Minor Burns but a Major Event in the Six Shooter Pass Area:

Antelope Fire Entrapment and Shelter Deployment Facilitated Learning Analysis

Incident Date: September 10, 2021

The Antelope Fire was first discovered on Sunday, August 1, 2021, in the Antelope Creek drainage on the Goosenest Ranger District of the Klamath National Forest.

https://inciweb.nwcg.gov/incident/7764/

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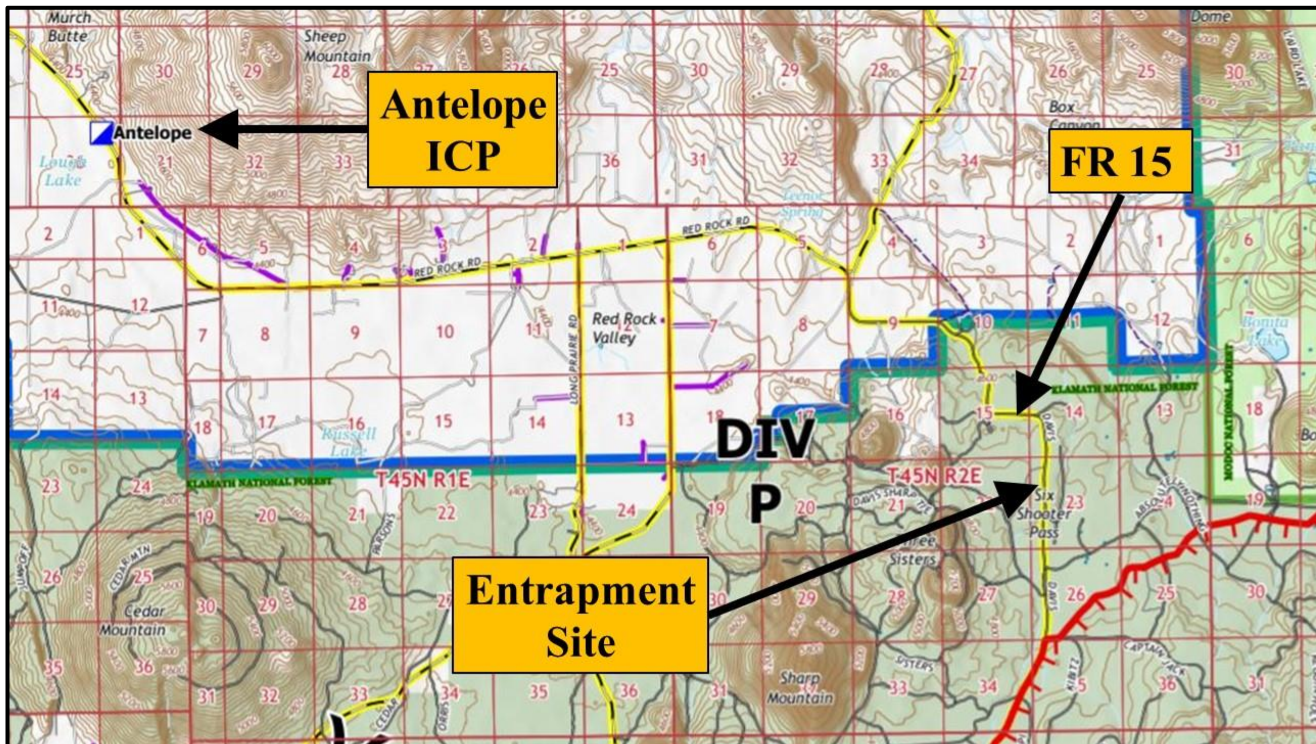
1. Incident Summary and September 10th Operational Map

As night operations for the Antelope Fire were working in the early morning hours of September 10th several engine crews and a Water Tender Operator suddenly found themselves entrapped as they tried to escape a wall of fire quickly approaching them. As the Water Tender Operator's vehicle caught fire, the operator was forced to flee his water tender. He deployed his fire shelter to use as a shield, and narrowly escaped the worst of the flames by jumping onto the side of an engine passing by.



This image is the Antelope Fire Operations Map from September 10, 2021. The image shows the location of the entrapment early on the 10th, Forest Road 15 (FR 15), and the location of ICP.

