

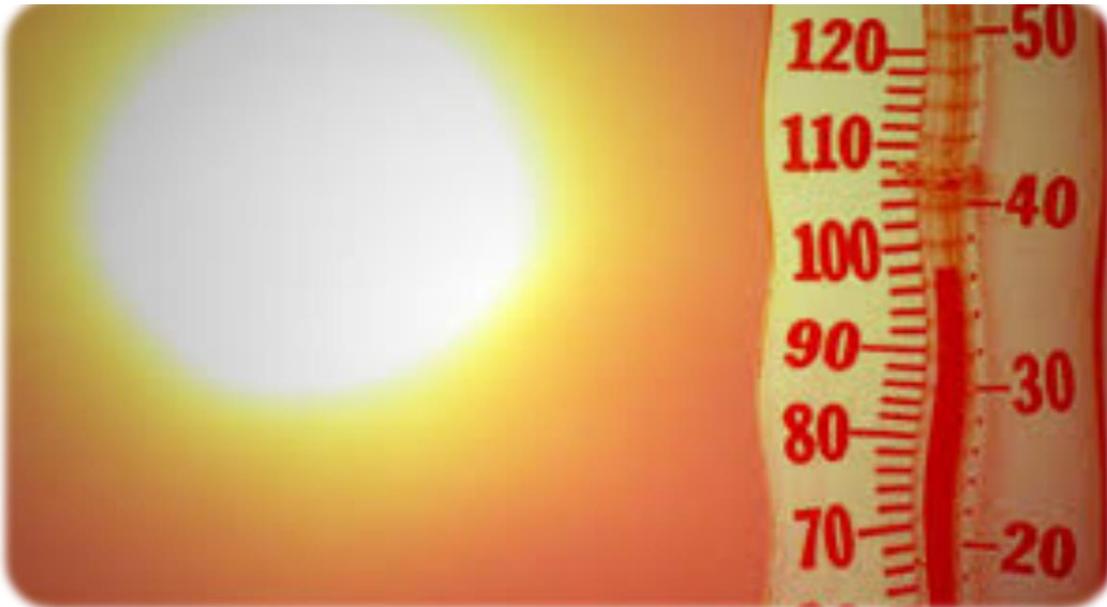


**United States Department of Agriculture
Forest Service**

Seed Orchard Run Heat Related Illness FLA

Idaho City Ranger District

Boise National Forest



*“Dispatch, we’d like to request an ambulance to the airport.
One individual. Difficulties breathing during PT. EMTs on
scene.”*

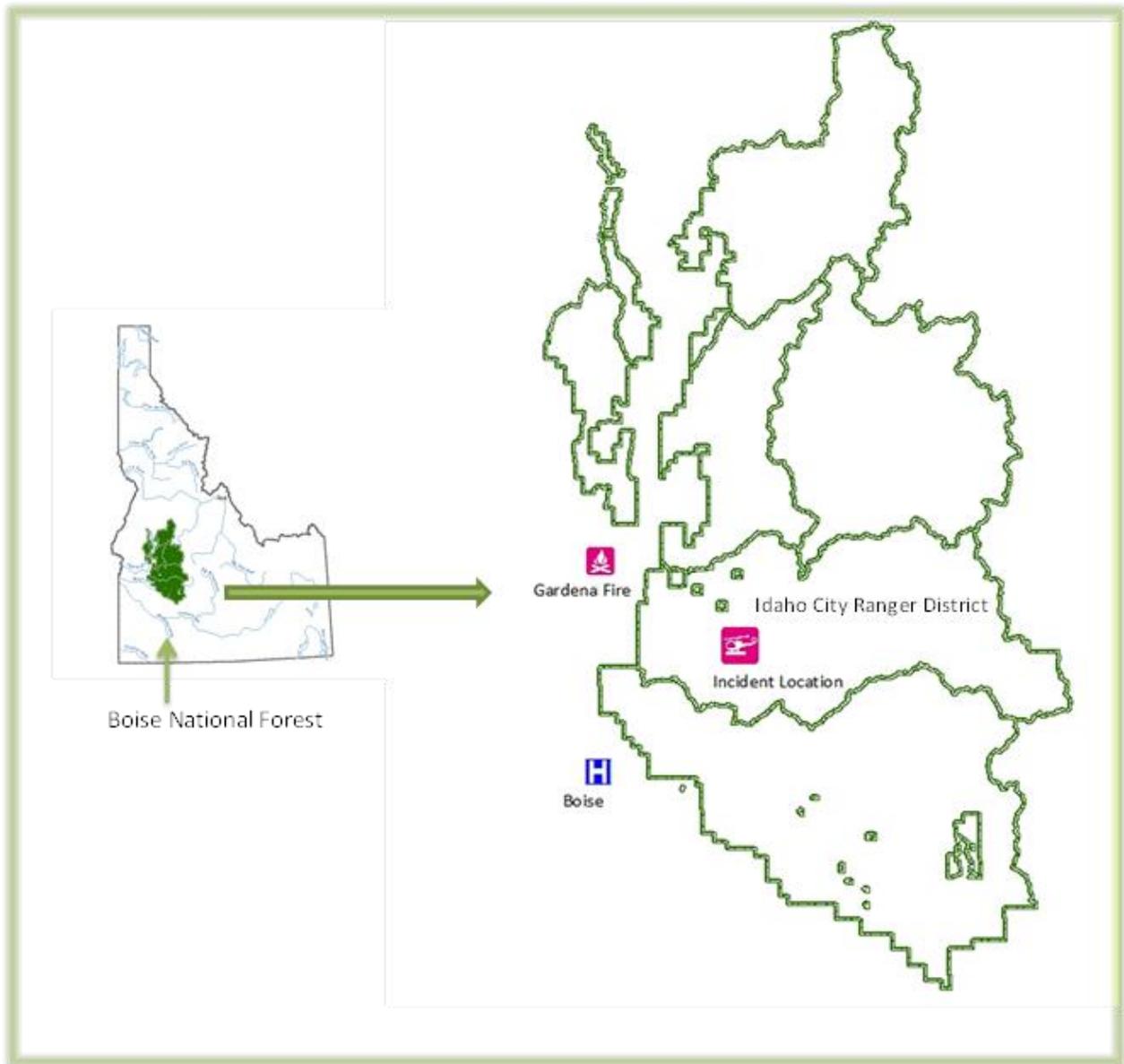
Incident Date: June 30, 2015

Report Date: July, 2015

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Vicinity Map of Incident



The intent of this Facilitated Learning Analysis (FLA) is to tell the story of those that were involved in this heat related illness incident and to share information and knowledge on lessons learned to help prevent an incident like this from happening again.

