational standards for District Type 3 incidents that detail expectations, roles, and responsibilities for command structure Incident Command System (ICS) positions at the Type 3 complexity.

Recommendation 2: The State Fire Management Officer should coordinate with District Fire Management Officers to develop pre-established Type 3 Incident Management Organizations and operational standards.

Finding #8: In an attempt by DOZ1 to contain spot fires above East Cemetery Road, an approximate one-acre unburned section of fuel remained between East Cemetery Road and the dozer line.

Discussion: ENG1 was tasked to assist DOZ1 in securing line and containing spot fires above East Cemetery Road, but turned around before making it to the unburned section after being directed to disengage. It is highly likely that the unburned section of fuel between the dozer line and East Cemetery Road contributed to the multiple radiant heat blasts received by DZSW1. The rationale provided by DOZ1 as to location of dozer line was sound and consistent with best firefighting practices.

Recommendation1: The District Fire Management Officer should develop Standard Operating Procedures as they relate to fire dozer operations.

Finding #9: DZSW1 proceeded south down the previously scouted dozer line and encountered unanticipated fire intensity resulting in a fire entrapment.

Discussion: As DZSW1 moved down the dozer line back to East Cemetery Road on the ATV, fire intensity increased rapidly and DZSW1 lost visibility in smoke. DZSW1 attempted but was unable to execute an escape on ATV up the dozer line due to poor visibility and dozer berms. DZSW1 then made the decision to continue down the dozer line to East Cemetery road and follow it back towards the safety zone into clean black.

Recommendation: The District Fire Management Officer should ensure a thorough risk assessment is completed for ATV use during fire operations ensuring emphasis on a continued and constant evaluation of LCES while operating ATVs.

Finding #10: As DZSW1 proceeded down the dozer line towards East Cemetery Road, the ATV became inoperable for unknown reasons. DZSW1 subsequently sustained first and second degree burns from multiple radiant heat blasts.

Discussion: DZSW1 recognized the potential of fire entrapment and made the decision to continue down the dozer line and execute a sharp right-hand turn back onto East Cemetery Road back into clean black towards the safety zone. Before reaching the intersection, the ATV ceased operating due to unknown reasons and stopped against the dozer berm towards the unburned area of fuel (see photo 1). DZSW1 recognized the immediate peril, took a deep breath, and buried head between legs while still on the ATV. The first wave of radiant heat hit DZSW1, and likely caused the first and second degree burns. Following the first wave, DZSW1 pulled the ATV away from the berm and crouched low to the ground in an attempt to use the ATV as a heat shield. DZSW1 did not deploy fire shelter due to concerns that moving away from ATV would cause additional exposure to heat. The radiant heat disfigured plastic components on the ATV (see photo 3).

Recommendation: None.

Finding #11: Notifications of the injuries to DZSW1 were not made according to planned action from morning briefing.

Discussion: The morning briefing for 7/27 included verbal notification procedures in the event of an injury, but the district emergency plan was not included. The investigation team was provided a copy of the district medical plan. The plan is very general and lacks specific procedures for emergency medical situations. Emergency medical plans should be developed that encompass the entire district fire response area with special emphasis on unique or difficult areas.

Recommendation: The State Fire Management Officer should coordinate with District Fire Management Officers to ensure incidents of all complexity levels have an Incident Emergency Plan, standardized communication center protocols, and an incident medical plan that satisfies the requirements found in NWCG memo 025-2010 and in *Standards for Fire and Fire Aviation Operations,* Chapter 7-14.

Finding #12: DZSW1 was rapidly transported from the fireline to higher levels of emergency care.

Discussion: Though the notification process was not followed, on-scene firefighters made timely communications and effective decisions to transport DZSW1 from the fireline to emergency medical care.

Recommendation: None

Finding #13: The site of the entrapment was not preserved for review by the investigation team.