2. Incident Background

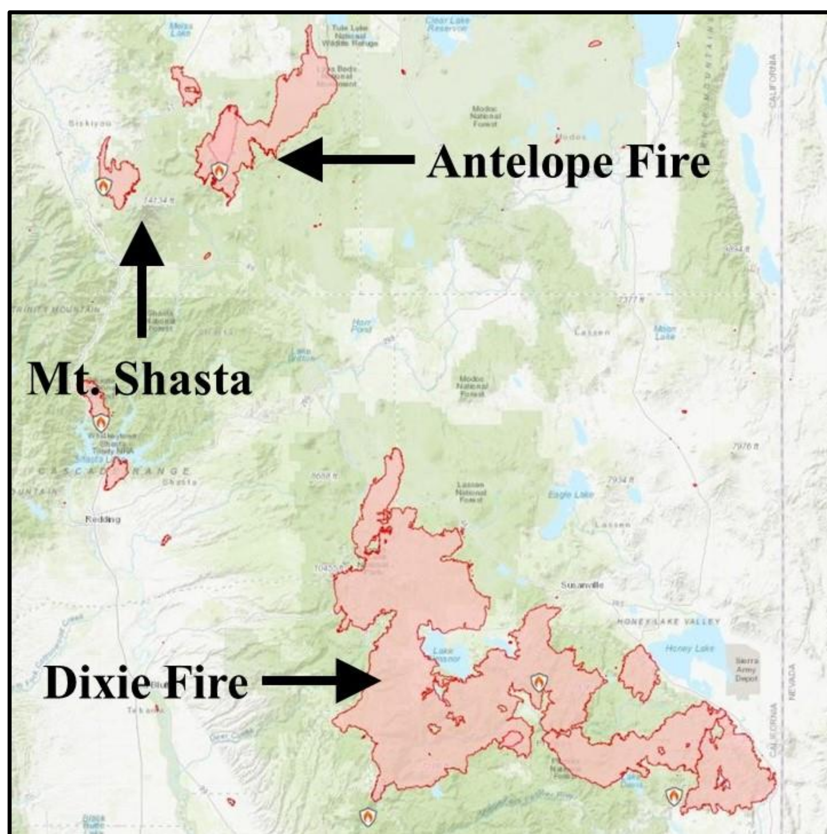
The Antelope Fire on the Klamath National Forest was first discovered on August 1, 2021. During the fire's first five weeks, it had been under several different Type 1 Incident Command Teams (IMTs). The fire behavior during this time was such that multiple teams felt confident that they were "getting out in front of the fire" only to have it blow up again. The Deputy Forest Supervisor remembers how this exact type of fluctuation made transitioning to the right-size IMT difficult during the first part of September.

The fire activity had temporarily decreased during the first week in September. Consideration was being given to transitioning the fire from a Type 1 IMT to a Type 3 IMT as resources were being released. However, the fire came out of containment lines on September 6 and made significant runs on the 7th and 8th, which led the Klamath National Forest to order a Type 2 IMT rather than the Type 3 IMT.

Prior to the increased fire activity on the 6th-8th, night shift operations had been relatively small, with only a single night Division. However, an overall shift in operational strategy triggered an increase in the resources on the night shift, the appointment of a night operations chief (Night Ops), and a reorganization of the Divisions.

As the Type 2 IMT took over the fire on the morning of September 9, several factors contributed to the increasing volatile conditions on the fire. The Dixie Fire, located only about 100 miles away from the Antelope Fire, was approximately 928,000 acres in size.

According to the IMT's Incident Meteorologist (IMET), the proximity, size, and heat output of the Dixie Fire was sending pulsing waves of heat into the weather patterns, affecting the Antelope Fire area. The rippling winds coming over the Shasta Lake Highlands, and the storm cells in the area that created a frontal passage, had caused additional instability.



This image shows the location of the Antelope Fire in relation to Mt. Shasta and the Dixie Fire.

The Incident Meteorologist chose to issue a Red Flag Warning (RFW) for the day shift because the relative humidity (RH) was low, there were predicted gusty southwest winds, and the existing potential for dry thunderstorms that could produce strong outflow winds. This warning was kept in place for the night shift because even though the RH was expected to be above RFW criteria, the combination winds and possible thunderstorms in an area of extremely dry, drought-stressed vegetation would continue to lead to high potential for significant fire spread.

The evening briefing included the warning that the RFW would be in place until wetting rain fell across the area.

A column collapse was predicted, communicated across the command channel, and occurred during the afternoon of the day shift. The crews assigned to the night shift, who were

waiting to go on duty, reported witnessing fire plumes and erratic wind behavior. At the night briefing, the IMET told them that wetting rainfall was unlikely to occur before midnight and that critical conditions should be expected until the rain arrived, which was mostly likely going to occur around 0200.

3. Incident Narrative

Night shift receives instructions from operations to keep the fire east of Forest Road 15 and take care of any spot fires

The Task Force on the night shift, which included four engines (Engine-1, Engine-2, Engine-3, and Engine-4), as well as a Water Tender (WT1), received their 1800 briefing from operations: hold the fire east of FR 15, construct additional line as needed, initiate firing as needed, patrol and mop-up. While the Task Force Leader instructed the Task Force to meet at Drop Point (DP) 30 for a more thorough briefing, access to the Drop Point was cut off by a large spot fire.

As a result, the overhead met on a two-track road near the spot fire. When Division Papa arrived there to tie-in with the day Division resources, they discovered that the spot fire had already crossed FR 15 from the east to the west and a CAL FIRE Strike Team of engines was already engaged in suppression efforts, providing direction to resources, including to WT1.

Although CAL FIRE resources were requested and responding as the fire threatened their Defense Protection Area (DPA), not all resources knew that they were working on spot fires on this Division. While CAL FIRE was trying to get a dozer line around a large spot fire, they also instructed contractor and cooperator engines to start trying to catch some of the smaller spots from the main spot fire. The engines began to engage the spot fires, but tied-in with their Task Force Leader (TFLD) and voiced concern about the need to establish a safety zone.

Because Division Papa had not seen the area in the daylight, they continued to build situational awareness, tying-in with the CAL FIRE Battalion Chief and other resources. There was confusion related to how incident resources were being used and who was directing them.

Originally, at approximately 1900, the Gila Hotshot Crew, was told by a CAL FIRE firefighter to go direct on the head fire east of FR 15. The Gila Superintendent pushed back against those instructions and staged his crew in a safe location, while the Gila Hotshot Superintendent and Division Supervisor discussed alternatives.

Two Division Papa engines began to engage the spot fire and the rest held the road, which gave the Hotshot Supervisor and the Division Supervisor enough time to get things figured out.