Executive Summary

“Ben is down” the call came over the radio. It was June 30, 2015. After several days of rising temperatures in the area the crew went for a physical training run. During the run a crewmember began experiencing symptoms of a possible heat related illness. Another crewmember assisted him to the ground and his condition began to rapidly decline. Ben became unconscious. Knowing the severity of the situation EMTs immediately began patient assessment and stabilization.

With the patient’s status and distance from the hospital, crew leadership understood the urgency to get Ben to definitive care. An air ambulance and ground transport were ordered early in the incident. After approximately 25 minutes, the air ambulance arrived and flight medics prepped the patient for evacuation and began advanced life support. The air ambulance left for Boise with Ben on board.

The Forest Supervisor initiated a Facilitated Learning Analysis (FLA) and assembled a team to review the circumstances surrounding the incident. The team’s charge included capturing employee perspectives and telling their story, a learning analysis, and the promotion of a learning culture.

The FLA did an in-depth evaluation of the incident. This included interviews with relevant individuals, a review of forest standard operating procedures such as the Boise National Forest emergency plan, hospital liaison program, emergency medical response plan, safety plan, dispatch procedures and medical response resources. Crew training, qualifications and environmental factors such as weather were also reviewed. The team found no reckless and willful disregard for human safety.

Introduction

The information for this FLA was gathered through interviews, dispatch logs and site visits. The FLA team came together to review this heat related illness (HRI) that occurred on June 30, 2015. Names mentioned in this FLA are fictional. Quotes and the chronological timeline are as close as possible however some were approximated. The goal is to learn from this HRI, without any fear of reprisal.

The quick response of those involved and the smooth implementation and use of proper medical protocol led to the patient receiving advanced life support in a timely manner. Those involved in this incident should be commended for their actions in responding to this medical incident in a quick and professional manner.

To best learn from this FLA, try and refrain from analyzing actions of those involved with your hindsight knowledge and put yourself in the shoes of those that went through this incident first-hand. Through that lens see how you would react without having the advantage of hindsight. Remember that this story was compiled from multiple interviews with each person having a piece of the puzzle. No one person had all of the puzzle pieces at the time of the injury.

Background

In recent years, Engine-436 had little to no movement within the four primary permanent positions until this season (2015). Three out of the four permanent employees took 120 day details beginning March 2015. With the open positions, the assistant engine captain, Alex, was detailed into the engine captain position. The assistant engine captain (FEO) position was not filled, while the assistant fire engine operator (AFEO) was filled with an out of area detailer, Sara. An apprentice, Roger, was used to fill in behind the lead firefighter. Lastly, two seasonal employees, Jennifer and Ben, were hired to round out the engine module. This is Jennifer's first year in fire, while Ben had one year of previous experience on E-436. Though this is only Ben's second year in fire, he has prior life experience in the military and deployment to the Middle East which has contributed to his success as a wildland firefighter.

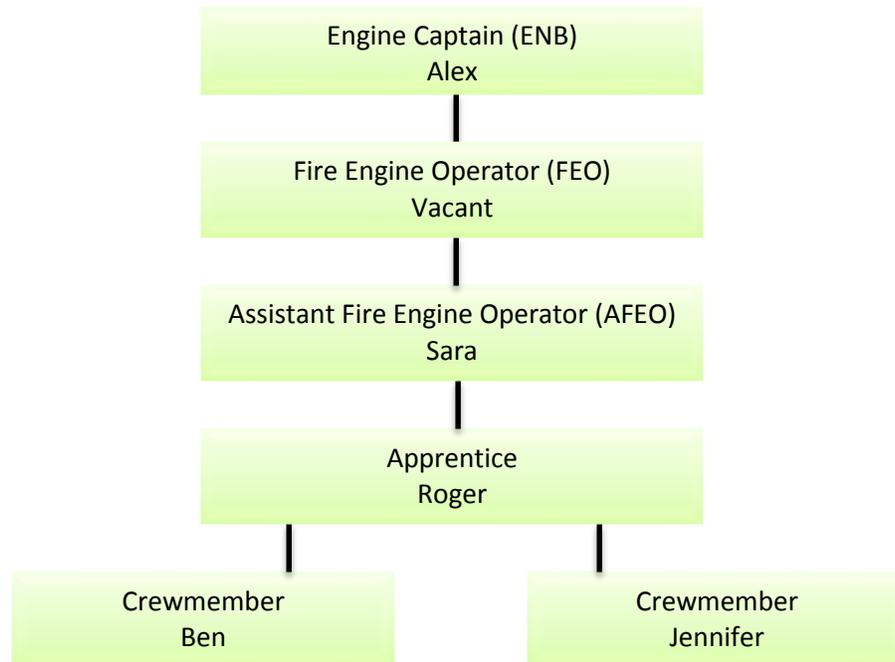


Figure 1. Engine 436 Organization Prior to June 28th

Pre-season start up and training took a bit longer with there being new personnel to E-436. Critical training such as fire refreshers, engine operations, physical training (PT) and medical scenarios including heat related injuries was covered. Ben showed up for his first day of work May 4, 2015, fit and in noticeably better shape than the previous season. Alex was encouraged that Ben had taken the initiative during the off season to train. Ben being a returning seasonal proved to be helpful because he was able to assist with basic daily operations such as morning engine checks and locating of supplies. Jennifer started in June because she had to finish up school and attend basic fire school.

The Story

With only a half mile left in the run, Mike noticed Ben start to wobble, and asked him “Are you doing okay?” Ben responded, “No, I’m not doing well.” Mike helped Ben to the ground and within what seemed like moments Ben became unresponsive.

How does someone go from a morning PT run to unresponsive so quickly!? Let’s take a look at the days leading up to Tuesday June 30, 2015.

