

Little Goose Fire

Facilitated Learning Analysis

Entrapment of Two Firefighters - August 12, 2007

Introduction:

What follows is a Facilitated Learning Analysis (FLA) report regarding an entrapment of two firefighters on the Little Goose Fire, in Northern Wyoming, on August 12, 2007. A Facilitated Learning Analysis is a process used to capture salient factors of an event, helping participants and others see more deeply into future events; thus making more informed, wiser and better decisions in the future. An experienced facilitator from another geographic area met key participants of the Little Goose Fire for a FLA session on November 27, 2007. As a means of introduction to the group, a FLA PowerPoint presentation supported the FLA preface and was followed by a sand table exercise of a story of another 'near-miss' fire. The participants of the Little Goose Fire entrapment event then revisited the fire behavior on Division D just prior to and after the near miss event using photos, short video clips, and the sand table. An open, forthright discussion of perspectives of the incident and reconstruction of the event helped team members, the facilitator and others to better understand the unintended outcome of August 12, 2007.

The intent of this analysis was to understand the thoughts, decisions and actions of persons involved and avoid fault finding and placing blame. One goal was to use this event to aid firefighters in recognition of early developing situations and allowing firefighters to make decisions that will prevent near misses, accidents and injuries. The details brought about in this report are meant to foster a learning environment for other firefighters across the nation in order to prevent further injuries and or death. The single most important focus of the FLA is to have a facilitated dialogue with the participants of the event to learn why the decisions and actions of persons involved made sense to them at the time. Knowing why the persons involved did what they did can provide lessons learned to others seeking to learn these lessons without having to venture through a similar portal. If the perceptions, interpretations, decisions and actions leading up to an accident made sense to qualified employees, then other employees could make similar decisions with similar or worse outcomes.

The key members of the incident organization that were requested to contribute in the FLA had mixed feelings about participating in this analysis. Once the process and intent were defined this put some members of the group at ease.

This report contains a synopsis of the conditions in which the event occurred, the location of the fire, a summary of the event, firefighter and IMT lessons learned that were identified by the participants, and several emphasis items that the FLA identified based on observations and conversations. It is hoped that firefighters will use the "Event Summary" narrative, the "Lessons Learned" and "Discussion Points" (either stand alone or together as time allows) during safety briefings and training sessions. A sand table can be used to help tell the story. Realizing that every fire incident is unique, the focus of the Facilitated Learning Analysis is not the Little Goose Fire, or the last fire you fought, but the next fire you are about to fight.

Note: No names will be submitted in this report. Again, the objective is to provide take-home lessons to the wildland firefighter community with the focus on the next fire we fight.

Brief Summary:

A local area Type III organization transitioned with a Rocky Mountain Type II Incident Management Team (IMT) on August 11, 2007. The Type II IMT was in command of the incident operations on August 12th, 2007, the day of the event, and this was the first day for the team following transition. On August 12th, two fireline supervisors, the Structure Protection Specialist (STPS) and Task Force Leader trainee (TFLD(T)) working in Division D, were asked by Division D to retrieve a fold-a-tank along Stumpy Ridge Road. While taking apart the tank they were radioed by the lookout to immediately leave the area because uncontained hotspots below them were making runs upslope toward their location. The two firefighters dropped the tank, loaded into the pickup and drove west toward Drop Point 2. After traveling .2 miles the fire had crested the ridge and compromised the road and escape route. They then backed the truck into a grassy area to turn around to travel east towards Safety Zone #2. At this point the fire had made a second run behind and to the east of them, blocking any secondary escape route to the east towards Safety Zone #2. They remained in this area for approximately 10 minutes jockeying the vehicle back and forth between pockets of burning fuel to reduce the radiant heat exposure. Once the heat pulses diminished they were able to proceed to Safety Zone #2, incurring no injuries and some minor damage to the pickup truck.

