

# **Bull Fire Entrapment**

**April 29, 2011**

***FACILITATED LEARNING ANALYSIS***



## Table of Contents

<b>I. Summary</b>	<b>3</b>
<b>II. The Bull Fire Entrapment</b>	<b>6</b>
<b>III. Lessons Learned and Recommendations from Participants</b>	<b>12</b>
<b>IV. Team Lessons Learned and Recommendations</b>	<b>17</b>
<b>V. Lessons Learned and Reminders: Summary “25 Nuggets”</b>	<b>23</b>
<b>VI. Commendations</b>	<b>24</b>

### Appendices

#### A. Chronology

#### B. FLA Process Lessons Learned by the FLA Team

#### C. FLA Team Members

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Download the Google Earth companion file at <https://sites.google.com/a/firenet.gov/geta-group/training/flag-library/BullFireAccidentDepiction.kmz>.

## Entrapment

“A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. Entrapment may or may not include deployment of a fire shelter for its intended purpose. Entrapment may result in a serious wildland fire accident, a non-serious wildland fire accident, or a near-miss.” (Interagency Standards for Fire and Fire Aviation Operations, 2011 p. 18-6)

### I. SUMMARY

On Friday April 29, 2011, the Bull Fire entrapped and burned two firefighters on the Coronado National Forest near the Mexican border, west of Nogales, Arizona.

A local firefighter reported the Bull Fire to Tucson Interagency Dispatch on Tuesday afternoon, April 26, while it was still two miles south of the border, in Mexico. A quick aerial reconnaissance estimated the fire at 15-25 acres.

The District Ranger and District Fire Management Officer flew over the fire on the morning of the 27<sup>th</sup> and found that it had grown from 25 acres to over 1200 acres in less than 24 hours. The fire now threatened to move north into the United States onto National Forest System lands, and ultimately toward the city of Nogales. The Ranger and District Fire Management Officer (DFMO), working with the Acting Forest Fire Staff Officer, developed an initial plan to fly crews a mile in to Mexico and stop the fire short of the U.S. border before Red Flag winds predicted for the 29<sup>th</sup>.

U.S. wildland fire agencies conduct operations in Mexico under a Wildfire Protection Agreement negotiated between the two countries and implemented through annual operating plans. Local officers of U.S. Customs and Border Protection were unfamiliar with these



protocols, and fire managers spent much of the morning of the 28<sup>th</sup> resolving coordination with Customs and Border Protection. This significantly affected the tempo of operations, cut short the operating window on the 28<sup>th</sup>, and ultimately meant that only half of the available resources were able to engage. Local crews with helicopter support worked hard throughout the 28<sup>th</sup>, but when they returned to the U.S. at the end of the day they had been unable to halt the fire's progress.

The plan for the 29<sup>th</sup> called for a hotshot crew to construct a line and burn out between the Peña Burn and Walker Canyon across the head of the Bull Fire, just inside Mexico. Local crews would move up Walker Canyon and burn out on the east flank. The helitack crew established H-3 on a hill on the U.S. side of the border. Crew transport began about 0905.

When the Incident Commander arrived with the last firefighters at 0955, the hotshots had begun line construction and were just starting firing operations. The local crews were headed to their positions. The IC had a quick discussion with the helitack crew about their role, before heading down to the control line below them. The IC told the helitack crew to remain at H-3. Their safety plan, should the fire cross the constructed line below them, was to light an escape fire – establishing a safety zone – and step into the black.

Around 1040, the Red Flag winds arrived. Flame lengths of 1-2 feet became 8-10 feet, leaning over the control line and quickly compromising it. At least three large slopovers headed north towards the helitack crew at H-3.

When they realized that the hotshots would not be able to catch the slopovers, the helitack crew members began building a quick scratch line around their equipment, and then lighting a controlled backfire on the south side of H-3. As the fires below them consolidated, reached the bottom of the slope, and began moving rapidly toward them, they realized that they were not creating black fast enough. They ran downhill away from H-3 and the fire, and then ran back to H-3, dodging through the flames carrying their fire shelters in their hands. Both firefighters received burns.

An incident helicopter transported the injured firefighters to the Tucson hospital. The Forest Safety Officer met the firefighters at the hospital. Each was treated for 2<sup>nd</sup> degree burns. The physician released them that day. They were referred to the burn center in Phoenix and also released from the center that same day.

On Monday, May 2, the Forest Supervisor delegated authority to a Facilitated Learning Analysis (FLA) team to analyze the Bull Fire Entrapment, to learn what happened, and to identify lessons that could be learned to prevent entrapments and injuries in the future.

The team identified the following key risk management elements related to the entrapment:

1. Safety Plan at H-3
2. Organization and Culture
3. International Border
4. Communications
5. Incident and Medical Response



## II. The Bull Fire Entrapment

### Tuesday: April 26, 2011

District personnel reported the Bull Fire on April 26, 2011 at 1530 approximately 2 miles south of the U.S. – Mexico Border west of Nogales, Arizona. Air Attack launched and reported the 15 – 25 acre fire had potential to move north into the US onto the National Forest System Lands.