The local area was experiencing a heat wave, which resulted in high indices and fire danger. Because of this and the fact that local resources were committed to fires elsewhere, the Boise

NF had ordered additional resources to assist with the potential fire load (Engine 433 and Crew #1, both from New Mexico).

Thursday June 25th: The engine crew (E-436) had the day off. Seven day staffing had not begun due to the lack of qualified Engine Bosses (see appendix C).

Low/High Temperature:
52° @ 0600, 86° @ 1500
High/Low Relative Humidity (RH):
64% @ 0700, 20% @ 1400

Friday June 26th: E-436 was called in on a day off as lightning was anticipated that afternoon and the neighboring district had already had multiple new starts that day.

Low/High Temperature:
51° @ 0700, 91° @ 1700
High/Low Relative Humidity (RH):
70% @ 0700, 19% @ 1700

Saturday June 27th: E-436 assisted the district prevention officer with a local community event by staffing an informational booth and escorting Smokey Bear around town. Ben noted to Alex that he had been having intense gastrointestinal issues that day, but otherwise felt good and had been hydrating. Mike, the engine captain that was previously detailed to another position, came in for 1.5 hours to transition with Alex prior to starting with the engine crew the next day.

Low/High Temperature:
54° @ 0600, 97° @ 1700
High/Low Relative Humidity (RH):
66% @ 0600, 14% @ 1700

Sunday June 28th: E-436 began seven day coverage with Mike (Engine Captain), Sara (AFEO), Jennifer (FFT2) and Ben (FFT2) staffing the engine (See updated org chart Appendix C).

Mike decided to take the engine crew on an easy PT hike wearing full line gear to assess the module, since this was his first day back after his detail. To avoid heat problems, they stopped several times for water breaks, 10 and 18 conversations, and regular rest stops. The weather for the day was predicted to be the hottest day on record for the year with a potentially record breaking temperature. After PT, the engine crew worked inside around the station to avoid the heat and to be prepared for an initial attack.

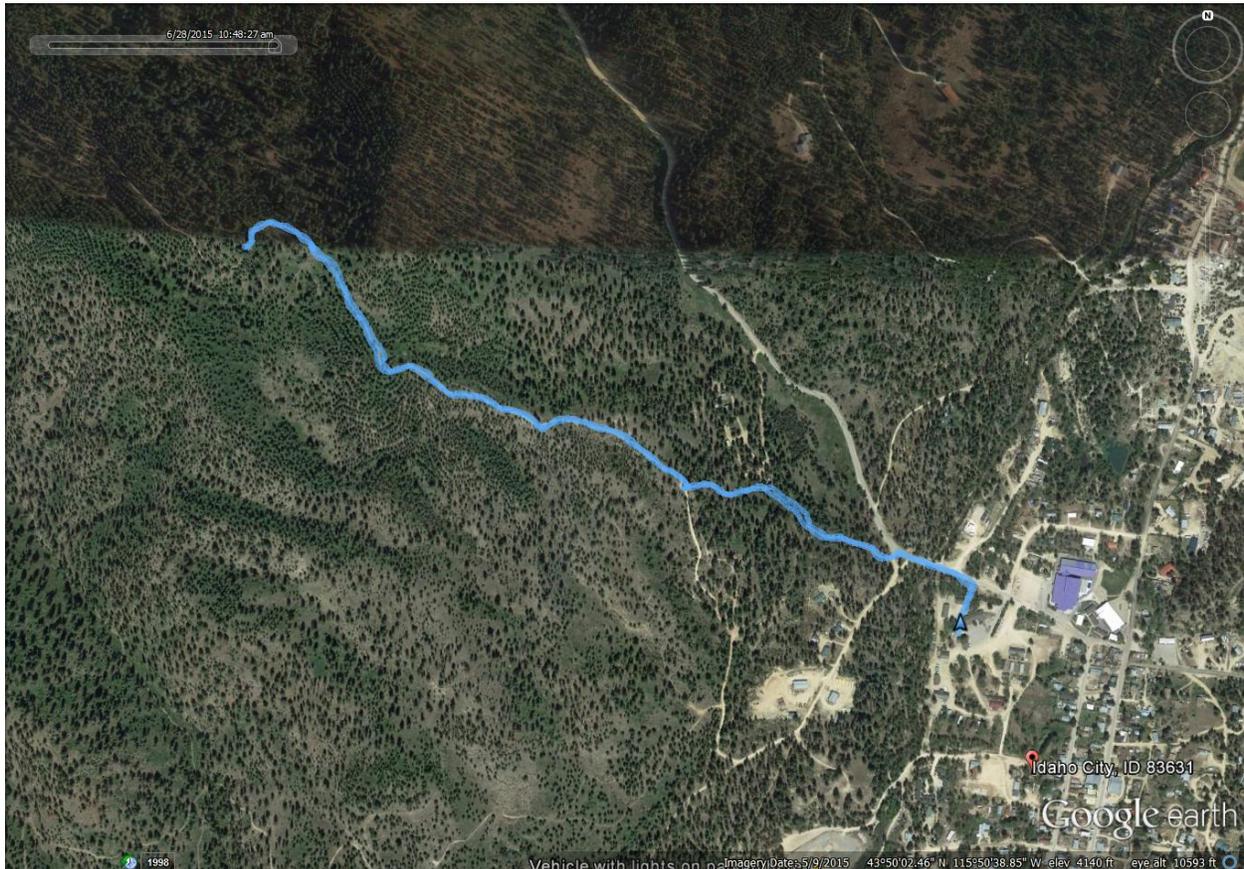


Figure 2. Route taken by crew on June 28th PT hike. Max. elevation 3918 ft; elevation gain 731 ft.; distance 2.2 mi; maximum slope 44%, avg. slope 12%.