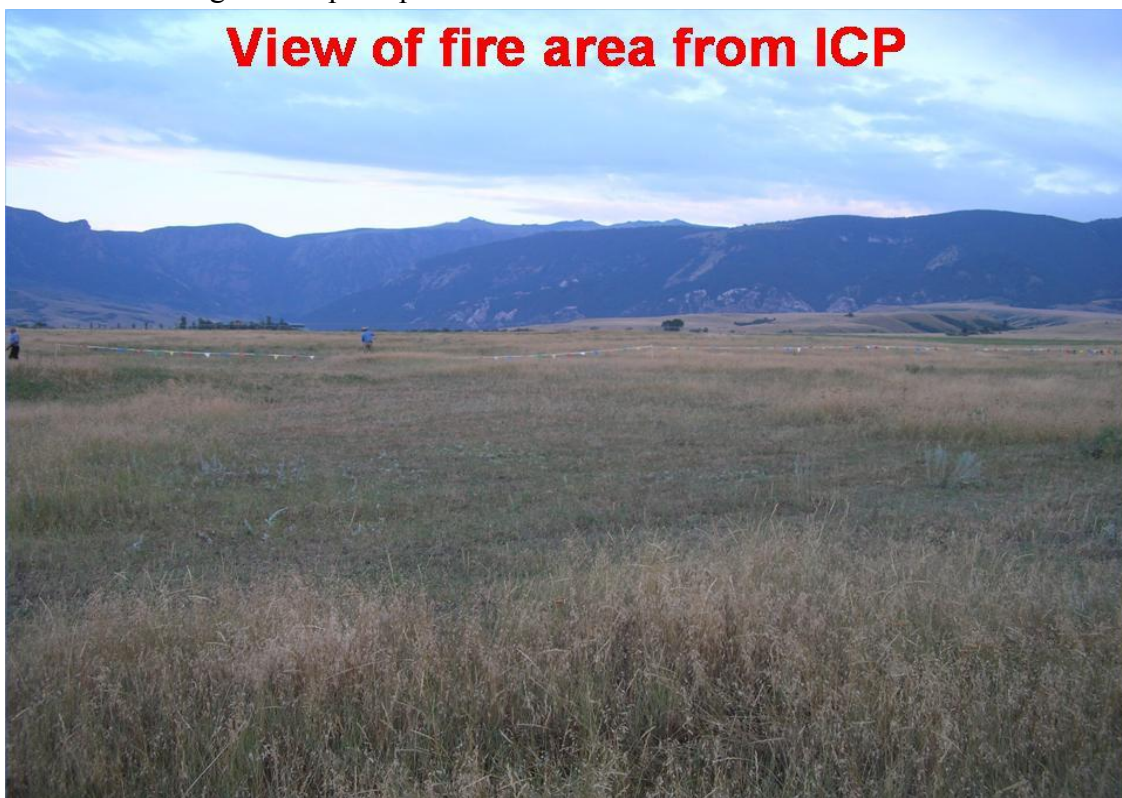
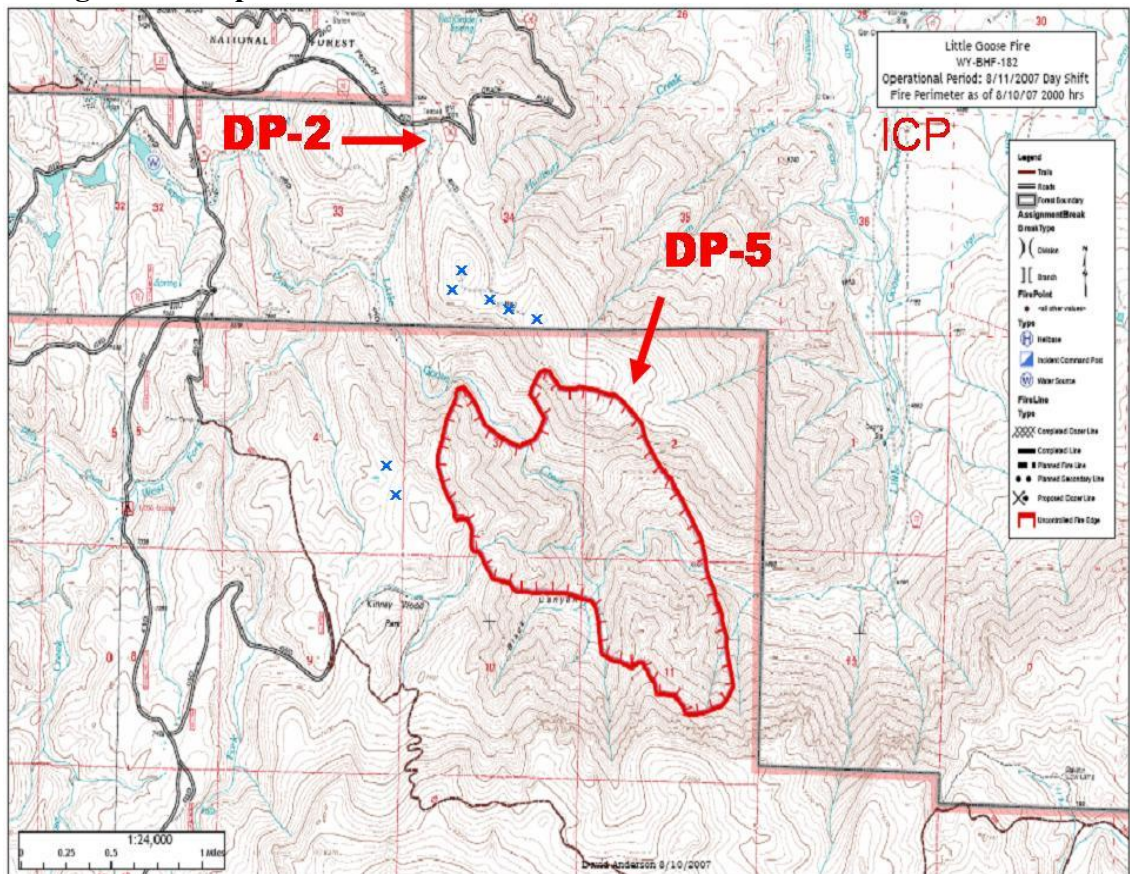


Photo 1: View from ICP on 8/11/2007, looking West, upper left side of photo, fire is up in the large drainage. At this time there is low fire activity.