### Wednesday: April 27, 2011

On April 27, 2011 the District Ranger and District Fire Management Officer (FMO) conducted a helicopter recon flight with two district module leaders and formulated a plan to insert resources and take suppression action to keep the fire out of the U.S., keep it small and keep risk exposure to a minimum. Customs and Border Protection protocol in the past for fires in Mexico didn't require check in at a port of entry. Forest resources considered this while creating the plan. Getting in quickly and extinguish the fire early in the burn period was a priority.

The helicopter recon flight showed the fire grew to over 1200 acres in the previous 24 hours. The plan for the following day included herding the fire to the west into the Peña Fire and line construction from the north flank and work back east and south. Bomberos (Mexican firefighters) worked the South flank of the fire to the east. Communication with the bomberos is hit and miss but tactical considerations take into account their actions and face to face communication takes place occasionally to coordinate and keep personnel safe. If the US resources could cut the fire off on the north and work east and back to the south to tie in with the bomberos the probability for success was high. An additional helicopter was ordered to support operations and mitigate medivac concerns with complications related to the international border.

### Thursday: April 28, 2011

On the morning of April 28, 2011 the District Assistant Fire Management Officer (AFMO) was assigned as the incident commander. During the briefing, the District Ranger and AFMO discussed the location of the fire in Mexico and the risk management issues associated with

engaging a fire over a mile into Mexico. They decided to implement the plan developed on April 27 after some dialogue.



The Customs and Border Protection protocol enforced on the 28<sup>th</sup> was an unexpected development. It required the helicopters to get inspected at the port of entry in Nogales, AZ before doing troop shuttle. With inspections completed, the helicopters returned to Peña Blanca Helibase to pick up firefighters and transport them to H-1 in Mexico. The helicopter and pilot had to return to the port of entry to be re-admitted to the U.S. after dropping off firefighters. This process delayed getting firefighters to the fire ground early in the burn period and affected the operational tempo and planning cycle in the early part of the shift. A Type 1 Crew (IHC) staged all day at Peña Blanca Helibase ready for troop shuttle. The customs delays in the morning and the anticipated additional time to get folks off the hill in the evening prevented getting the IHC to the fire.

High tempo operations occurred on the 28<sup>th</sup>. Local resources used dynamic tactics with drip torches and flappers throughout the shift. Mexican dip sites near the fire supported nearly 200 bucket drops during the shift. Communication on Air to Ground Frequency was extremely busy. Ground resources used hand signals to direct drops during the day. The District Fire Net was down. This increased radio traffic. Firefighters used direct and indirect tactics to create control line along the west and north flanks of the Bull Fire. Helicopters created wetline that firefighters burned off of between bucket drops. Lighters with drip torches created blackline and worked in tandem with firefighters on flappers to extinguish one side of the blackline operation.

During the shift on the 28<sup>th</sup> two helitack personnel staffed the helispot. They supported suppression operations along the fire line. At some point during the shift fire crossed the unstaffed helispot and damaged equipment. Towards the end of shift the IC and resources felt beat up and tired but also very successful in making progress to secure the north flank. On the 28<sup>th</sup> Forest Fire Management staff worked very hard to smooth out the Customs and Border Protection issue. By the end of shift on the 28<sup>th</sup>, two Customs agents staffed a mobile port of entry at Peña Blanca Helibase. This cut down on the flight time necessary to get fire fighters

back to the U.S. At the end of shift, the fire size was estimated at 3000 acres. Helicopters shuttled firefighters off the fire out of H-1 and H-2. Fire resources at the direction of the IC created H-2 at the end of the shift. The IC reported all resources were off the fire and en route to quarters at 1830 hours.



**Friday: April 29, 2011**

On the morning of April 29<sup>th</sup> at 0745 the IC and IHC Superintendent conducted a recon flight and communicated to dispatch that the fire grew 100 acres over night. A helicopter manager approved a new helispot, H-3, on the U. S. side of the border about 300 yards from Mexico. The fire moved north over night and both of the previous helispots were not useful for operations. The new helispot on the US side alleviated customs delays and mitigated medivac concerns that affected the previous day's shift.



During the recon, the IC and IHC Superintendent developed a plan to burn out a piece of line on a small ridge 10 feet into Mexico from the international border. The plan included establishing fireline to the west down a small ridge to tie into the Peña Fire burned area and east to Walker Canyon. A checkline at the high point on the ridge about half-way between Walker Canyon and the Peña fire also needed to be built to create a safety zone and anchor point for the burn operation. The IHC would run the burn operation at the international border while the District crew that had worked the previous shift would walk Walker Canyon to the south and prepare to fire off the west side of the canyon to the south. The burn operation would secure the west side of Walker Canyon and the north and keep the fire out of the US.

On April 29<sup>th</sup> a Red Flag Warning was in effect from 1100 – 2000 MST for strong and gusty winds, very low humidity and High to Very High fire danger. The Red Flag conditions played a role in the plan to get on the fire early and complete the burn operation before Red Flag conditions developed.