At approximately 1724, the engine was dispatched to the Gardena fire along with E-433 from New Mexico. The fire was located on Hwy 55 on BLM and private lands. E-436 arrived on scene at approximately 1900. Once on scene, Mike was assigned as Division A and the rest of E-436 and E-433 married up to form a squad. E-436 and E-433 were assigned to improve and cold trail the right flank of the fire securing the “backdoor” behind helitack. The initial pitch off the road was steep for about 200 yards. After the initial steep pitch, the terrain turned gentle and rolling. The engine crew took it slow hiking in to the fire. As they started up the second hill, Ben mentioned to Sara “I’m hurting a little.” Once they reached the fires edge and tied in with

helitack, they took a 15 minute break before beginning their work assignment. Ben complained he was feeling sore. Temperatures were still over 100° at this point. The engine crew hiked about 3 miles total as they worked to secure the fire line. Around 2130 the engine crew tied back in with Mike and began hiking off the hill to return to the vehicles. As they were hiking out Ben complained about cramping in his legs. Mike asked Ben if he needed to take a break, “No, let’s keep moving.” Mike inquired, “Have you been drinking water?” Ben replied, “Yes.” During this same time frame, a crew member from E-433 was demonstrating possible heat illness or fatigue. Mike and the engine captain from E-433 distributed the crew member’s gear and continued hiking to the trucks. Once back at the trucks, Ben mentioned to Jennifer and Sara that his face was numb. Before returning to Idaho City, the engine crew stopped to grab something to eat at the local gas station at 2200, but it was already closed. They arrived back to the station around 2400 and went out of service. The engine crew was told to report at 0800 Monday morning to start work. Alex and Roger were called to come in the following day which was their normal day off, to help with staffing the engine.

Low/High Temperature:

57° @ 0700, 101° @ 1500

High/Low Relative Humidity (RH):

70% @ 0700, 13% @ 1600

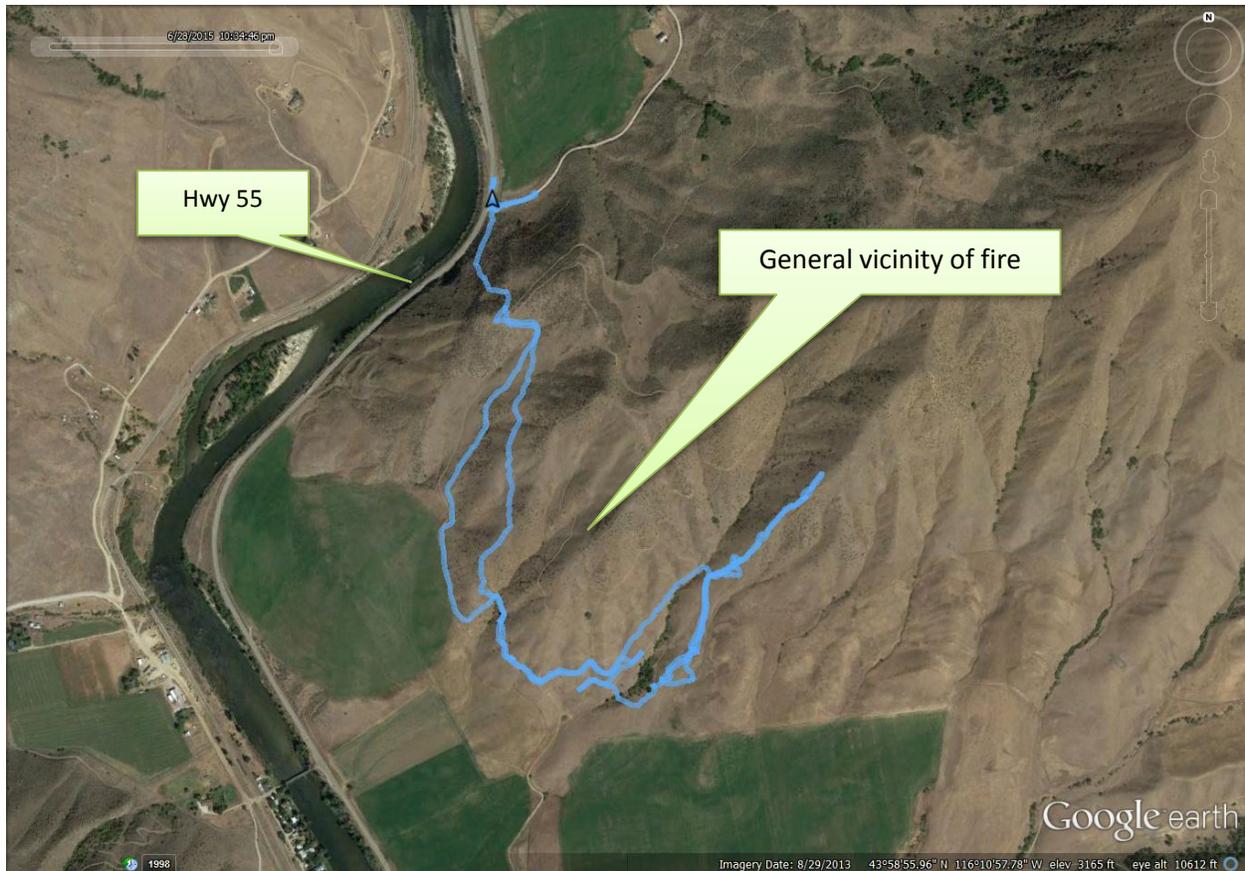


Figure 3. Route taken by Mike on Gardena Fire; Route used by engine crew was similar but shorter. Max. elevation 3177 ft; elevation gain 1080 ft.; distance 3.8 mi; maximum slope 55%, avg. slope 10%.

Monday June 29th: Mike, Sara, Roger, Jennifer, and Ben reported at 0800. Alex showed up after PT. They started off the day with daily engine checks and then began refurbishing their tools and gear from the fire.

After the engine crew was fire ready, they played two games of 2 on 2 basketball for PT with one person sitting out each game. The person who sat out did calisthenics (push-ups, sit-ups, etc.). Ben mentioned that his legs were sore, but other than that he felt great. Mike encouraged Ben to drink water during PT after the cramping he had experienced on the fire. After PT, the engine crew got cleaned up and grabbed breakfast. Sara noticed Ben didn't eat breakfast, which was odd because "Ben eats a lot of food."

Around 1100, the engine crew met up with E-433 and Crew #1 for morning briefing and daily assignments.

"Ben was pounding the water that morning." - Roger

Mike assigned the engine crew to train on and test Mark III pumps in the shade at a nearby creek, as it was again going to be another hot day. Before they set out, Mike encouraged “Everyone should drink a gallon of water before lunch and be monitoring how much you’re urinating.” As they were working on the pumps, Jennifer noticed Ben acting oddly. He would try and start the pump with one pull and then stop. He also appeared to be tired, sweaty and unable to focus.