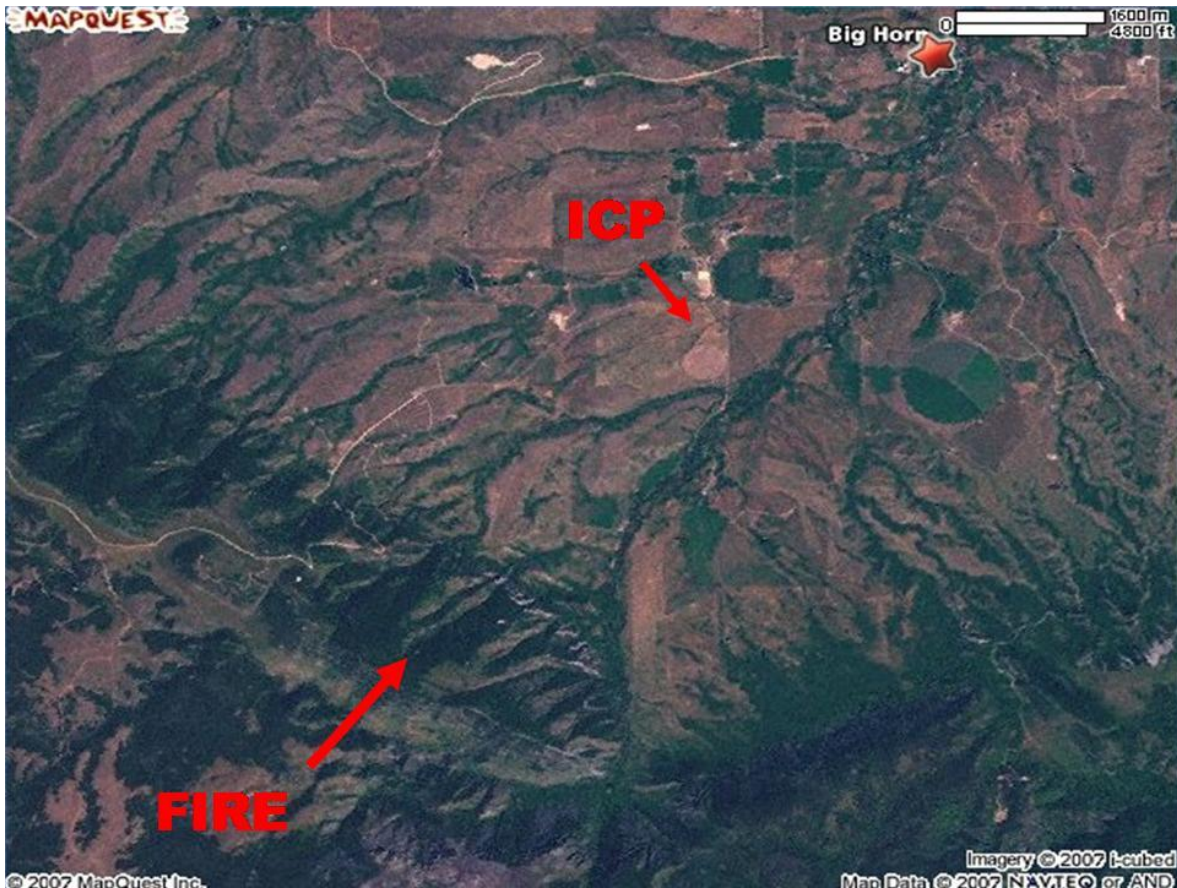
Photo 2: View from ICP late afternoon of 8/12/07, looking west. Compare this photo of the fire from ICP taken a little more than 24 hours after the previous Photo 1.



Figure 1: Map of fire area



Mapquest with Google view overlay of fire area relative to ICP area and urban intermix.



Conditions /Environment

The Little Goose Fire started on 8/10/2007 and grew to 800 acres by the end of the day, Burning on both sides of the lower end of Little Goose Creek.

Multiple structures were threatened along Stumpy Ridge as well in Little Goose Creek. A Rocky Mountain Area Type II IMT was ordered and planned to arrive the afternoon of August 11. A local interagency Type III organization composed of U.S. Forest Service, state & local agencies were delegated authority to manage the incident until transition occurred with the Type II IMT.