A helicopter inserted two helitack crew on a ridge below what was to become H-3 early in the shift. They cleaned up the helispot and the troop shuttle began with the IHC to H-3. After the first load of firefighters it was clear the fire had moved and the plan might need to be changed. The IHC Superintendent was on the second load and walked south to black edge of the fire to evaluate going direct. Due to underslung line and rollout hazards the Superintendent decided to stick to the original plan of line construction and back fire. Troop shuttle continued.

At the Helibase, around 0830 – 0900, an IHC crewmember spun some weather and got a 40% RH. When they arrived on the fireline conditions were drier and the wind was “in their face” from the southwest at 10 – 15 mph. The IHC constructed a fireline with an 18” – 24” scrape. The final load of the District folks and the IC left Peña Blanca Helibase at about 0955 for the 5 minute flight to H-3. After the short flight the District folks packed up and headed down from H-3, past the IHC. They had started their test fire for the burn operation. District folks wondered why the IHC weren’t using flappers to construct line, a favored tool and technique on the district. The District personnel didn’t raise any concerns. The IHC crewmembers discussed



local techniques earlier during conversations with the District folks but opted for digging tools to construct fireline. The IC stayed behind at H-3 with the helitack crewmembers.

The helitack at H-3 consisted of a senior and junior crewmember. Helitack 1 was a local forest resource off another district with over 10 years experience. Helitack 2 was off another nearby forest in his 3<sup>rd</sup> season of fire. The three discussed the options for the two helitack that day. The IC told the crewmembers to remain at H-3. The IC recognized that there was unburned fuel between H-3 and the burn operation. They covered LCES. The IC directed the crewmembers to ring the helispot to create a safety zone for both crewmembers if needed. He used shorthand to describe the planned safety action as “‘Wag Dodge’ it if there are problems.” The IC left H-3 and headed south toward the burn operation.

The IHC started their burn operation with a test fire. The test fire had 1-2 foot flame lengths in the grass with some slightly larger flame lengths in the brush. After the District folks walked past toward Walker Canyon the IHC started burning to the east of the checkline and then to the west once there was 75 feet of blackline created.

At about 1000 hrs the IHC lookout reported a southwest wind 10-12 and an RH of 10%. Sometime after 1030 everyone felt as if a “light switch” was turned on. The southwest wind came up to 25 mph and stayed there. Quickly, three slopovers occurred north of the handline.



The IHC crewmembers aggressively attacked the slopovers but with consistent 25 mph wind the 1-2 foot flame lengths grew to 10 – 12 foot flame lengths. The IHC crewmembers backed off and desperately watched the fire move off the ridge toward H-3.

On H-3, the two helitack watched the burn operation and immediately recognized that the slopovers threatened

their position. Helitack 1 told Helitack 2 to put in some checkline around the gear while he continued to monitor the slopovers. Helitack 1 returned and they both pulled out their fire shelters expecting the worst. They held their shelters and began to light along the edge of the checkline with a fusee, and they flapped out the side of the fire nearest to the gear. By this time the slopovers had backed down into the drainage and were aligned with slope and wind. The slopovers merged and moved very rapidly uphill toward H-3. Helitack 1 radioed the IC to

advise him they were abandoning H-3. Helitack 2 left H-3 to the west-northwest running downhill. Helitack 1 ran down behind him in that direction but the two were separated. The IC



quickly radioed for them to stay put and get in the black. Helitack 1 screamed for helitack 2 to return. On their return to H-3 they dodged at least 2 major flame fronts, quickly choosing an area of lower intensity and jumped through the flames.

Both helitack made it to H-3 and initially thought they did not sustain any

injuries. The IC arrived in just minutes and soon after recognized the severity of the injuries. He requested the medivac and reported the entrapment 1108 hours. Shortly after the helicopter left helibase for H-3. At 1116 the helicopter departed the Bull Fire in route to the hospital. At 1138 the helicopter arrived on the pad at the hospital.

The Forest Safety Officer responded immediately to the hospital along with the District Ranger (from the home unit of Helitack 1). Helitack 1 had notified his family. Forest managers had also quickly contacted family. The acting Forest Fire Staff Officer ordered an IC for the Incident Within an Incident (IWI). The IWI IC ordered a Forest Liaison to assist with the response to the injured firefighters and lay the groundwork for what would be the formation of the Facilitated Learning Analysis Team. The IWI IC called the Wildland Firefighter Foundation for assistance and advice. The Foundation advised the firefighters be referred to a burn center immediately. The Forest Safety Officer also advocated for a referral. The attending physician referred both firefighters to the Burn Center. An air ambulance transported the more severely injured firefighter to the nearest burn center. The center treated and released the firefighter that evening.

Back on the Bull Fire all resources regrouped and moved down Walker Canyon to the next Forest Road carrying fire and their safety zone with them. The acting Forest Fire Staff Officer requested a Type 2 team. The remaining resources worked hard through the night and played a major role in containing the fire by the next operational shift.