When the engine crew took lunch at 1300, Roger thought Ben seemed to be acting normal.

_____ *“Ben seemed out of it and unable to focus when I was talking with him.”*
-Alex

After lunch, Alex checked in on the engine crew to see how they were doing and to do some pump education. Alex asked Ben, “What’s wrong?” Ben replied, “I’m cramping and have a headache.” Alex said, “Do you think you could go on a fire right now if we got a call?”

Ben responded, “No, I don’t think I could.” After having this conversation with Ben, Alex tied in with Mike to discuss the situation. The decision was made to send Ben home at 1400 to the barracks after instructing him to rest up and hydrate. Mike told Ben he would check in on him later in the day.

At 1730 the announcement came over the radio from dispatch that all fire resources would be extended until 2000.

Ben showed up in boots and greens at approximately 1745 to check in with Mike. When asked how he was feeling, Ben responded, “I feel good and have been drinking lots of water.” Mike and Alex had no reason to doubt Ben’s self-assessment and had him work the last two hours of the day.

Once Ben was off work, he went back to the barracks, made dinner and then went to bed.

Low/High Temperature: 60° @ 0600, 105° @ 1600 High/Low Relative Humidity (RH): 64% @ 0700, 14% @ 1500
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Tuesday June 30th: Ben came in to work on his day off to assist in staffing the engine, as Alex had to take a personal day. This day was very similar to previous days, with temperatures expected to be in the 100s. After the engine crew did their morning engine checks, they set

out for a PT run with engine 433. Mike checked with Ben to see how he was doing, “I am good to go, I’m solid.”

They ran the seed orchard run which is approximately 3.5 miles. All were told to take it nice and slow, as it was set to be a hot one. At established points during the run, the faster runners on the engine crew turned to loop back to the slower runners in order to keep everyone together. Roger noted that Ben was in his typical spot during the run up until the end, where he fell to the back of the pack.

“The last time I looped back I noticed Jennifer had passed Ben, which seemed odd.” - Roger



Figure 4. Route taken by engine crew on June 30th PT run. Max. elevation 3865 ft; elevation gain 624ft.; distance 3.5mi; maximum slope 29%, avg. slope 4%.

Everyone was told to take a right when the trail split which took them around the backside of the airport. Jennifer saw Ben and two crew members from E-433 take a left instead of the right turn and passed this information onto Mike. Mike ran back to grab the group of three and got them going in the correct direction. As Mike ran with Ben, he saw him start to “wobble” and asked him, “Are you doing okay?” Ben responded, “No, I’m not doing well.” Mike helped Ben to the ground. At that point, Ben was making small talk as the engine captain from E-433 came upon Mike and Ben. The engine captain left his radio with Mike and ran to get water for Ben, as well as Crew #1, who were back at the station, for assistance. Soon afterwards, Ben became unconscious. Mike used the radio and called on Tac. to his engine crew, “I need help! Hurry!” Sara and Roger arrived first and began trying to cool Ben down by pouring creek water on and fanning him. Sara is an EMR, but didn’t yet have any medical equipment to provide much assistance other than taking a few vitals and getting a patient assessment.

“I need help! Hurry!” -Mike



Figure 5. Location where Ben collapsed on trail.

The Assistant Fire Management Officer (AFMO) heard the radio traffic on Tac. and radioed to ask what was going on. Mike responded “Ben is down!” The AFMO quickly left the district

office and arrived at the airport shortly thereafter. Once on scene, the AFMO took command of the incident and began relaying information to Boise Interagency Dispatch.

1048: “Dispatch, we’d like to request an ambulance to the airport. One individual. Difficulties breathing during PT. EMTs on scene. I’ll get back to you with more information.”

At this point, EMTs from Crew #1 had arrived at the airport with medical gear to assist. They began to administer oxygen to assist Ben’s breathing. They also applied cold packs to cool Ben’s body temperature but removed them after a while, as Ben began to sweat and they feared he was going into shock.

1052: Air Ambulance is requested by AFMO to dispatch.

1054: Update to dispatch that patient is unresponsive to verbal and painful stimulus.

Air Ambulance is 21 minutes out.

1056: Update to dispatch that patient went down during PT due to fatigue and breathing is being assisted with bag valve mask. No other resources needed.

1108: Patient’s pupils are pinpoint and unresponsive.

“Pupils are pinpoint and unresponsive” - AFMO

1117: Air Ambulance is on the ground and transitioning with EMTs.

1154: Air Ambulance is off the ground and enroute to the hospital.

Low/High Temperature:

63° @ 0600, 100° @ 1600

High/Low Relative Humidity (RH):

69% @ 0600, 20% @ 1600

Ben’s medical providers initially were not sure what his diagnosis was, and several days into his care his medical status started to worsen. He was transferred to a larger medical center for more specialty care and the preliminary diagnosis has been heat illness. Ben has some degree of kidney and liver failure and the future of that is not known. As of the date of this report, Ben continues to receive advanced medical care for the conditions that led to this incident.



Figure 6. Location of incident and response vehicles.

“He is the last person I would expect to go down during a PT run because he was in such good shape.”

-Alex

Place yourself in the shoes of one of the crew members on E-436 during this situation. Imagine your concern and fear if you saw one of your teammates take off to the hospital not knowing how, when, or if he was going to recover. How well are you prepared to respond to a medical emergency when you have little to no medical equipment or trained personnel nearby?

Lessons Learned Analysis

This analysis is intended to examine the learning opportunities shared by firefighters, overhead, and the FLA Team. The following list has been compiled to help employees and the greater fire community to learn from this unfortunate event.

Work Environment

- There is a high level of concern locally, regionally, and nationally from firefighters, cooperators, leadership and the greater firefighting community that firefighters continue to suffer heat related illnesses. We all need to remain vigilant in analyzing risk versus gain in our day to day operational risk assessments.
- All personnel at the station were aware of the hot and dry conditions. All personnel were drinking water and Gatorade. Supervisors backed off the intensity of workouts and had personnel working in shaded areas near water. Crews often worked inside, out of the sun, while at the station.