During August 10, the observed fire behavior was short crown runs and short range spotting (~ 200 feet) with the fire actively burning in timber but not burning in the sage or grass. The fire was burning on both sides of Little Goose Canyon on 20% to 80% slopes, and was tending to move to the north and northeast.

August 11th weather:

Temperatures 71 to 76 degrees;
Relative humidity 27% to 32%;
Northeasterly winds with gusts to 15 mph
Haines 6

Fire behavior was predicted to greatly moderate on the 11th, from the previous day.

August 12th , predicted weather:

Temperatures 78 to 83 degrees (up 7 degrees);

Relative humidity 15% to 20% (down 12%);

Winds southwest 10 to 20 mph (change in direction from previous day's NE winds)

Haines 6

The predicted fire behavior forecast for the 12th called for increased activity over the previous day in areas exposed to wind.

Event Summary:

A Rocky Mountain Area Type II IMT transitioned with the local Type III organization on August 11, 2007. The planned strategy for Division D was to keep fire to the south and west of Stumpy Ridge Road and protect the structures. The fire at this time was in the canyon to the south of the structures, as it had been for the two previous days.

Following are assignments and specific instructions for the resources working Division D. This information was provided by the TFLD(T)'s PowerPoint as well from the FLA dialogue and interviews with key members of the team. Following are general and specific directions given to Division D assigned engines and handcrews: To treat lower structures and test pumps; prepare and gel upper structures along the ridge; locate and identify multiple escape routes and safety zones. The structure protection resources were to: **Become familiar with the area; conduct structure triage; and then regroup at 1200 hours.** Division D resources were to complete assignments and leave the area by noon or early afternoon. Supervisors were to be watchful regarding potential increased fire behavior activity that would increase risks to personnel on Division D; direct engines in the cabin area to start sprinklers and move toward safety zone with any indication of fire threat.

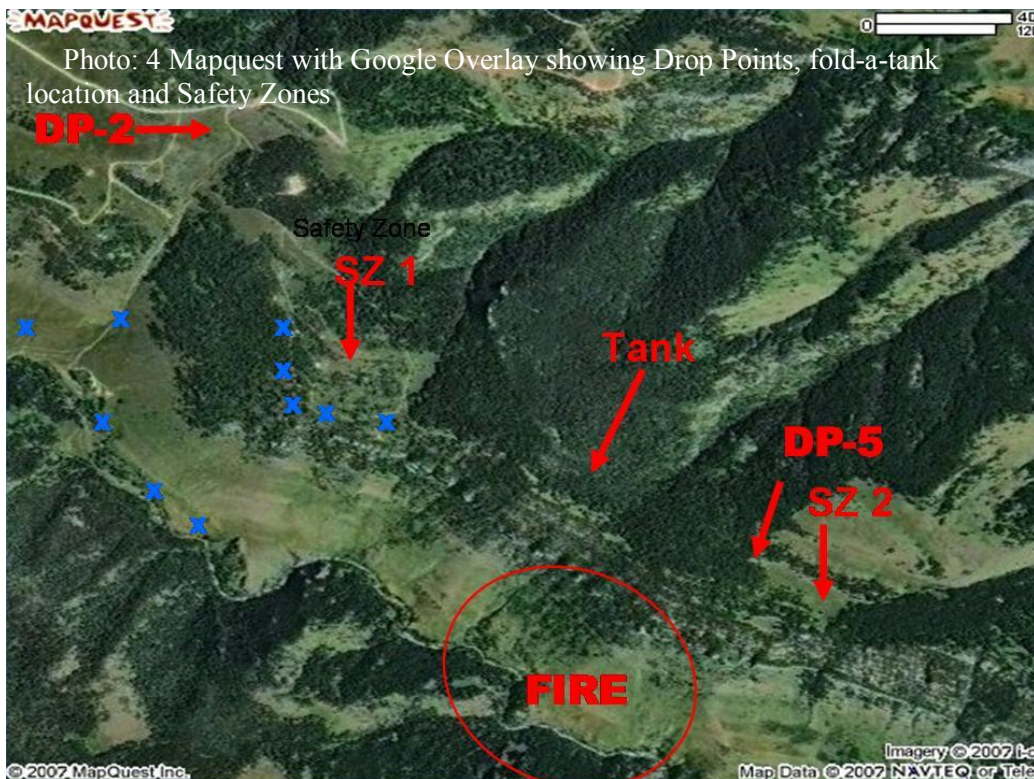
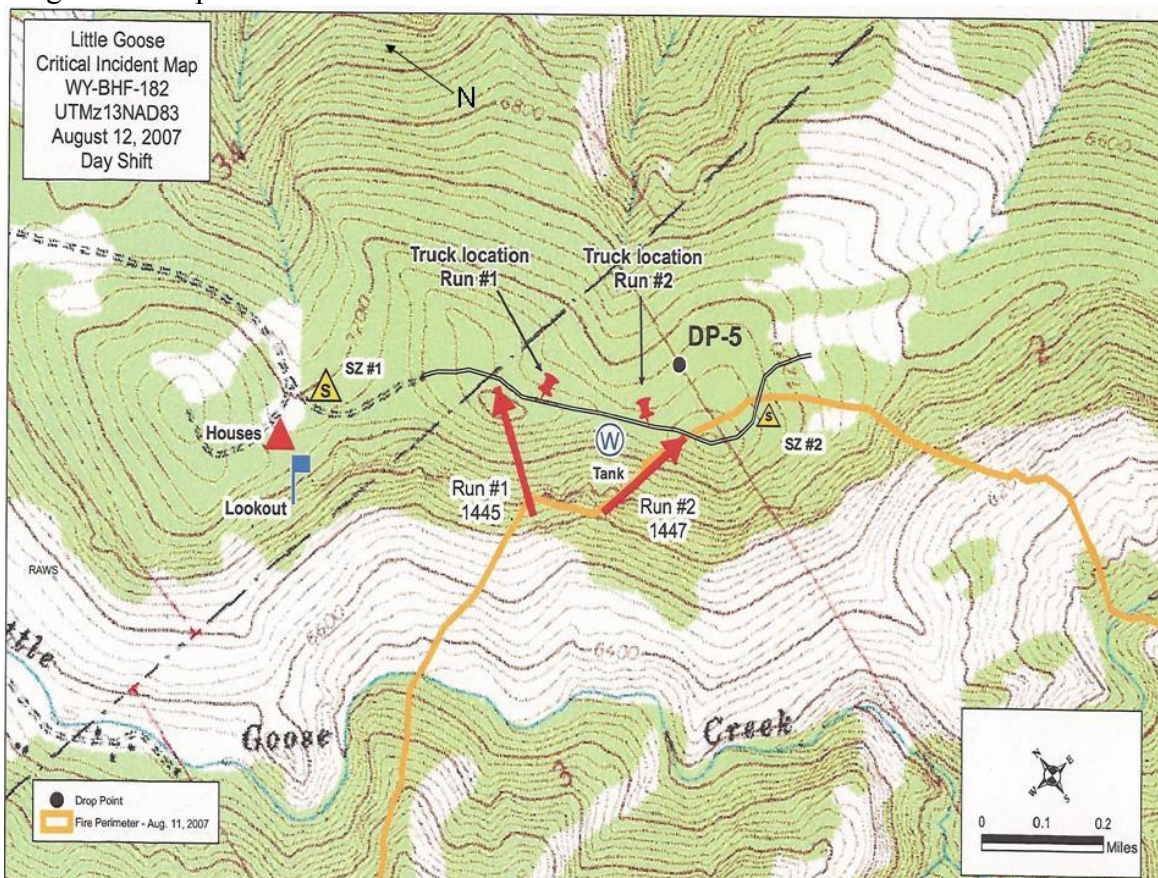