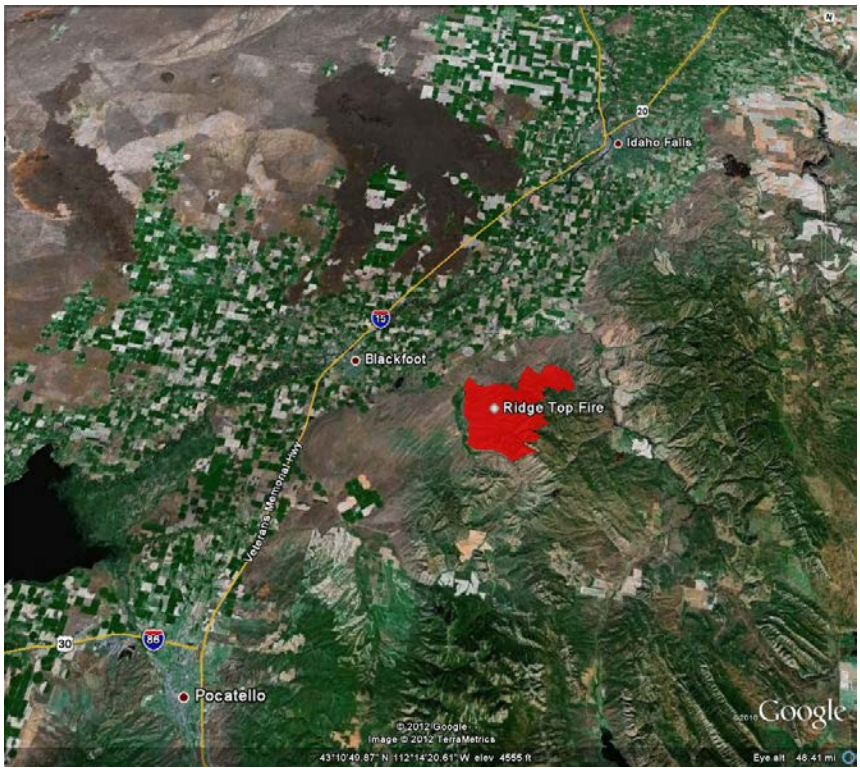
Discussion: The scene was photographed by on-site firefighters, but was compromised before the accident investigation team was able to visit the site. Accident sites should be secured immediately and nothing moved or disturbed until the area is photographed and visually reviewed. Exact locations of injured personnel, entrapments, injuries, fatalities, and the condition and location of personal protective equipment, property, and other equipment must be documented. *Standards for Fire and Fire Aviation*, Chapter 18-7.

Recommendation: Agency administrators must ensure that Incident Commanders secure the accident site.