Situational Awareness

- Factors such as diet, sleep, and medical history can have a direct effect on a person's susceptibility to heat related illnesses. Personal awareness and monitoring are effective tools to assist in the prevention of heat related illnesses. Heat related illness can affect anyone no matter their fitness level.
- Fire leadership involved in this incident said a lesson learned for them is to more intensely question an employee if they state that they are not feeling well. In some cases, employees may not be totally aware of their wellbeing or they may be motivated by other factors. In any case, follow up is necessary.
- Employees learned that it is crucial to evaluate themselves mentally and physically prior to, during, and after work.

"Always keep your chain of command informed of your body and your current capabilities. Always maintain hydration!"

- Ben

“We’ve done many medical training scenarios, which were helpful for this incident but never a scenario involving PT. We will now.”

– Crew #1

Training

- Personnel at the station identified that medical response training had been done in situations involving fire personnel while on the fire line or while working on projects. This incident has highlighted that all personnel, whether in the office, in a work center, or involved in physical fitness training, should run scenarios. These scenarios would highlight inefficiencies in handling unexpected situations where medical gear or communications aren’t readily available.
- Supervisors identified the continuing need for the Agency to promote and maintain EMT qualified personnel on modules. The Agency should allow time and funding for continuing education for current EMTs and Paramedics. The Agency should consider placing official EMT positions on fire modules in the interest of our employees’ wellbeing.

- Personnel involved identified that historically the engine crew would go on PT

“We will now carry at least two radios during physical training because of this incident.” – Crew #1, E-436

runs with only one radio. The primary purpose for carrying the radio was to ensure the engine crew was able to hear initial attack calls came from dispatch. As a result of this incident the engine crew will carry additional radios to more efficiently handle a medical emergency while on PT runs.

Patient Care

- Dispatchers play a critical role in the coordination of the medical evacuation of a patient and should be considered part of the incident. Providing support and follow-up on patient status with dispatch should be standard practice.
- Individuals involved in the incident would appreciate more frequent updates. However, the nature of this incident and the concern for privacy played a key role in the availability, timing and kind of information that was released.

- The employee and his family cited that patient advocacy went well. The family stated that the support from the employee’s peers and leadership was helpful and supportive. It is the opinion of the FLA team that the Patient Liaison Program for the Boise National Forest is excellent and worked well when executed. Here is a link to the Boise National Forest Liaison Program that is located on the Boise Interagency Dispatch site: <http://www.idahofireinfo.blm.gov/southwest/safety.htm>.

“Assistance and support has been very good and humbling. It's a very tough and stressful time and support and assistance are really a help for the mind and soul.”

- Ben’s Family

- The first responders and EMTs were good at what they did which led to a well-executed response.
- There is a checklist which includes a box for Life Flight located within the Initial Response Pocket Guide (IRPG) on pg. 109, item 5 of the 9 lines “Transport Plan”. Personnel involved believe this should be changed to Air Ambulance because Life Flight is the name of a company. The use of the term “air ambulance” would insure the closest available helicopter, which is qualified and approved for the mission, would be dispatched to the scene.
- On page 103 of the IRPG and the 6 Minutes for Safety (Heat Disorders July 25, 2014) in the Lessons Learned archives, have the symptoms for heat stroke listed and they specifically state “hot, dry skin.” This is for classic heat stroke which elderly and the very young suffer from. These documents need to be changed. For Exertional Heat Stroke, which is what wildland firefighters suffer from, the skin is likely wet and hot. Wet skin needs to be added as a possible symptom.

Additional learning

- Personnel onsite and in dispatch who were involved in the medical emergency did an excellent job. They made timely decisions in the best interest of the patient. Training and scenarios have proven to be helpful in this and in other emergency situations. The first responders stated that they wished they had brought all of their medical equipment on site rather than having to make several trips to and from the station and

vehicles for additional supplies. This did not affect the outcome regarding patient care or severity of injury in this case.

- There was a general lack of awareness that the local volunteer ambulance services are on a daily rotation. The ground ambulance arrived shortly after the air ambulance. The ground ambulance departed from Mores Creek which is approximately 25 minutes via highway. This delay did not affect the outcome; however, getting the ambulance rotation schedule will assist crews with the planning of daily operations.
- Personnel have identified the need for the Agency to look at policy regarding longer term care for employees and their families. Currently the Wildland Firefighter Foundation provides some relief using donations from other firefighters and donors. When foundation money runs low, or sometimes out, the families of injured Agency personnel are even more affected with financial burdens. Many seasonal employees are not from the area where they work which can make it difficult for families to find and pay for extended stays.

Development

Heat Illness Discussion

The following discussion is a compilation of information of current medical thought and an overall look at exertional heat illness. Since the preliminary diagnosis is heat illness in this case, it was felt a review of this diagnosis was warranted. Not all of these conditions were present during the circumstances of this event that led to this accident.

Exertional heat illness is the result of a body's intolerance to and inability to dissipate external heat or heat produced internally by work or exercise, where the body can't regulate its temperature and heart rate response to the heat. Only 30 percent of energy used in a muscle contraction is used for force of contraction, while 70 percent of the energy is released as heat. This underscores how physical work results in heat production. The heat produced by our bodies is what causes heat illness—when we cannot get rid of this heat fast enough or do not allow for adequate recovery. Performing physical tasks—such as hiking up hills—can increase your body temperature to near-critical levels. The ability to balance heat is different between individuals, and varies on a daily basis. Each case is unique. Only the individual truly knows if they are OK. The [Heat Stress Study RLS](#) released on the Wildfire Lessons Learned site on July 8, 2015, discusses heat and wildland firefighter exertion. Portions of information from this RLS are incorporated into this discussion.

Heat exhaustion is mild to moderate symptoms of heat illness and heat stroke is severe symptoms of heat illness. The line between heat exhaustion and heat stroke can be very fine. A

person can rapidly progress from heat exhaustion to heat stroke or it may take days of poor recovery to get to heat stroke. Heat exhaustion is cramping, nausea, thirst, headache, swelling of hands and feet, itchy red rash, progressing to more concerning symptoms of vomiting, worsening headache and dizziness, lightheadedness, body temperature elevated but less than 102° F, rapid heartbeat, increased sweating, but normal mental status. Exertional heat stroke is body temperature above 104° F, altered mental status or unconsciousness, seizures, rapid heartbeat, abnormal breathing, low blood pressure, more likely sweating but may have dry skin, and cardiac arrest.