Unable to catch the growing spot fire, resources were instructed to fall back

One of the spots west of FR 15 was growing rapidly and the Gila Superintendent and Division Supervisor thought there was a low potential of controlling it. The dozer had not been able to catch it because the hydraulic line on the dozer had ruptured.

Realizing they were in a pocket of unburned fuel between the main fire and the large spot fires, Division Papa decided to redirect his resources to fall back and regroup further north on FR 15 for structure protection of nearby homes and several large hay barns. At that time most of the CAL FIRE resources disengaged to reengage in structure protection and proceeded south on FR 15 toward DP 30. The spot fire continued to head west into the hills, and the Task Force temporarily lost sight of the head of the spot fire.

Top Photo – The spot fire as the Task Force was moving north on FR 15.

Bottom Photo – The spot fire hitting FR 15, while the radio traffic said that "the fire will bump the road in a couple of minutes."

The Task Force heads north on FR 15 – and the fire takes a 90-degree turn toward them

The Task Force began heading north on FR 15. A CAL FIRE Engine was in front, followed by the Division Supervisor, followed by WT1, then Engine-2, Engine-1, and Engine-4. As they were heading north, they could see the glow of the spot fire that had gotten away from them.

The spot fire had been moving parallel to the road, but now it was starting to take the shape of a long finger and curve back toward the road. The Task Force could see it moving about 300-400 yards off the road with 40-foot flame lengths in 20-foot timber.

The Water Tender Operator remembers someone coming across the radio, saying, "*it's going to bump the road in a couple of minutes*." But the fire was actually there in less than 10 seconds and pounded his Water Tender so hard that it shook. Next, the Water Tender Operator says he heard the Division Supervisor say, *"punch through this"*—but as the Division Supervisor was saying this, he was bringing his own truck to a fast stop to try to turn around.

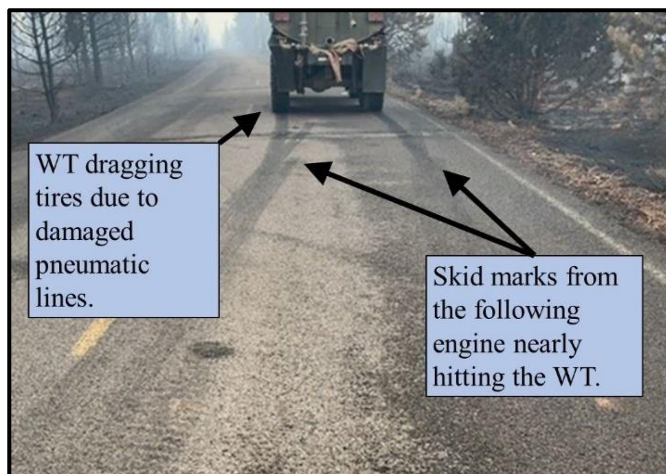
The CAL FIRE Strike Team Leader tells the CAL FIRE Engine and the Water Tender Operator that they are cut off and need to turn around

The CAL FIRE Engine that was several hundred yards ahead of the Water Tender was able to turn around and head south. However, when the Water Tender began to turn around, his vehicle was immediately hit by the flame front. This, in turn, backed up the vehicles behind him. At that point, WT1 had sustained extensive heat damage to the front of the Water Tender. The operator looked out his window to the south and saw that there was no escaping to the south. He decided to resume heading north.

The Water Tender's brakes fail, Engine-2 behind the Water Tender almost slams into it, and the Engine-1 Crew off-roads

The Water Tender began heading north again and was able to go about 300 feet before the operator heard a loud "pop." He knew it was the air brakes. He later recalled, "*the Water Tender is military, made to be able to travel on six flats, riddled with bullet holes—but it won't move at all when the air-brakes go*."

Engine-2 directly behind the Water Tender couldn't see well through the smoke and flames. The smoke was growing so thick in the cab that a crewmember in the back seat behind the driver said, *"I couldn't see the driver in the front seat from the smoke building as all the plastic melted inside the cab."* At about that same time, the Engine-2 Boss saw his window begin to bubble and crack. In what his crewmembers recall as an *"extremely calm tone"* the Boss explained to them that they needed to cover their faces and turn away. Although he took the steps to protect them, the glass did not shatter like they had anticipated, and they pushed forward.



Skid marks left by the WT are from dragging the tires when the air brakes failed. The second pair of skid marks are from the following engine skidding for 30'and avoiding the rear end of the WT.

As Engine-2 raced away from the fire front, they could barely make out the Water Tender in front of them and slammed on their brakes, leaving 30-foot skid marks, just short of the back of the Water Tender.

Engine-1 couldn't understand why Engine-2 was coming to a stop but thought they couldn't pass them on the road because of the fire. Engine-1 then turned to the east, into the green, and navigated through growing spot fires as they saw Division Papa drive by on the road.

Division Papa was able to get a glimpse of the road and he knew it was a straight shot. He placed his arm over his eyes and lowered his head to protect his face and drove out, thinking he could lead the other engines out. He got on the radio and told the rest of the engines to come through. Engine-1 saw Division Papa as he drove by, which gave them a chance to see where the road was. After some intense off-roading, they made it back onto the blacktop.