### III. Lessons Learned and Recommendations from FLA Participants

The FLA involved participants through individual and paired interviews as well as a one-day session primarily with the “boots on the ground.” Individual/paired interviews included:

Forest Supervisor	Incident Commander
Deputy Forest Supervisor	Dispatcher
Acting Forest Fire Management Staff	Air Attack Group Supervisors
District Ranger	
District Fire Management Officer	
Assistant District Fire Management Officer	
Forest Safety Officer	

Participants in the one-day session included the Incident Commander, Hotshot Crew, Helitack Crew, Engine Crew, and two hand crews for a total of approximately 40 people. The level of fire experience varied widely, from individuals who had more than 20 years of experience to crew members on their first shift on their first fire of their first season as a hotshot.

The FLA Team facilitated an After Action Review-like discussion with participants that elicited a composite understanding of the planned actions and the actual events that transpired from the beginning of the incident through the afternoon of the day the entrapment occurred. Participants shared freely and discussion was robust. Using Google Earth and a sand table, people were able to tell and show what happened. After this, the participants broke into five small groups to discuss and document “lessons learned.” Participants voluntarily inter-mixed between modules. They were asked to share individual lessons learned and lessons that they would want other firefighters or even the Chief to know. Lessons can be learned from actions and behaviors that worked well as well as those that did not.

The following includes the actual flipchart documentation and items from interviews. All are grouped by topics developed after the fact by FLA Team. It is important to remember that especially for the group session this is what *they* say that *they* learned.

## Helispot

- Helispot location: Why not look elsewhere? Why not stay at helispot?
- Helispot down wind and upslope
- Mitigate safety concerns if helispot is at head of fire recon 1<sup>st</sup> and be more thorough
- Multiple options for escape routes, safety zone for Helitack – (everyone knows them)
- Check to know if helispots will be staffed

## Culture and Leadership

- Negative connotation associated with shelter deployment
- See something say something
- Should be able to use safety tools you have without repercussion
- Importance of clearly articulating expectations regarding not putting people at high risk
- Helped to be very engaged as Line Officer – Interest, supported, learned
- Gaining perspective of risk in new situations can be difficult
- Mixed messages “You’re accountable.....but .....Don’t blame yourself” [Note: i.e. Don’t put all the blame on yourself]
- Clarify when we do Facilitated Learning Analysis or Serious Accident Investigation

“We’re going to expose less now to avoid exposing more, later.”

## Complexity

- Timing seemed intricate with a lot of moving pieces with a small window
- Pulling off complicated operations on 1<sup>st</sup> assign. Differing levels of SA across the fire. Communicate between adjoining resources. Fire Behavior.

“Crossing the border changes the risk management environment.”

## Border

- Why fight fire in Mexico? Maybe treat as fire use.
- USFS and US customs protocol
- Establish US/Mexico protocols- How would this change if whole event was on Mexico territory
- Customs problems solved and tried Thursdays plan on Friday with new ground and Red Flag
- Have defined protocol for border operations.
- Don’t let policies dictate safe firefighting

## Communication

- Better comms -- More frequencies—designated to emergency traffic only—clean up eg. A2G [Air to Ground] only for that traffic
- Good comms
- Communication with adjoining resources even if they are in another country

“Get in. Get the plan done. Get out before the winds come.”

## Incident within an Incident (IWI)

- Excellent management of IWI
- Importance of Burn Injury Protocol
- Consider having on site person at hospital to initiate/complete CA-1 vs off-site supervisor
- Consider education/info to local MDs on wildland fire-type burn injuries (eg short video by MD, Card/sheet and contact by Forest SO)
- Great reminder of the importance of getting treatment fast
- Whoever goes to hospital – have a stack of EAP cards
- Great to have Forest Protocol and unit designee for emergencies (eg. Hospital) keep it up-to-date and have copies

“The issue of a possible investigation wasn’t an ‘oh sh\*\*’. The ‘oh sh\*\*’ was around the concern for the firefighters.”

## Local Considerations

- Get familiar with local area and tactics and organization and season status
- Adapt to local conditions
- Adapt to local tactics
- Improve crew collaboration and share local knowledge with other resources (Swatter video)

## Basics

- Everyone re-evaluate their situation continuously LCES, 10 and 18, (Frontal assaults, unburned fuel and comms with adjoining forces)
- Accountability of adjacent resources – how our actions are impacting nearby resources
- Appropriate safety zones and escape routes
- Evaluate how your actions affect other resources
- Safety zone/escape routes always have one and options for others
- Fight fire aggressively having provided for safety first
- Develop own situational awareness proactive vs. reactive
- Use of proven tactics
- Avoid overextending resources
- Accountability for resources involved
- Frontal assault
- Consider affect of actions on other resources not directly involved in operations
- Anchor points in a saddle

“Accidents can be a result of a rare combination of normal performance variability.”