HEAT EXHAUSTION	EXERTIONAL HEAT STROKE
Normal to elevated body temp <102°F NORMAL MENTAL STATUS Sweating Muscle cramping Nausea/Vomiting Thirst Headache/Dizziness Swollen hands and feet Itchy red rash Lightheaded Rapid heartbeat	Body temperature >= 104°F ALTERED MENTAL STATUS or unconscious Likely sweating but may have dry skin Seizures Rapid heartbeat Abnormal breathing Low blood pressure Cardiac Arrest

Prevention of heat illness involves several aspects. **Hydration alone will not prevent a heat-related injury.**

- Aerobic fitness is important. The more aerobically fit you are the better heat tolerance you tend to have, but adequate recovery from high-heat producing physical tasks is important as well. See Heat Stress Study RLS linked above.
- Personal health is important. Illness or chronic medical conditions can put you at increased risk of heat illness. Fatigue can decrease your body’s ability to respond to heat. Good hydration before and during the exertion is important to prevent dehydration which leads into heat illness.
- Medications can put you at increased risk for heat illness, even over-the-counter ones. Some medications can interfere with the heart response to heat or can alter your heat tolerance.
- The after effects of overindulgence in alcohol and use of illegal drugs can last over 24 hours, so what you do on your days off may affect you the day you return to work.

Alcohol and illegal drugs can elevate your heart rate and blood pressure and decrease your heat tolerance. Alcohol is also a diuretic causing your body to lose more fluids than you think. This is the same for legal stimulants; energy drinks, herbal supplements, No-Doz, etc.

- Prior heat illness puts you at increased risk for repeat heat illness.
- Personal history of Sickle Cell Trait or Disease puts a person at increased risk of serious injury or death from heat illness.

Self-Assessment

- Am I hydrated?
 - Have I been drinking non-caffeinated fluids the day before exertion to stay hydrated?
 - Did I party a little too hard last evening? Do I feel hung over, even the slightest?
 - During exertion, drink at least 1 liter of fluid, water or Gatorade/electrolyte solution, per hour
 - $\frac{1}{3}$ to $\frac{1}{2}$ of your daily fluid intake for moderate to arduous exertion should be an electrolyte solution of some type and the rest water
- Am I feeling well?
 - Any stomach issues?
 - Nausea, vomiting, diarrhea
 - Any headache?
 - Pain, pressure, lightheaded, dizzy
 - Any muscle pain or cramps beyond what I would normally have?
 - Any cold symptoms (not known allergy symptoms)?
 - Stuffy nose, sore throat, cough, fever
 - Am I taking any medications (including over-the-counter) or herbal remedies that may have unknown side effects with the heat?
- Am I rested?
 - Have I been sleeping well and getting enough sleep?
- Do I have a history of a prior moderate to severe heat illness – moderate to severe heat exhaustion or heat stroke?
 - A history of prior heat illness puts you at increased risk for repeat heat illness
 - Have I made a full recovery from that episode – NO symptoms for at least 24 hours with exertion and/or heat exposure for heat exhaustion; medically cleared by medical provider AND no symptoms with heat exposure and exertion for heat stroke

Links

<http://www.wildfirelessons.net/orphans/viewincident?DocumentKey=4517671f-7f79-4216-b0f1-a0f3fb126f7e> (Heat Stress Study RLS)

<http://www.wildfirelessons.net/orphans/viewincident?DocumentKey=771b2050-967e-43ce-a9b0-f1fdef488794> (Minidoka Ranger District Heat Stroke FLA)

<http://www.wildfirelessons.net/orphans/viewincident?DocumentKey=d1613b5f-6a03-4e37-abf2-517ed9922f87> (Grand Wash Heat Illness FLA)

<http://www.wildfirelessons.net/communities/community-home/librarydocuments/viewdocument?DocumentKey=8b1193b4-20f7-416f-8d33-c3e78e73fd00&tab=librarydocuments> (Heat Illness and the Wildland Firefighter)

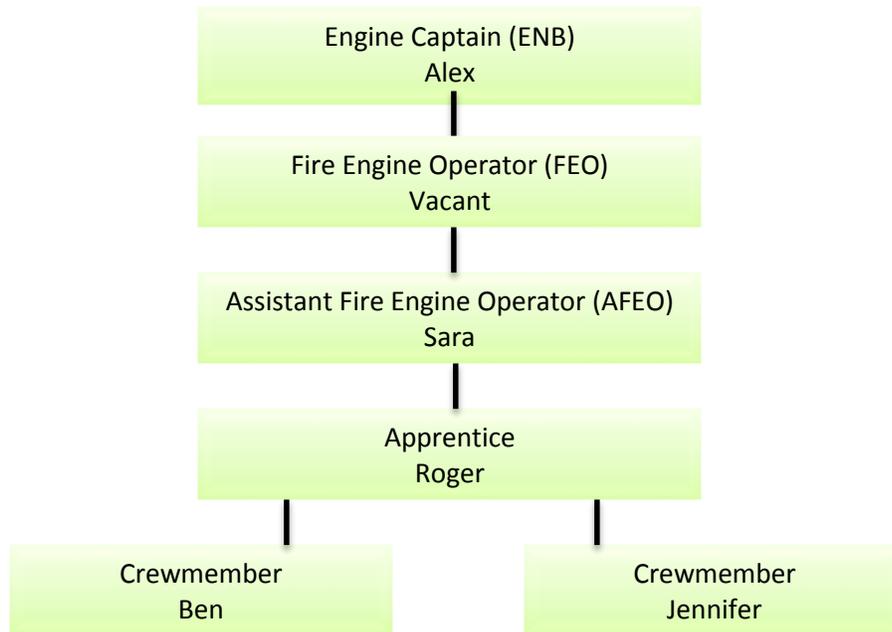
<http://www.aafp.org/afp/1998/0901/p749.html> (Heat-Related Illnesses, American Family Physician)