The Water Tender Operator exits the tender with his fire shelter and radio

Meanwhile, the cab of the Water Tender was also filling with smoke. The Water Tender Operator thought that he was going to be burned over in the tender. Falling back on his training, he grabbed his fire shelter and his radio and jumped out of the cab. He made his way to the front of the passenger side of the tender to escape the most intense flames. He hunkered down there for a second. He thought to himself, *"I don't want to have to go into that shelter on the ground because it's only a 50/50 chance."*

While they were caught in the bottle neck on the road, the Engine-4 Engine Boss Trainee caught a glimpse of the Water Tender Operator as he jumped out of the cab of the tender. Because of the conditions on the road, they were forced to come to a stop next to the Water Tender, temporarily blocking some of the heat and smoke. Because of their positioning and highly visible lights, Engine-2 was able to see an escape route on the road behind Engine-4 and they followed them out. Engine-4's engine had caught fire while blocking the flame front; the gauges and the plastic had all ignited.

Picture shows the damage to a Task Force Engine and the melted gauges from blocking the flames.

The noise of the fire was so loud that Engine-4 couldn't hear anything except the fire beating against their engine. In a split second, they lost sight of the Water Tender Operator. They couldn't tell where he went and it was impossible for them to stay there any longer.

Unbeknownst to them, the Water Tender Operator had partially deployed his fire shelter and jumped onto the sideboard of his engine. He was holding the grab bar with his left hand and his radio and fire shelter with his right hand as Engine-4 started to pull away.

Engine-4 quickly moved north as the Water Tender Operator desperately tried to get their attention. He frantically yelled into the radio, *"Stop! Help me! Stop, man. Stop. Open the door—it's locked. Stop. Let me in. It's hot out here!"*

The Water Tender Operator was holding his fire shelter up to the side of his face to block the flames and heat. As he clung to the side of the engine, the hand he was using to hold the shelter received partial thickness burns. His right ear was also burned.

Engine-4 never heard the Water Tender Operator's radio transmission due to heavy radio traffic on the tac channel he was using.

Picture shows heat damage to the engine that "blacked out" the inside of the cab.

As they sped away, they stopped before hitting an unknown obstruction which turned out to be a cattle guard. As they momentarily hesitated, the crewmember in the back passenger seat briefly heard the Water Tender Operator hitting the back passenger window with his radio. They immediately opened the door and pulled him into the smoky cab. Once they got out of what the Water Tender Operator referred to as the "hell zone," the Engine Boss told them to roll down their windows to clear the black, thick, burnt plastic smoke from the cab.

The Engine-4 crew, three of whom were paramedics and the other was an EMT, asked the Water Tender Operator if he was OK and proceeded to check his airway. He had ash and soot on his tongue but was not showing signs of any noticeable airway distress.

The Engine-4 Engine Boss attempted to contact Division Papa and the Task Force Leader (TFLD) multiple times on the tac channel. But due to heavy traffic, the Engine Boss Trainee (ENGB(t)) instead contacted the COMM unit on command and cleared emergency traffic to provide a medical incident report or "8-line." He reported, *"A 'Green' medical with 1st and 2nd degree burns and smoke inhalation."*

If this event seems hard to keep straight in your mind as you read the narrative, we've done our jobs at maintaining the confusion that everyone felt at the time. However, we've pieced together the event from multiple sources and produced this animated graphic (below) to help you visualize how the entrapment happened. Click on the image below to play.

There is a very popular video with the dramatic, heart-racing footage of this incident that has been uploaded to various websites and it's pretty easy to find online. We are not including it here because it only shows one perspective. Our goal <u>is to weave together multiple perspectives</u> to provide the reader with a clearer view of the entire incident.

The injured Water Tender Operator and the Engine-4 engine crew arrive at ICP

Upon arrival at the Incident Command Post (ICP) the members of the IMT were outside the incident command yurt, waiting to receive the Engine-4 crew. The Medical Unit Leader (MEDL) directed one of the MEDL trainees to take the Water Tender Operator to the Sky Lakes Medical Center in Klamath Falls in a passenger vehicle because they didn't think that his injuries were severe enough to go to a burn center. They were concerned about his airway and getting him to an emergency room.

The Safety Officer and the Incident Commander (IC) met the Engine-4 crew at the MEDL yurt. The Engine Boss Trainee was trying desperately to get an update of the remaining resources of the Task Force. The Safety Officer remembers telling the crew, *"Everybody is accounted for and the person with the*

This image shows the entrapment across the road as the Task Force members attempted to drive out.

worst injuries is the Water Tender Operator you brought in." However, the crew just remembers hearing *"Everybody is accounted for."*

The MEDL Trainee recalls that the Engine-4 crew was *"really shaken up,"* and that the engine driver was coughing excessively. The Safety Officer asked the MEDL Trainee to *"look him over."* The Engine-4 crew and the MEDL assessed the engine driver and determined that he needed oxygen, which they provided from their own medical equipment.

As the crew continued to provide care to the engine driver, the ENGB(t) asked if everyone was OK. A person from the IMT mentioned that he had not heard from anyone else involved in the incident, to which the ENGB(t) said *"they're all dead."*

Even though the IMT had assured them several times, the Engine-4 crew could not comprehend that everyone was OK given the hellscape they had just seen. The Safety Officer and the MEDL began to realize that they would need to consider offering peer support.

The Engine Boss told all of his crew to text their wives and tell them there was an incident but the crew was OK. The Engine-4 crew believed the national morning news would break a story of at least six crew members dying on the Antelope Fire.

Members of the IMT told the Engine-4 crew that everyone was fine and that, *"They all had gone back to work on the line."* Again, the Engine-4 crew could not believe what they were hearing. It wasn't until many hours later when the night shift came off the line that they started to believe what they were being told.