## Weather and Fuels

- Red Flag evaluation complacency and fun and challenge of it
- Burning with 25 MPH
- Understand Red Flag condition and how they will affect operations throughout the day and how we will respond to them
- Develop actions for projected weather conditions
- What happens if we get a spot? Anticipating tools/tactics effectiveness under Red Flag Warning
- Familiarize yourself with fuels and how they react under current weather conditions
- Leaving people in the green on Red Flag days in light fuels

“We have fire season ten months out of the year.”

## Equipment and Training

- Test and Wear PPE – Shrouds and shelter training
- Improved fire shelter training – When vs. How

## **Preplanning, Planning and Situational Awareness**

- Addressing political/bureaucratic issues – border issues and other agencies
- Make plans that don't rely on air resources
- Establish medical plan ahead of time
- Worst case scenario – what are you going to do?
- Briefing should include: "What does failure look like? What does success look like?"
- Contingency plans in place early
- Thought Thursday issues were solved and maybe didn't focus enough on new issues

## **Aviation**

- Don't rely on aviation to achieve operational objectives
- Start operations earlier. Why can't pilots get up early?
- Ensure Air Attack Group Supervisor is informed of plans and tactics

## **Trigger Points**

- Trigger points – accurate for the situation and communicate
- Plan that has adequate time to initiate triggers (Decision Space)
- Establish trigger points/ re evaluate/ have actions for triggers—don't ignore when you hit trigger points

## **Observations**

While some of the Lessons Learned expressed may seem very basic, this might indicate that basic training for these firefighters (10 and 18, LCES) is now more internalized and remembered after their participation in this FLA. To use a term often quoted here: They now have a "slide" in their mind, a picture, of the importance of those basic concepts and rules. For example, "Fight fire aggressively having provided for safety first" was stated (perhaps by a lesser experienced crew member). It's not necessarily true that the crews weren't following this order of the ten standard fire fighting orders, yet it's now reinforced that this order is extremely important and the crewmember has seen it in action.

## **IV. Lessons Learned and Recommendations by the FLA Team**

### **The Safety Plan at H-3**

#### ***Observations***

- The location of H-3 and the decision to station helitack personnel there may have been influenced by cultural factors (helitack stays at the helispot) and border logistics (H-3 is in the United States) as well as operational considerations.
  - H-3 was favorable for helicopter operations, had excellent visibility and served as lookout point
  - H-3 was also located at the head of an active fire, at the top of a steep slope, with unburned fuel between it and the firing operation
- The primary safety plan at H-3 was effectively a contingent or emergent approach (escape fires are in the “Last Resort Survival” section of the IRPG).
- If the control line failed to hold, the helitack members were expected to make a rapid mental shift and take quick and decisive action to create a safety zone. While they were experienced firefighters, had enough time, and began taking action fairly soon, their actions were not effective in establishing a safety zone.
  - The expected action made sense, could have been successful, and was communicated, but ran counter to much training and muscle memory in firing operations (emphasizing controlled ignition, backing fire).
  - The expected action required the sacrifice of equipment.
  - The expected action would result in failure of the mission to contain the fire south of the border.
- Firefighters are trained in how to deploy shelters, but may delay deployment until the last possible moment – or beyond it. There is a common cultural understanding among firefighters that deployment is a very bad thing and triggers a major investigation.

#### ***Lessons***

- All personnel should have Primary, Alternate, Contingent, and Emergent (PACE) safety zones. Safety zones requiring decisive action should generally be considered Contingent or Emergent.
- If escape fires are planned for use to establish a safety zone, use of escape fire should be practiced and mentally rehearsed.

## **Recommendations**

- The wildland fire community should take away the “stigma” of deployment. Deploying a fire shelter is making use of a (last resort) safety tool. The trigger for a review should relate to the situation (entrapment) that required the use of the tool rather than to the use itself.
- Basic firefighter training and refreshers should teach not only *how* to deploy a fire shelter, but when to deploy. Deployment – when necessary – should be encouraged rather than sanctioned.
- When utilizing helispots and there is unburned fuel between the helispot and the fire, ensure that personnel staffing them have adequate LCES in place at all times.

## **Organization and Culture**

### **Observations**

- The IC carried a great deal of responsibility in his day job going in to the incident, and was under stress that he may have been reluctant to voice. The local fire season has been ongoing almost without interruption.
  - Key District and Forest leadership positions are filled by actings or managers still going through transition and building unit cohesion. Others are currently on off-unit fire assignments.
  - Culturally, we reward success in doing the impossible – making broken systems work and succeeding under pressure. We can be reluctant to call for help. An articulated goal of this operation was to catch the fire now so that we would not have to call in a team.
  - Systems to call for help *before* an incident (prepositioning a team or additional overhead) may be underutilized.
  - Our messages about individual decision-making in risk management carry with them a burden of responsibility when things go wrong.

### **Lessons**

- Fire managers should be trained and encouraged to recognize when they need help and to ask for it – not only during an incident but proactively.
- Agency administrators and fire managers should watch out for overloaded employees (including themselves) and mitigate appropriately.

## ***Recommendations***

- Consider pre-positioning or requesting overhead as well as on-the-ground resources (NIMO teams are one option).
- Continue to utilize the R1/R3 agreement.