Figure 2: Map of the Portable Tank Area and Fire Runs 1 and 2



By 1200 hours on August 12th, fire behavior began increasing in activity with individual tree torching and ground fire spread from uncontained fires below, to the south of the fold-a-tank and below the southwest side of Stumpy Ridge. At about this time, Division Supervisor D had a type I helicopter working bucket drops trying to check hotspots from spreading towards Stumpy Ridge. At about 1200 hours, fire spread rapidly east of Stumpy Ridge structures west of Safety Zone #2 near DP5 and then ran through grass and into the timber, burning up a water tank (pumpkin).

At 1300, Division Supervisor (T) from an adjoining division stated, “The fire activity along the Alpha/Delta Division break is beginning to increase with single tree torching and active ground fire.” Division Delta had already been experiencing fire growth east of DP5.

At a little before 1430 hours, Division D asked the STPS if he could have someone pick up the fold-a-tank located between Drop Point 2 and Drop Point 5 (see Photo 4 and Figure 2 above). He was concerned that the fire may also burn this tank. The STPS and TFLD (T) said that they would retrieve the fold-a-tank. The STPS and TFLD both maintain the time was approximately 1430.

After spending a few minutes briefing with the Lookout who was located at one of the lower structures in the cabin area, the STPS and TFLD (T) proceeded east along the Stumpy Ridge Road towards the fold-a-tank. According to the STPS and TFLD(T) between 1430 and 1500 hours they stopped in route to the tank, at a high point along the

road to look south off the ridgeline to see what the fire was doing below them and if they should continue driving to the tank. They stated “they did not see any indicators that fire activity had increased.” At this point Division D was driving out of the area going to DP5, along with one of the hotshot superintendents. Division D asked where they were going and they said they were going to pick up the fold-a-tank. Division D said “good” and later states, “I didn’t feel there was a risk to them continuing with their mission.” Although, just before this chance meeting, Division D had ordered all resources in the Division to regroup at DP-2 (which was according to the original strategy for this division, regroup at or around 1200) due to the increased fire behavior and flanking fire moving west along the ridge. The fuels to the east and west of the fold-a-tank were a mixture of dense to open stands of timber and the tank was in a relatively small grassy area.