Division Papa and Night Operations had gathered the Task Force at a familiar staging area (the "hay barn") to regroup before making their way back to ICP. Night Operations told the Task Force that the Water Tender Operator was being transported with minor injuries to the hospital and that there were no other shelter deployments or injuries. The IMT continued to monitor accountability and to confirm that there were no additional injuries.

The next morning, the MEDL called the burn center to determine if the Water Tender Operator needed to be seen there. Based on a verbal description of his burn injuries, the MEDL was told that it was not necessary.

4. Lessons

I. Engaging in discussions about risk does NOT imply that you are being "improper" or disrespectful.

Proper refusal of risk begins with a risk-informed conversation between everyone involved. The formal process of "proper refusal of risk" in the incident response pocket guide (IRPG) is to ensure and document that there are no violations of safe work practices, environmental conditions would not make the work unsafe, firefighters are not lacking the necessary qualifications or experience, or that defective equipment is being used.

The word "proper" and the implication of "improper" should not discourage firefighters from having a risk-informed conversation with their supervisors. Experienced hotshot crews, like the

Gila Hotshots, may be more comfortable initiating these conversations, but all resources should feel empowered to do so.

II. Anticipate increased needs for clear communication amid increased confusion immediately after an Incident Within an Incident (IWI).

A. Clearly worded messages may not be as clear to people who are reeling from an incident. The crewmembers who had a hard time believing that the other crews did not perish in the fire remember hearing *"they [the other crews] are accounted for."* But it did not seem to register that *"accounted for"* meant the crews were alive and well.

Some of them thought that they were being told that the crewmembers' bodies had been "located." For several hours, they therefore went on believing that these people had perished. However, multiple members of the IMT remember providing a more detailed response, saying "*Everybody is accounted for and the person with the worst injuries is the Water Tender Operator you brought in."*

This illustrates how difficult communication can be directly after an incident. They may be responding to your questions at a yurt in ICP, but their minds might still be "back at the scene" of what they just saw. Be prepared to answer questions within your scope of authority, even if it seems like it's been "asked and answered." If people seem to be having a hard time processing a message (watch verbal and nonverbal responses) ask direct questions to ***ensure that your message was understood as it was intended.***

B. Tell people to be sure to reach out to their loved ones immediately after an IWI to confirm they are OK. Word travels fast over social media. If families or close friends are not notified immediately, this could cause subsequent panic, and potentially additional mental health trauma if they were to find out about a tragedy online. It is also important to remind loved ones to avoid posting any information online until other affected families can be contacted.

C. Ask for a Critical Incident Stress Management (CISM) "consult" after an IWI. People who have just gone through a traumatic event don't always know what they need in the moment. They may feel like it would be a burden to request help during a difficult time, *even if the option was presented to them in earnest*.

Additionally, responses to trauma may be delayed, making it difficult to assess directly after something occurs. If resources leave the incident, it may be impossible to continue to assess their needs in this area. Firefighters in the field or those directly involved in an IWI don't have to make these decisions alone. Just as we can request a consult with a burn center, we can also request a consult with CISM coordinators.

1. Avoid thinking that the only two options are ***to order CISM*** **or** ***not to order CISM*****.** There are more options than "get them rolling right now" or "no CISM." Consult with Regional CISM coordinators directly to help make that decision. You do not need to decide if the situation was *critical enough*, or if *enough people were involved,* or *if services could be provided to people other than U.S. Forest Service employees*. CISM and Casualty Assistance Program (CAP) coordinators can help with this step. (See Appendix A: Casualty Assistance Program Coordinators & CISM Coordinators.)

2. Be ready to paint a picture or provide a "size-up" for coordinators about the IWI based on your factfinding on the ground. The tools provided by Stress First Aid help to provide language that may be useful in recognizing and communicating the initial signs of stress. (See Appendix B: Stress First Aid Continuum.)

III. When making initial medical decisions about injuries that may seem minor, proactively recognize that things could change quickly for the worse. Although the medical decisions in this incident avoided negative outcomes, the particular situation gives us all a chance to reflect on those borderline medical cases. Even if the initial presentation of an injury, especially a burn or potential smoke inhalation, seems minor, follow the burn protocols in the Red Book and err on the side of caution.

A. Any visible scars on the face can act as an unavoidable reminder of a traumatic event. Although it might seem separate, the ears are a very visible part of one's appearance. An immediate referral or consult with a burn center will determine the appropriate next level of care**.** (See Appendix C: Requesting a Burn Center Consult.)

B. Burn injuries, which may include smoke inhalation, need to be transported with the highest level of care available (Advanced Life Support, Basic Life Support, Life Flight, etc.) as the patient's condition can change rapidly and unexpectedly.

IV. Vehicle safety for night operations is critical.

A. Contribute to scene safety by preparing your vehicle to be HIGHLY visible in the smoke and at night.

1. Repurposed military vehicles that are painted camouflage are difficult to see in the backdrop of a forest, especially at night in the smoke. They are made to blend into this type of environment. Reflective striping and the use of contrasting paint colors will increase the visibility of the vehicle.

2. Installing lighting beyond the overhead lightbar may prove critical for safety during nighttime operations. Having high visibility for 360 degrees around the vehicle may improve its ability to navigate and be seen by others.

3. Turn ALL your lights on before you are in thick smoke. This can help others see you, which might prevent them running into you. You might also be able to provide the only way another vehicle could find the road in thick smoke.