Appendix A. Timeline of Events

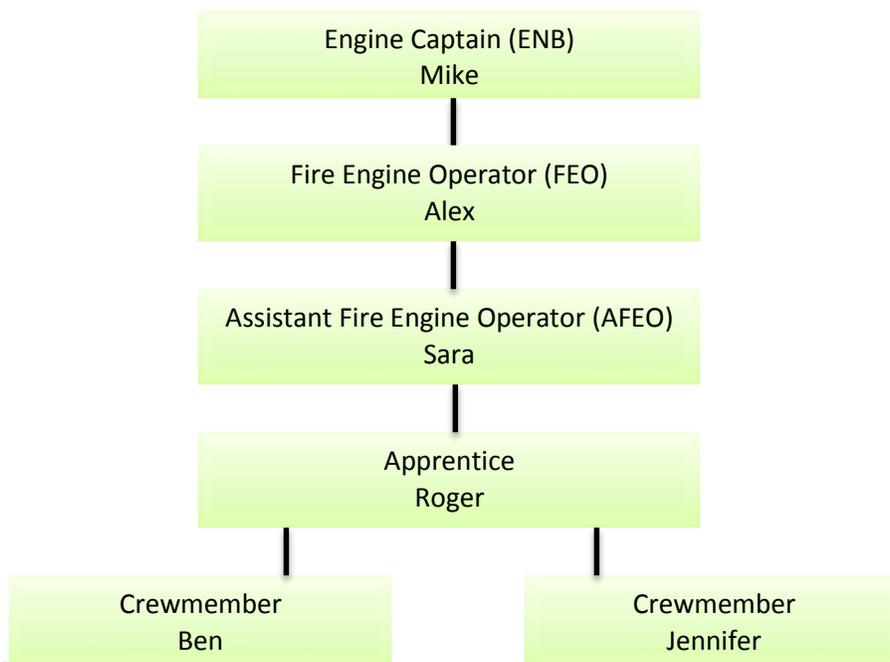
DATE	DAILY HIGH TEMPS & RH	DAILY ACTIVITIES
Tuesday, June 23rd	NA	Ben returns from vacation.
Wednesday, June 24th	High temp: 88 °F, RH 19%.	Pre-7 Day coverage, normal workday. Everybody worked.
Thursday, June 25th	High temp: 86 °F, RH 20%.	Module was off; nobody worked that day.
Friday, June 26th	High temp: 91 °F, RH 19%.	Regular day off. Module was called into work due to LAL 4. Ben was hesitant to come into work due to having gastronomical issues.
Saturday, June 27th	High temp: 97 °F, RH 14%.	Engine captain came up on his own time to transition with the detailed engine captain (approx. 1.5 hrs.)
Sunday, June 28th	High temp: 101 °F, RH 13%.	Start of 7-day staffing. Started at 0930. Light PT day with a 2.2 mile full gear hike with 4 stops for water, rest, and IRPG safety discussions. The engine crew worked inside during the day due to projected high temps. Engine crew was dispatched to the Gardena Fire @1700. Arrived at 1900 and worked the fire until 2200. Ben complained of leg cramps on the hike off of the fire. Returned to station at 2400.
Monday, June 29th	High temp: 105 °F, RH 14%.	Started day at 0800 to refurb engine from the fire. The engine crew worked on pumps down by the creek where it was cooler and in the shade to take it easier on the crew. During the pump refurb, other crewmembers noticed that Ben was not acting normal. At 1400, Ben told his supervisor that he wasn't feeling well. Alex sent him home (on the compound) to rest and drink LOTS of water. Ben returned at 1745 and said he was feeling well enough- "good to go"- to work the extended staffing hours until 2000.
Tuesday, June 30th	High temp: 100 °F, RH 20%.	Engine crew started at 0930. Engine crew conducted maintenance on trucks, then went for PT run around the seed orchard to the airport with pre-suppression resources that were staged at the district. Towards the end of the run at approx. 1045 am Ben started to wobble, and Alex caught Ben and sat him on the ground. Once on the ground, Ben passed out. Alex got a radio from a nearby crewmember and called his engine crew on TAC and said Ben had gone down and he needed assistance. The AFMO heard the radio traffic and responded to the airport to assist (5 min ETA). The local engine crew EMR and the visiting crew EMTs administered aid. When the AFMO arrived, he took over as POC for the incident and contacted dispatch to order EMS resources (ambulance and Life flight). Life flight arrived on scene at 11:17 and flight paramedics took over patient care, loaded patient, and left the scene at 11:54. Alex and AFMO returned to the district office to make emergency notification contact with Ben's parents.

Appendix B. Engine 436 Personnel Organization

Pre-Season through June 27th



Starting Sunday June 28



Appendix C. Crew Qualifications

ENGINE 436

MIKE (SFEO) - ATVO, CRWB, ENGB, FALB, FIRB, HEQB, ICT4, STCR, STEN, STEQ, TFLD, FFT1, FFT2, ICT5, DIVS(T), ICT3(T), RAWS(T), RXB2(T)

ALEX (FEO) - ATVO, ENGB, FAL2, ICT4, RADO, RXCM, ENOP, FFT1, FFT2, ICT5, FIRB(T), HEQB(T), HMGB(T), RAWS(T), HRAP(T)

SARA (AFEO) - ABRO, FFT1, HECM, FFT2, EMR, ENOP(T), ICT5(T), PETM(T)

ROGER (Apprentice) - FFT1, FFT2, ICT5, RXCM, ENGB(T), FIRB(T)

BEN (Crewmember) - FFT2, RXCM, FFT1(T)

JENNIFER (Crewmember) - FFT2, RXCM

Appendix D. FLA Team

Genevieve Masters, FLA Team Leader
Humboldt-Toiyabe National Forest Service

Eric Zanotto, Lead Facilitator
Pike, San Isabel National Forest and Cimarron and Comanche National Grasslands

Jennifer Symonds, D.O.
Wildland Firefighter Medical Qualifications Program Manager, Medical Officer
U.S. Forest Service

Todd DeMasters, Subject Matter Expert
Boise National Forest

Jennifer Purvine, Union Representative
Salmon-Challis National Forest Service

Emily Webb, Writer/Editor, Documentation Specialist
Boise National Forest

Anthony “TJ” Gholson, Subject Matter Expert
Boise National Forest Service