## **International Border**

### ***Observations***

- A decision to cross the international border changes the risk management environment under which firefighters operate. Whether and how much risk is increased is unknown; opinions differ among the fire managers involved. This unknown risk is assumed by the agency administrator and IC.
  - Border protocols are established and based on risk management considerations.
  - Some risk mitigation measures are unavailable in Mexico (law enforcement, TFRs, Life Flight).
  - Intelligence on the fire perimeter and Mexican firefighting operations and communication with Mexican firefighters is limited.
  - Risk associated with drug and human smuggling traffic is recognized but uncertain.
  - Crossing the border adds logistical complexity to the incident (coordination with US Customs and Border Protection and Border Patrol).
  - The political consequences of a bad outcome in Mexico are unknown.
- Bureaucratic issues associated with the border crossing had a significant and unanticipated effect on the tempo of operations on Thursday, and set the context for Friday's plan and operations.
  - Coordination with US Customs and Border Protection delayed the start of Thursday's operation and the tempo of the operation once underway, pushed firefighting operations closer to Friday's red flag conditions, and reduced the overall chance of the operation's success.
  - The location of H-3 was influenced by the fact that it is within the United States.
- Dispatch, fire managers, and US Customs and Border Protection moved rapidly and ultimately successfully to resolve coordination issues on Thursday – with significant investment of management attention.

## **Lessons**

- Fire program managers should involve Customs and Border Protection officials when conducting fire operations in Mexico. Give them a detailed briefing before engaging so that they are well aware of the operation.
- Do not allow border issues to dictate tactics and placement of helispots and personnel.
- If unanticipated border issues occur, re-evaluate the operation and the safety of firefighters.

## **Recommendations**

- Review the Wildfire Protection Agreement between the US and Mexico with the Department of Homeland Security (DHS), and ensure a common understanding of process.
- Engage in a risk analysis dialogue regarding fire fighting operations in Mexico that addresses the full range of cross-border risks. Consider involving off-Forest or out of Region perspectives.
- Ensure that risk associated with border crossings is assumed at an appropriate level and clearly understood by personnel involved in a cross-border fire.

## **Communications**

### **Observations**

- Given the issues highlighted in Lessons Learned on Organization and Culture (stress, new people in new roles, long season, complex unit) building relationships to ensure effective communication is critical.
  - Risk management discussions occurred at many levels during incident management planning and implementation.
  - Quickly assessing and calibrating risk in a new situation involves integrating one's own knowledge and experience and trust of others with local experience.
  - Relationships in the process of being developed could have led to less than effective communication such that messages communicated and received may not have aligned. (Example: intention of the conversations relaying the initial strategy to incoming IC and the comfort level with that strategy, specifically managing fire in Mexico.)

- Well-established relationships between experienced firefighters could have led to assumptions that what was said was implicitly understood. (Example: instructions given and received regarding the specifics of the safety plan at H-3)

### **Lessons**

- Pay attention to non-verbal cues, practice active listening, and take adequate and appropriate time when communicating, especially in stressful situations.
- Continue to create an environment for open communication.
- Watch out for shortcuts in language that may not fully articulate the intent of the message. Ensure communication is complete.
- When receiving communication, ensure that you fully understand what is being said.
- Continue to conduct briefings that include local considerations and share the day's plan such that all incident personnel are aware of the objectives and tasks.

### **Incident and Medical Response**

- Once the injuries occurred, the unit medical response was outstanding and well-coordinated. The injured firefighters received timely and high-quality medical care
  - The injured firefighters could not be transported directly to a burn center because of helicopter fuel limitations, but burn protocols were known and immediately invoked.
  - The Forest Safety Officer met the firefighters at the ER and effectively advocated for them, securing a referral to a burn center and an air ambulance for the more seriously injured firefighter.
  - A Finance Section Chief met the firefighters at the ER and effectively coordinated with OWCP.
  - Forest managers coordinated timely notification of family members and provided for their transportation and lodging near medical facilities.
  - District and Forest fire managers and agency administrators provided timely and appropriate notification of Forest and Regional personnel.
- Helicopter personnel had (in part as mitigation for border crossing concerns) prepared and trained in advance for transport of injured firefighters in the event an air ambulance was unavailable.

### ***Lessons***

- If the plan is that the incident will provide medivac transport to the burn center, ensure that the helicopter that is designated for the medivac always has enough fuel to make it to and from the center.
- Continue to follow proper protocols to ensure that the designated personnel assigned to the medivac are aware of the injuries of the personnel involved.

### ***Recommendations***

- Provide burn protocol information and brief medical information related to wildland fire-related burn injuries to all local medical facilities.
- Update Forest list of personnel who are designated to be the liaisons between the Forest, medical facilities, families and injured personnel.