B. Call in on the radio, or otherwise, to communicate if your vehicle is struggling or becomes stalled out. In the thick smoke, trailing vehicles may misinterpret your slow speed or stopped position as choices you are making about what you are seeing, rather than a vehicle emergency.

V. NTDP Fire Shelter Assessment and Lessons. The National Technology and Development Program analyzed this incident as well as the fire shelter used in this deployment. They have developed several important lessons described in Appendix D: NTDP Fire Shelter Assessment and Lessons.

5. Facilitated Learning Analysis Team

At the beginning of this learning process, the two-person RLS team assigned to this incident were under the impression that the event and subsequent injuries were minor. During the interviewing process, we learned that although the burn injuries were minor, the event was much more complex than we originally thought. We added additional SMEs and worked with the Forest to scale the process up to a Facilitated Learning Analysis (FLA). The final team members were:

Agency Administrator – Kelsha Anderson
District Ranger
White River National Forest

Editor and Team Lead – Dr. Rebekah Fox
Professor of Communication Studies
Texas State University
National Forests and Grasslands in Texas

Team Coach – Heath Bell
Risk Management Officer
Region 8

Subject Matter Expert – Samantha Orient
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Subject Matter Expert – Amy Evans
Medical Unit Leader (MEDL)
Lincoln National Forest

Subject Matter Expert – Paul Varnedoe
Forest Fire Management Officer (FFMO)
Francis Marion & Sumter National Forest

6. Appendices

Appendix A: Casualty Assistance Program Coordinators & CISM Coordinators

CASUALTY ASSISTANCE PROGRAM COORDINATORS & CISM COORDINATORS - October 2021					
Location	**Contact Name**	**Contact Email**	**Contact Phone Number**	**Position**	**Specialty**
Washington Office	Amber Watson	amber.watson@usda.gov	202-440-1738	National CAP Manager	CAP/CISM
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Washington Office	Miranda Stuart	miranda_stuart@nps.gov	850-728-8200	National BLM CISM Coordinator (120 detail; July 18)	CISM
R1	Alicia Tanrath	alicia.tanrath@usda.gov	406-493-7043	Safety & Occupational Health Specialist	CAP
	Linda Donner	linda.donner@usda.gov	406-314-8864	Regional Safety & Occupational Health Manager	CAP
	Chris "CJ" Johnson	chris.m.johnson@usda.gov	406-529-7751	CAP-Curriculum and Operations Membership Chair	CAP
	Dan Cottrell	daniel.cottrell@usda.gov	847-217-6692	Fire and Aviation Trainer	CISM
	Tony Maillet	antoine.maillet@usda.gov	406-821-2155	Guidance Counselor	CISM
R2	Sandy Bearden	sandra.j.bearden@usda.gov	303-275-5197	Safety Manager	CAP/CISM
	Todd Legler	todd.legler@usda.gov	307-272-4175	Forest Risk Manager	CISM
RMRS	Leif Kuno	leif.kuno@usda.gov	970-227-1564	Safety and Occupational Health Manager	CAP
R3	Kimberly Lightley	kimberly.lightley@usda.gov	541-215-5058	CAP Manager (120 day detail; August 15)	CAP
	Judith Palmer	judith.palmer@usda.gov	505-842-3350	Forest Supervisor	CAP/CISM
	Ryan Myers	ryan.myers@usda.gov	505-842-3461	Assistant Fire Director	CAP, Risk
	Kenan Jaycox	kenan.jaycox@usda.gov	505-842-3473	SW Coordinator Center Manager	CISM
R4	Jennefer Parker	jennefer.parker@usda.gov	435-760-7525	District Ranger	CAP
	Nick Bohnstedt	nicholas.bohnstedt@usda.gov	208-315-3771	Helitack Squad Leader	CISM
	Kris Bruington	kbruington@blm.gov	208-709-2420	BLM Fire Operations	CISM
	Mike Kidwell	mkidwell@blm.gov	775-721-6298	BLM Tanker Base Manager	CISM
	Asad Rahman	arahman@blm.gov	530-515-9504	BLM Fire Operations	CISM
R5	Wendy Flannery	wendy.flannery@usda.gov	209-288-6247	CAP Manager	CAP/CISM
	Brian Anderson	brian.m.anderson@usda.gov	818-317-3220	Hotshot Superintendent	CISM
	Molly Day	molly.day@usda.gov	209-916-5248	Prevention Specialist	CISM
R6	Dave Lent	dave.lent@usda.gov	509-684-7058	Behaviorial Health and Wellbeing Specialist	CAP/CISM
	Renae Crippen	renae.crippen@usda.gov	541-910-3142	BMCC Center Manager	CAP/CISM
	Tessa Chicks	tessa.chicks@usda.gov	360-982-8220	Dispatcher	CAP/CISM
	Tim Hoiness	timothy.hoiness@usda.gov	541-280-5912	Fire Training & Safety Manager	CAP/CISM
R8	Rhea Whalen	rhea.whalen@usda.gov	770-846-2206	Fire, Lands & Planning Staff Officer	CAP
	James (Todd) Lerke	james.lerke@usda.gov	270-924-2092	CAP Coordinator	CISM
	Mark Eaton	mark.eaton@usda.gov	404-347-7781	Safety Manager	Safety, EAP, CISM
IITF	Felix Torres	felix.torres@usda.gov	787-764-7748	IITF Agency Administrator	CAP
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	Katie Mergel	katie.mergel@usda.gov	541-589-2175	National CISM Coordinator	CISM
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Appendix B: Stress First Aid Continuum and Seven Cs of Stress First Aid