The STPS and TFLD (T) arrived at the fold-a-tank and began tearing it down (at approximately 1430 to 1500 hours). As the two were just loading the tank into the truck, the lookout radioed them and said that “they needed to leave and return to the safety zone near the structures.” The lookout states that prior to the separate radio call to the STPS and TFLD (T) urging them to leave, that at 1430 hours, he had seen a large column of grey smoke begin to rise out of Little Goose Creek downhill of the structures on Stumpy Ridge. He also states that around this time he broadcasted, over the radio, to pull everyone out of the structure area and that the Structure Protection Specialist acknowledged the broadcast. As the lookout was driving out of the lower structure area he observed, “The fire spread from halfway down the canyon and ran up to the ridgeline in 3 to 4 minutes with 150 foot flame lengths.”

The two firefighters dropped the tank and drove the truck back to the west towards Safety Zone #1. To demonstrate the extreme rates of spread, the STPS stated, “In the time it took us to jump in the truck and start west towards the safety zone, the fire started to crest the ridge in the canopy.” As the firefighters were driving, the fire had made a rapid run from below and blocked their primary escape route. They chose to back down the road to a small grassy area near the tank where they could turn around and at that point the fire made another run behind them to the east, blocking their secondary escape route. Now with no escape routes available, the firefighters decided to remain in the cab of the truck, and the TFLD (T) who was driving maneuvered the truck back and forth between pockets of burning fuel while the STPS communicated their situation to air attack. At this time the STPS told the TFLD (T) they needed to get their shelters out of their packs in case they needed them to deflect the radiant heat. Both of their fire shelters were removed from their line packs and from the bagging. The shelters were never opened and unfurled but were removed from their covers as a contingency action. When air attack was contacted he was unaware that there was anyone left in Division D and was unsure of their location. At about 1500 hours air attack assisted the entrapped firefighters by having H769 make water drops in their vicinity reducing the fire intensity near the road going east bound. Soon the firefighters were led out of the area by H769 who directed them through the smoke as they drove to Safety Zone #2. They stayed at Safety Zone #2 for about 30 minutes.

Division D became aware of the situation by listening to the radio transmissions and at 1540 he informed the STPS and TFLD (T) that the fire behavior had moderated and visibility had improved and they could safely exit the area to the west and return to DP2. They drove along the Stumpy Ridge Road, past the fold-a-tank site and met Division D along the way. They discussed their experience, the status of resources in the Division and

drove to DP2. The portable tank and fittings did burn (see photo #5), several items in the bed of the truck burned, the rear tail-light lens melted, and there was some discoloration of the drivers door CSFS shield. They arrived at DP2 at 1600 and then continued on to the ICP to report the incident. When they arrived at the ICP the two firefighters immediately informed the IC of the near miss they experienced. The IMT then notified the appropriate officials.

Photo 5: The fire ran through the fold-a-tank site from 1430 to 1600.



The fire behavior **general summary** for the end of the day, August 12th, stated: “Starting in the early afternoon, the fire began uphill runs on the southwest side of Stumpy Ridge. These runs produced strong convective lifts. The southwest winds carried fire brands to the north and east of Stumpy ridge. The spot fires continued to establish, pull together and make uphill runs.”

Specific fire behavior summary for the entrapment site area, for the end of the day, August 12th, stated: “The fire activity increased in uncontained areas that were exposed to the wind on the southwest side of Stumpy Ridge. There is a rock outcrop band on the upper slopes of this aspect. The uphill runs encountered these rock bands and fire behavior was modified. West of the DP-5 area, an initial run through a gap in the rock band hit the ridge

just west of the fold-a-tank site. Almost immediately after the first run a second run through the rock gap to the east hit the ridge just east of the fold-tank site.”

Following are a series of photos demonstrating the extreme fire behavior beginning at 1430 August 12th through the evening of August 12.



Lessons Learned by the firefighters:

- Learn as much as you can about fire behavior and fuel conditions from: The locals, the team transitioning out, from review of weather, fuels information, fire history, change of conditions over time, etc.
- Ask more questions and never make assumptions. Ensure that all those under your supervision provide specific updates on changes in the fire environment.
- Make contact with Air Attack and maintain a dialogue with them throughout the course of changes in conditions. They may have a greater view of these changes and the affects to firefighters on the ground. Do not make assumptions that what you see is reality for it may be one view and one perspective.
- Use multiple lookouts when there are potential hazards and risks, and have them check in often. Assure that they can see into the areas of concern, and see the ground as well as the canopy.
- As conditions come into alignment, fire will find any opening or weakness. Those weaknesses can be exploited in an instant.
- Fire Order 3: Base all actions on current and *expected* behavior of the fire.
- Fire and fuels conditions are changing - what was normal 10 years ago is not normal any longer, but our risk management processes need to recognize and be in step with the new conditions.
- Extreme fire behavior may now be the norm.
- Do not always rely on what you or others think will happen.
- Past training helped guide actions during “survival mode”.