## V. Lessons Learned and Reminders: Summary “25 Nuggets”

1. One’s life is more important than any equipment
2. Know if a helispot is and can be staffed safely...Select your helispot carefully
3. Know the whole plan. Know your plan and adjacent resources plans. Air: Know ground plans and vice versa.
4. Clearly articulate expectations
5. Take fully in to account all elements, including those outside direct fire activities, to determine risk
6. Be clear on trigger points and actions associated with them
7. Wear PPE...Determine what tasks we ask fire fighters to do that can’t be done without gloves.
8. Teach “when” to deploy a shelter as well as “how” ...Continue to focus on psychology of firefighting
9. Practice, practice, practice actions that might need to be taken in emergency
10. Shift negative culture around shelter deployment
11. Follow “PACE” (Primary, Alternate, Contingency and Emergency) and establish multiple escape routes and safety zones
12. Line officers support all by being engaged
13. Listen to the ‘said’ and the ‘unsaid’ ....watch out for overloaded employees
14. Gaining perspective of risk in a new situation can be difficult
15. Crossing the border changes the risk management environment
16. Frequently re-visit border crossing protocols with appropriate agencies
17. Be courageous: Ask for help or relief when you need it
18. Dialogue regarding risk associated with fighting fire in/near Mexico
19. Communicate early, often and effectively in speaking and in listening
20. Clearly articulated leader’s intent does make a difference. Risk management IS being discussed.
21. Possible new technology: Shrouds that stay closed and close on side, gloves that retard fire AND provided dexterity, video on “light and swat” tactics.
22. Attitude towards “Red Flag Warnings” may differ by geographic area
23. Briefings should include what success looks like AND what failure looks like
24. Can we start air ops earlier in the day?
25. Remember that in any second a situation can change

## **VI. Commendations**

### **Leader's Intent / Risk Management**

- The Forest Supervisor and two Park Superintendents met in March with all local type 3 and 4 ICs and communicated a very clear leaders' intent message focused on safety.
- The District Ranger communicated a very clear and well-understood leader's intent message to the Incident Commander, articulated in risk management terms: expose fewer firefighters today and catch the fire early to avoid exposing many more firefighters later - protecting structures and developed areas in the United States.
- Pete Gordon's legacy (former Forest Fire Staff Officer) – years of leading and developing the safety/risk management and leadership culture we have today. Local resources have a rich understanding of risk management.

### **Communications Regarding Weather**

- All fire personnel clearly understood that Red Flag winds were expected late on Friday morning.

### **The International Border**

- The wildland fire agencies have an established international agreement with Mexico, signed at the Cabinet level and implemented through annual operating plans, providing authority for entry of firefighters into Mexico.
- At the local level, US and Mexican firefighters know each other and cooperate well when they have communications.
- The response to the unexpected coordination issues with Customs and Border Protection (CBP) on Thursday morning were addressed rapidly and effectively by Forest and Dispatch Center personnel, working with Customs and Border Protection officers. Within three hours, CBP had set up a mobile Port of Entry, and had officers at the helibase.
- The Region has recognized the special risks associated with operating near the international border, and provided mitigation. Firefighters carry cards with Border "Watch Out Situations."

## **Medical Care**

- Excellent Forest response to burn injuries. Quick transport, Forest Service presence and advocacy at hospital, referral to burn center, family coordination.
- Excellent coordination with OWCP. “ASC did a fine, fine job” and were “very helpful.”

## **Learning**

- Even before a draft FLA document was prepared, the Region had distributed an updated Safety Alert related to operations near the international border and the Forest had initiated high-level negotiations with US Customs and Border Protection regarding flights into Mexico. Lessons were already being learned and implemented.

## Appendix A

### Chronology

Date	Time	Event
<b>4/26/2011</b>	1535	Bull Fire reported approximately 1.5 miles south of U.S – Mexico Border
		Air Attack reported the fire at 15-20 acres and will cross into the U.S. at Walker Canyon on the Coronado National Forest and come out pretty hard and can push east (toward Nogales, Arizona)
<b>4/27/2011</b>	1015	Helicopter Recon estimates Fire at 1250 acres and active burning in grass and brush
		District Ranger, District FMO, and 2 Module Leaders formulate plan for following day 4/28/2011 to launch Air Attack at 0800 and begin troop shuttle into fire at 0830 Border crossing issues are identified as being an issue and approval is requested and granted for resources to enter Mexico
<b>4/28/2011</b>		Resources assigned -Incident Commander Type 4, Nogales District Crew 5-2, Engine 5-22, Engine 7, two type 3 helicopters and Air Attack
	1100	Troop Shuttle Begins
	1300	Troop Shuttle Complete (Length of time due to Customs Complexity)
		Resources are engaged in firefighting operations in Mexico
	1828	End of shift estimated 3000 acre fire all resources back at Peña Blanca Helibase returning to quarters
<b>4/29/2011</b>	0745	Aerial recon: H-3 approved, IC and IHC Sup formulated a plan that included burn operations on the north end of the fire and the east flank.
	0815	Helicopter Drops off two helitack at H-3
	0905	Troop shuttle began IHC inserted first followed by district and off forest resources
		IHC begins line construction - 20 feet south of US/Mexico border and begin to establish black at the high point for a safety zone
	0955	Last Troop Shuttle with remaining firefighters and Incident Commander arrives at H3, IC briefs the 2 Helitack crewmembers that are remaining at H3 on LCES and begins to make his way to the firing/line construction operation
	1000	Request to helibase to have buckets ready
	1015	First helicopter launched with bucket