Stress Continuum: Definition, Causes, and Your Role

READY	REACTING	INJURED	ILL
Definition • Rested • Restored • Relaxed	**Definition** • Strained • Able to recover	**Definition** • Harmed by stress • Pain	**Definition** • Impairment in functioning • Disease • Loss of quality of life
Causes • Fulfilling roles • Time for self care • Rest & Relaxation • Plenty of resources	**Causes** • Normal daily stress • Not being pushed too far or too hard	**Causes** • Life threat • Loss • Moral injury • Wear and tear	**Causes** • Unhealed Orange Zone Stress injuries • Secondary conditions
Your Role • Accessing wellbeing resources • Self care • Other care	**Your Role** • Alternate exertion with rest • Monitor your own well-being • Offer support	**Your Role** • Recognize stress injuries early • Remember and use the 7 C's of Stress First Aid	**Your Role** • Link into care • Recover • Return

Stress First Aid

The Seven Cs of Stress First Aid:

1. **Check** on stress reactions
2. **Coordinate** with other resources and more intensive support
3. **Cover** actions improve sense of safety
4. **Calm** with presence, information and supportive actions
5. **Connect** with social support
6. **Competence** actions foster work, social and wellbeing skills
7. **Confidence** actions rebuild self-image, trust, meaning and hope

Appendix C: Requesting a Burn Center Consult

Note: This clarifying guidance will assist Forest Service Employees—including contracted and AD employees—in communicating U.S. Forest Service Policy with healthcare providers after a wildland firefighter burn injury. It is important that the right care at the appropriate level is discussed before the wildland firefighter is released from care.

Burn Center Consultation Protocols for Forest Service Wildland Firefighters

A burn injury sustained by a wildland firefighter may need a consultation or a referral for care by a Regional Burn Center. The Forest Service has existing policy, located within the 2021 NWCG Redbook Chapter 7 that specifies conditions for treatment at a regional burn center (see "Specific Conditions"). However, this letter clarifies responsibilities when specific criteria may not be met (see "Borderline Conditions").

Remember that an injury which needs immediate stabilization may be sent to the nearest hospital first before being transferred to a burn center if appropriate. This is the call of the transporting local authority.

Burn injuries are often difficult to diagnose and may take up to 72-hours post injury to develop to the full extent.

A partial thickness burn larger than the size of the injured person's palm should be evaluated in an ER and not an urgent care or doctor's office.

Specific Conditions- Burns that are to be treated at a burn center:

1- Any full Thickness Burn (a.k.a. 3rd degree)
2- Any partial thickness burn (2nd degree) greater than 10% of total body surface area (TBSA).
3- Partial thickness burns (2nd degree) involving the face, hands, foot, genitalia, perineum, or major joints.
4- Any patient with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality.
5- Electrical burns, lightning injury, chemical burns are present or if inhalation injury is suspected.

Borderline Conditions- When the above criteria are not clearly met, consider the following:

The Agency Administrator, or designee (ex: Hospital or Family Liaison), should work closely with the attending physician when there is a concern about borderline conditions not meeting the above criteria. The Forest Service cannot require an attending physician to make a referral, nor does a Regional Burn Center have to accept a referral. However, Forest Service Employees need to initiate a conversation with the attending physician to either obtain a virtual consult with a Regional Burn Center or refer them for follow-up within 48 hours with an outpatient burn center clinic. Regional Center Locations can be found at the American Burn Association Website linked below. Conditions which may promote additional conversation include, but are not limited to:

1- Burn injuries are greater than superficial (1st degree) but less than the above partial thickness criteria (5% or more of TBSA).
2- A medical provider has made a direct comment they are not sure of the degree of the burn or size.
3- A medical provider has made a comment that they do not know where the burn center is.
4- The medical provider has not discussed burn injury consultation options with the injured wildland firefighter or representative.

Resources:

2021 NWCG Redbook Chapter 7

American Burn Association, Burn Center Locations

Appendix D: NTDP Fire Shelter Assessment and Lessons

Antelope Incident Fire Shelter Deployment

Fire Shelter Analysis
September 10, 2021

Fire Shelter Analysis Overview:
A firefighter deployed a fire shelter at the Antelope Fire incident, on the Klamath National Forest on September 10, 2021, when his Water Tender became disabled while trying to escape a fast-moving fire. The U.S. Department of Agriculture, Forest Service, National Technology and Development Program (NTDP) did not attend the review; however, the Facilitated Learning Analysis (FLA) Team provided the fire shelter and narrative for review. NTDP was unable to interview the firefighter to learn more detailed information about the fire shelter deployment.

Fire Shelter Deployment:
At the time of the entrapment, the firefighter was escaping in a Water Tender. He had very little time to prepare for deploying a fire shelter. When the Water Tender air brakes failed and his primary method of escape became untenable, he quickly assessed other options for reaching protection. As the cab filled with smoke, he grabbed his fire shelter and radio before exiting the vehicle.

The firefighter did not fully deploy the fire shelter, but rather un-accordioned it and used it as a heat shield. The firefighter also initially gained protection by using his Water Tender to block the intense heat. When another engine stopped next to the Water Tender, it helped block additional heat and he jumped onto its sideboard and held on to the grab bar. While holding onto the engine, he used the fire shelter to shield his head from the heat. The engine crew did not know he was hanging onto the side of their engine, due to the intense noise and smoke.