Maps/Photos/Illustrations

Area Overview #1

Area Overview #2



Area Overview #3

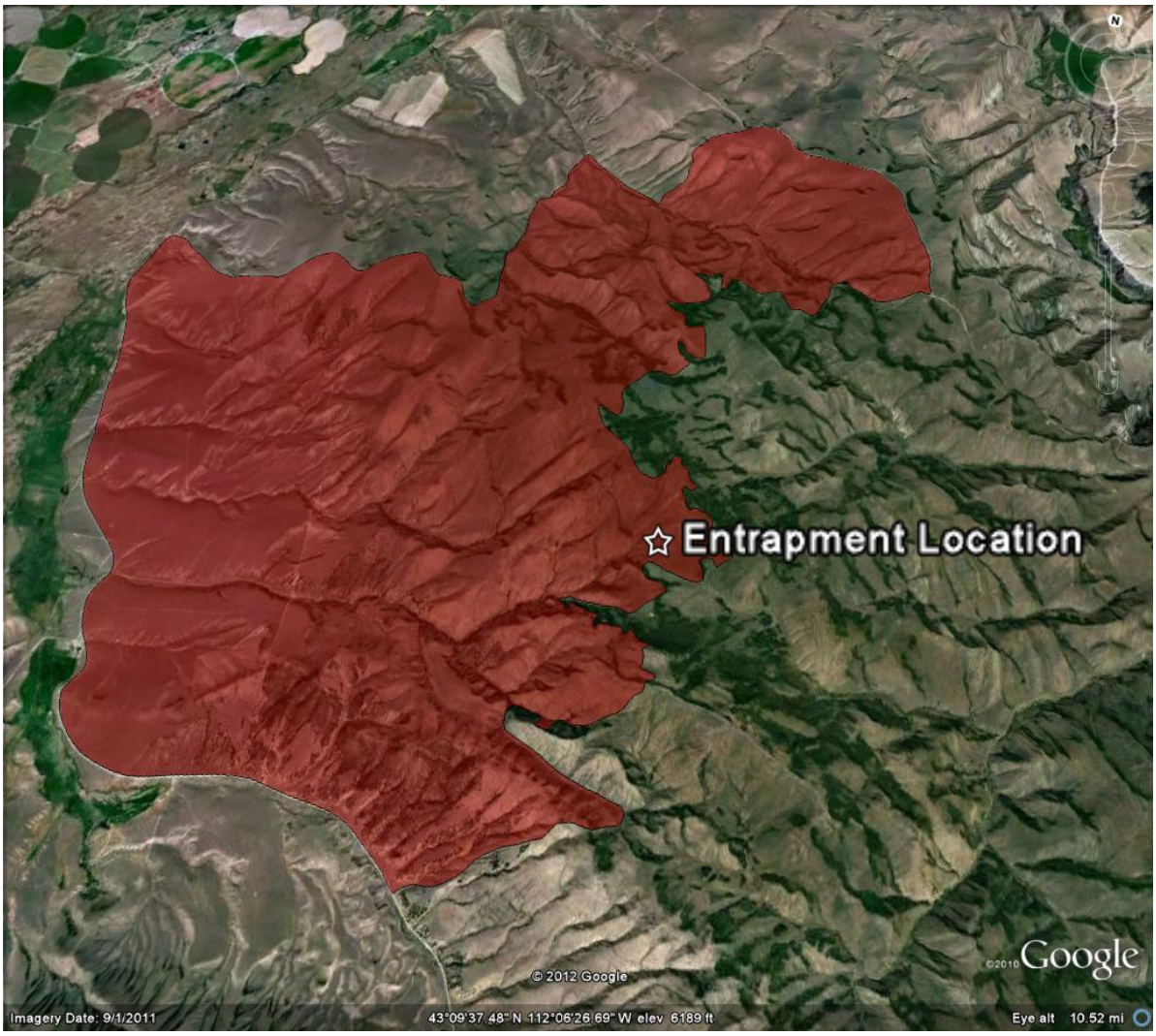


Photo 1: Overview of the entrapment site looking north

Photo 2: Representative fuels near entrapment site

Photo 3: ATV showing damage from radiant heat

Appendix A

Fire Behavior Summary

Fuel conditions at the time of the entrapment were at critically low levels. Fine fuels were not compacted due to below average winter snow fall. Timely spring rains brought substantial growth of annual grasses resulting in fairly uniform and continuous fuel beds. Dry summer conditions and gusty winds left live fuel moistures at critically low levels. Normal live fuel moistures for mid to late July in sage brush fuel types range from 100-140 percent. This year, percentages range from 72-98 percent. Normal Burning Index (BI) is 50 and the recorded high is 88. The BI on 07/28/2012 was 68. The fuel situation has created critical fire behavior conditions that allow extreme potential for large fire growth.

The Ridge Top fire was started by lightning on July 27, 2012 around 1545. Weather conditions near the fire area were: Temperature 94^{o}f, 13% relative humidity (RH), and winds variable south to west up to 14 mph with gusts to 22 mph. The weather accompanied with terrain and fuel conditions allowed for spread rates nearing 180 ch/hr, or 198 ft/minute. These aggressive spread rates caused the fire to grow to nearly 12,500 acres in a 24 hour period.

On July 28, 2012, winds had moderated and were generally out of a southern or western direction. Fire behavior had also moderated. Fire behavior consisted of active backing down-slope or downwind but not making any aggressive runs without terrain and wind alignment. As the day progressed, spread rates increased to 70-100 ch/hr with alignment and 1-3 ch/hr in areas where the fire was backing. The probability of ignition was 70-80%, which likely contributed to the frequent short range spotting that was experienced throughout the afternoon.

As winds continued to vary in speed and direction, firefighters reported seeing shifting direction of fire spread and reported these runs as “pulses.” While wind direction did change throughout the day, there are also terrain features that, in some instances, amplified the effect of winds and directly influenced the “pulses” firefighters reported. It was reported that crews noticed wind shifts and fire run direction changes fairly frequently, every 30-60 minutes in some cases.

Appendix B

Position Reference Listing

Incident Position Title	Report Reference
Incident Commander	IC
Incident Commander Trainee	IC(T)
Operations	OPS
Division X	DIVX
Division R	DIVR
Dozer 1	DOZ1
Swamper 1	DZSW1
Dozer 2	DOZ2
Swamper 2	DZSW2
Engine	ENG1
Engine Chase	CHS1