<b>Date</b>	<b>Time</b>	<b>Event</b>
<b>4/29/2011</b>	1020	Second helicopter launched with bucket
		Weather on fireline: RH 10 and Wind 10-12 SW
	1039	Wind increase noted on several locations around the fire estimated around 25mph and constant
		Three slops occur in a very quick time frame
		2 Helitack crew staffing H-3 recognize the spot fires are threatening their position - They begin to take action by building fireline around gear.
		The Helitack crewmembers also begin a burning operation by attempting to back fire off their constructed line using fusees and flappers
		Realizing the burn operations were not going to be successful enough to create a safety zone the Helitack crew members start to abandon the Helispot by heading away from the approaching spot fires. The senior crewmember communicates their intention to the IC to abandon the Helispot. The IC directs the crewmembers to stay at the Helispot and get in the black
		The slops move into the bottom of the drainage then make an uphill run towards the helispot
		The Helitack crewmembers return to the helispot and on their return have to pass through flame fronts to get to the Helispot
		H3 is burned over and the Helitack crewmembers are entrapped sustaining burns
	1106	Report of burn injuries to dispatch
	1115	Helicopter off Peña Blanca Helibase with Pilot + EMT to H-3
		Helicopter off H-3 with 2 Burn patients en route to St Mary's in Tucson
	1138	Helicopter on the pad at ST. Mary's Hospital in Tucson

## **Appendix B**

### **FLA Process Lessons Learned by the FLA Team**

#### **Initial Response**

- The Regional Forester’s first message in response to the incident set an initial tone that encouraged learning and facilitated the FLA team’s work.
- The early assignment of an IC and unit liaison for the incident within an incident set the stage for an effective review.
- The Regional Forester and Forest Supervisor established a clear leader’s intent with regard to learning.
- The unit liaison provided outstanding support to the team and performed critical work with participants in laying the groundwork for the team’s success.
- It would be helpful to be able to clearly communicate to all appropriate individuals and organizations why the decision was made to conduct an FLA

#### **Team composition**

- Be mindful of including trusted and experienced team members. Teams should have a significant amount of diverse experience and skill sets. Do not make the team “top heavy”.
- Conduct the “After Action Review-like” discussion early in the process. Have a person with good people skills that is intimately familiar with the process be available to brief participants on the process and start to build trust
- Consider adding in learning tools such as Tactical Decision Games (TDG) to the final report or product that could aid the field in changing behavior and truly learning – include a TDG Subject Matter Expert (SME) on the team.
- Google Earth proved to be an invaluable tool for helping draw people in to the discussion. Include a geospatial tool technical expert with a related operational background.

#### **Location of participant group discussion**

- Make the location neutral and comfortable, no row seating, no front and back to the room, consider setting the room up so that the participants make the choice where and

how they will sit, stand, etc.. Have a center focal point such as a sand table for people to use to help tell their story.

- Make food available for participants to help relax the atmosphere and lighten the mood

### **Facilitation of participant group discussion**

- Have a peer that participants can relate to focus on the facilitation while the remainder of the team actively listens. Take frequent breaks and continue to actively listen. Breaks allow the team to have a 5 or 10 minute tactical pause to make sure things are progressing well
- Listen for the questions behind the questions
- Talk about the elephants in the room
- No Line or Staff Officers in the room; only key participants and those involved
- Break into small groups and provide flip charts for the participants to record their lessons learned.
- Consider post group individual interviews of key players if there is more to the story they want to share in private
- Start off with an example story about how this process worked for you and how it changed your behaviors
- Clear up confusion about the policy on Serious Accident Investigation (SAI), Facilitated Learning Analysis (FLA), Accident Prevention Analysis (APA), After Action Review (AAR) etc. (See Red Book)
- Dress casual

### **Duration**

- Prepare yourself for some very long, trying days
- Be mindful of your health and well-being through the process as well
- Make sure all of the team is on the same page with the plan and supports the plan for the different phases of the FLA

## **Product**

- Pace: Get the product out fast for the field to see what is going on and help to foster support for the process
- Be very mindful of terminology
- Include as many photos and graphics as possible
- Ask participants if they have photos or video they are willing to share to be included.

## **Appendix C**

### **FLA Team Members**

Jerry Ingersoll, Region 6 Siuslaw National Forest Supervisor

Erin Connelly, Region 3 Santa Fe National Forest Deputy Forest Supervisor

Ben Murphy, Region 1 Lolo Hotshots/GETA Group

Gary Luce, WO National Advanced Fire and Resource Institute Training Specialist

Robert Morales, Region 3 Santa Fe National Forest Fire Staff Officer

Chris Tipton, WO Fire Use Training Academy Director