Even though the firefighter did not fully deploy the shelter, this event still qualifies as a fire shelter deployment. The National Wildfire Coordinating Group (NWCG) defines fire shelter deployment as "removing a fire shelter from its case and unfolding it to use as protection against heat, smoke, and burning embers."

Fire Shelter Equipment Analysis
The FLA team gathered the deployed fire shelter and shipped it to NTDP for assessment. It was manufactured in
2018. The fire shelter is in good condition and shows no signs of exposure due to extreme temperatures or abrasion (figure 1). The firefighter removed the fire shelter from the polyvinyl chloride (PVC) bag and un-accordioned it but did not shake it out, so the longitudinal folds (figure 2) are still tight. The fire shelter likely aided in shielding the firefighter from some amount of heat and it may have lessened burn injuries.

Figure 1—The deployed fire shelter as received from the Facilitated Learning Analysis Team (left), and laid out as it seemed the firefighter unfolded it at the incident (right).

After reviewing photos of the area and a video of the escape, NTDP staff believe that if the firefighter had stayed near the Water Tender, there would have been convective and radiant heat exposure. There were some unburned fuels at the road edge, and scorched trees nearby. This leads NTDP staff to believe limited direct flame contact to the shelter would have been likely. In this event, the firefighter would probably have needed to get into the shelter to prevent additional burn injuries.

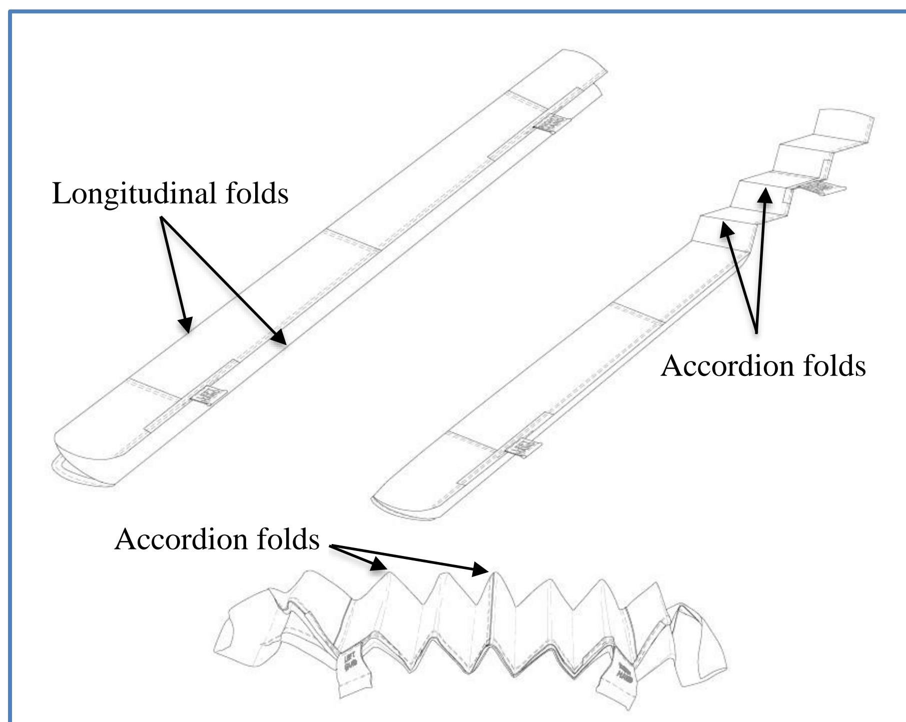

Figure 2—An excerpt from the fire shelter drawing, MTDC-1000, showing the folds.

Deployment Lessons:

The firefighter did not hesitate to pull out his fire shelter even though he did not want to get into it. Many firefighters have reported apprehension when making their decision to

deploy fire shelters. It is much better to be prepared, with the shelter out and ready, than to delay and try to open the shelter while being impacted by heat.

Using a fire shelter as a heat shield is a perfectly acceptable use, and it may help prevent burn injuries. Deploying a shelter does not need to be treated as an unquestionable, last-second, lifesaving event. If you feel your situation is uncertain and can be improved by deploying a shelter, do so.

This event is a good reminder not to deploy a fire shelter in the middle of a roadway. If you have to deploy a shelter on a roadway, use road shoulders or other areas where escaping vehicles are less likely to run over you. Deploying in the roadway in this case would have been dangerous, whereas the road shoulder next to the heavy Water Tender was likely safer from traffic.

Firefighters have both survived and perished while taking refuge inside vehicles. Past entrapments and close calls have shown that vehicles can catch fire rather easily. Cab windows can shatter, and cabs can fill quickly with toxic smoke. This can force firefighters to exit hastily into hazardous or unsurvivable conditions. If entrapped inside a vehicle, unfold the fire shelter to reflect heat, but be prepared to exit quickly, possibly using the shelter as a heat shield prior to deploying it on the ground.

Deploying a shelter next to a vehicle can offer beneficial protection. There are hazards to be aware of when using vehicles as a shield. These hazards include exploding tires and shocks, burning flammable liquids, toxic smoke from burning vehicle parts, and prolonged radiant heat exposure due to the vehicle catching fire.

Additional information:

- Fire shelter stigma: Lessons Learned Center Two More Chains, Fall 2011 edition
- Deploying on a road: The New Generation Fire Shelter pages 7, 8 and 11
- Deploying in a vehicle: Country Fire Engine Burn Over Green Sheet and Coal Canyon Fire Serious Accident Investigation Report