Lessons Learned by the Team:

- Remind personnel that human nature almost always over-estimates the probability of success and under-estimates the probability of failure, optimism bias.
- Strongly reiterate the risk management process of identifying hazards and risks, mitigating those risks to acceptable levels, and weighing that residual risk against the operational gains. (How critical is the mission relative to the potential loss or consequences of failure and the likelihood of an unintended outcome).

Emphasis items by FLA facilitator and Regional Fire Safety Branch Chief:

- It’s a “new world” and we should anticipate fire behavior in places and at times that are out of character with what we have experienced in the past. An “expect the unexpected” mindset for fire behavior, along with the growing complexity of our work (values at risk, abundant urban interface, etc.) should set the context for all involved with planning and implementation of strategy and tactics, it is important to be mindful of risks and consequences when giving and accepting assignments, and assessing and regularly confirming whether adequate LCES safety precautions are in place. Extreme fire behavior is unforgiving and shortens the time available to make decisions. In this event, individuals performed well when they found themselves in a threatening situation. However the first question that comes to mind is “Should they have been in that situation in the first place?” The team had already recognized the risks and hazards during the planning session the night before and had completed the LCES hazard abatement exercise which recognized that this division was at risk based on the predicted fire behavior for the day. Crews and

engines were briefed to regroup at a safe location and reassess at 1200 noon or about that time. The Division Supervisor directs all resources out of this division in the early afternoon and to regroup at Drop Point 2. But yet there was an attachment to the fold-a-tank by the DIVS, TFLD (T) and STPS, that compelled the STPS and TFLD (T) to drive into the area to retrieve the tank with support from the DIVS. Even though the fire activity was picking up, the Lookout at the cabins had broadcasted an alert for resources to disengage from the cabin area and fall back to the Safety Zone #1.

- During fires in transition, the first day of command while managing changing and dynamic fire environments, situational awareness has a tendency to break down as these environments go through rapid changes, and high tempo operational activity. Some checklists become invaluable tools to help ensure we stay focused on the priority of safety. The LCES Checklist (page 6 of the IRPG) is one of those tools that can help ensure that the fine lines between doing things right and tragedy are never blurred. This checklist takes less than 90 seconds to review. Fires will burn and homes will be lost. However, every firefighter has a responsibility to reassess LCES as conditions change.
- Fire behavior changes occur in seconds with transitioning fires. The ability of an individual to recognize critical changes is affected by rapid shifts that may occur on wildland fires. Fire leaders can readily observe incremental changes and still lose sight of the big picture. Therefore, it is everyone's responsibility to speak up when something doesn't seem to make sense, or sound right. Organizationally, we must possess the determination and the will to ensure for "safety first" with no exceptions. From a human factors standpoint, two human errors are common over the past few years: underestimating hazards, and using inadequate safety measures and failing to notice changing conditions and adjust tactics accordingly. "**Optimism**" as mentioned above in the team lessons learned is an error arising from human nature, we assume that nothing bad will happen and "**inertia**" – once we interpret our situation and choose a course of action, we tend to stick with it. Usually, optimism and inertia are appropriate, even beneficial, but sometimes they get in the way of sound decision making (Brad Mayhew, October 2005)
- Detailed discussions with participants included a discussion about lookouts. Lookouts were indeed in place, and the two firefighters had arranged a face to face briefing with the one lookout that would be positioned at the lower cabins just below the main ridgeline. A statement from one lookout is, "He did not have a full view of the fire below where the two firefighters were working to remove the fold-a-tank". This lookout states that "The ground was not completely visible from his vantage point but some dark smoke coming from the ravine indicated increased fire activity." Another lookout in the flats also could not see directly into the area, but did state that the fire behavior went from benign to extreme, "Within one orbit of the Air Attack". Were these two lookouts in the best locations available to see the danger and communicate a rapidly changing fire environment? Were there fire behavior trigger points or topographical trigger points identified that the lookouts could use to communicate fire spread and behavior?
- The operations organization recognized the risks in Division D during the August 11th planning cycle for the August 12th operational period as well as the potential for a rapidly transitioning fire by the afternoon of August 12th. This is apparent in the tactical assignments and directions for the day to the engines, structure protection resources and crews. One of the standing directions was to be alert and monitor the changing

environment. Instructions were for crews and overhead to do the work in the morning and regroup at noon and if necessary determine alternative tactics and strategy for the afternoon. The planned disengagement to DP2 and regroup did not occur until after the fire became active in the afternoon, but did occur prior to the occurrence of the extreme fire behavior. There were several signals that demonstrated an increase in fire behavior and thus fire risks to firefighters. The IMT did make contingency plans to mitigate the risks and provide for firefighter safety in Division D. So why did it make sense to the two fireline supervisors to become focused in retrieving the fold-a-tank? What made sense to them at this time? Could have other firefighters of equal or greater qualifications made the same decisions and took the same actions?

Following are: Discussion Point Questions, Generated Through the Facilitated Learning Analysis for the Little Goose Fire: Use these questions for continued dialogue and safety and tactical decision games with firefighters.

1. What should the priorities be for fighting this fire?
2. Given the fuel and weather conditions, what actions would you take to help ensure firefighter and public safety?
3. If at all, what point would you fall back, regroup, reassess and determine alternative strategies?
4. What actions can you take to ensure that public and firefighter safety remains the highest priority during a rapidly transitioning fire? For a fire in the WUI? For a fire in a remote but popular backcountry destination?
5. Identify ways safety focus can be maintained when supervisors assume additional duties or tasks, or become “Mission Oriented”.
6. When does an IC need to re-evaluate strategy and tactics?
7. What steps can be taken to ensure that orders are clearly understood?
8. What actions could have been taken to avoid entrapment on this fire?
9. Was Air Attack aware of the resources falling back to DP2 and was Air Attack actively engaged in providing information and situational awareness to the ground resources?
10. What have we learned from past entrapments, extreme fire behavior, and time for escape? What can be learned from this event?
11. If a lookout provided you with information that your current location would be overrun by the fire in 5 to 10 minutes, what actions would you take?
12. What other actions might the firefighters have taken once they were entrapped?
13. Using a vehicle is an option for refuge. What measures should you consider if you must seek refuge in a vehicle? When might you leave the vehicle?
14. What if any Standard Firefighting principles were compromised during this entrapment?
15. Which Watch Out Situations were not mitigated?
16. Do you think resources on the Little Goose Fire had adequate lookouts? If not, at what point do you think the established LCES became inadequate? What would quality LCES look like for this fire?
17. What other resource(s) might have been used to monitor the fire as it approached Stumpy Ridge Road?

18. Why is situational awareness so important to firefighters? How do you ensure that situational awareness is maintained? What can be done to help maintain – situational awareness? Who is responsible? How is critical information shared?
19. Whose responsibility is it to ensure that all actions are based on current and expected behavior of the fire?
20. How can the use of trigger points help prevent entrapments? What could have been used as potential trigger points on this fire?
21. If you get a feeling in your gut that things are not quite right, would you take actions to address that feeling? If so, what kind of actions would you take to accomplish a “gut check”?
22. When talking to accident victims, often a common thread is that “it happened so fast...” usually followed by “we didn’t have time to ‘react, escape, avoid it, and change plans’”. What are the lessons from these common threads?
23. Were there indicators that would have triggered an escape one minute earlier, or triggered not going into an area, instead of having firefighters surprised in the moment?
24. When we look at cues from our individual perspective or position on the fireline, often none of them seem alarming. Yet when you look at all the signs collectively (acknowledging it’s easier in hindsight) an earlier warning is often there.
25. What are some events that may have occurred that could have reduced situational awareness during this event?

To derive all that can be learned and applied to the question “What can we do next time to have a safe operation and positive outcome?” It is recommended that this incident be utilized by the interagency fire community as a learning opportunity for training, including its use as a basis for sand table exercises.

The Little Goose Facilitated Learning Analysis Summary:

While participants were very complimentary of the FLA process and goals for a learning culture, firefighters and managers were very concerned with the review process that actually happened. There was much discussion regarding whether the situation was a near-miss or an entrapment, and why the review was delayed as long as it was and why one agency (in this case the US Forest Service) has the authority to dictate what additional review / investigation procedures are appropriate.

(Facilitators Note: The issue of defining entrapment comes up repeatedly, and in the current state of affairs, demonstrates a need to re-evaluate nationally and on an interagency basis. The Little Goose Fire is a good example to bring the important perspectives of state and local partners into the dialogue. Having said that, the appropriateness of an FLA does not change with these disputed definitions, and suggests our energy is better spent when we instead evaluate situations for their opportunities for learning.)

FLA Participant’s Recommendations:

- Use the digital slides, video clips, and appropriate skills to create a presentation that can be shared with local, state, and federal firefighters working in similar fuel types.

- The speed that this fire transitioned, from benign to extreme are lessons that must be passed on to others- “The unexpected is normal now”. This needs to be highlighted in the presentation.
- Promote a mechanism to determine what is needed for accident review, analysis, and/or investigations to best facilitate lessons learned and future accident prevention. Considering the non-federal partners that are contributing to IMTs, to the regional firefighting effort and other events across jurisdictional boundaries in the RMA this is growing concern.