

SAFETY ADVISORY

Date/Time: May 27, 2011 1200

Event: Firefighters sustain burn injuries from stepping in ash pits.

Purpose: Alert wildland fire community of the hazards associated with ash pits, how to recognize and mitigate this exposure, and how to provide an appropriate medical response to burn injuries.

Narrative: In April and May of 2011, three firefighters in the Southwest stepped onto, what appeared to be solid ground, but turned out to be ash pits. In each case, the firefighter sustained burn injuries despite proper use of PPE and quick extraction from the hole. In support of agency and regional Standard Operating Procedures (SOPs), the burn victims were transported to a regional burn center for medical care. The resulting evacuations included a variety of medical transportation including medivac helicopter and/fixed wing aircraft from the incident to the burn center. In two cases, the individuals were located so remote that



immediate evacuation included transport via mule train to an area where they were then transferred to medical aviation transportation to the burn center. In the first case, there was some initial delay in determination which burn center to transport the patient until confirmation could be made which burn center was best staffed to handle the patient. However, this was well communicated between the incident and flight medical personnel and the patients transferred in a timely and efficient manner.

IC Actions: Thanks to good planning on the part of the Incident Management Team (IMT), and having incident medics available for evaluation of the patients, immediate medical attention was provided in all three cases, and transport to burn centers was quick and efficient. After each incident, the IMT ensured to communicate this hazard into safety briefings to alert fireline personnel to what had happened, what to watch for, and what to do if someone is injured. The fireline medical personnel were invaluable in providing immediate triage and assist in the medical evacuation decision through communications with the burn center, IMT, and medivac personnel.

How to Detect Invisible Hot Ash Pits: “Ash Pit Hazards” can be found on the 6 Minutes for Safety web site (http://www.wildfirelessons.net/documents/6MFS_ashpithazards.pdf). It lists environmental factors, including the presence of extensive root systems, deep duff or peat, landscapes that have once been cultivated or manipulated by heavy equipment, old dozer piles, sawmills, timber sale yards or decking areas, and rodent holes filled with combustible debris. In these cases, all were located in the same very dry riparian area with no sign of stump holes anywhere nearby. Indicators included white ash on the surface and possible translucent smoke that dissipates quickly above the ground with little if any indication of the hazard.

Role of PPE: All three firefighters were wearing standard issue green Nomex pants and all three firefighter’s boots met NWCG PPE standards. In one injury, the burn occurred on the foot, through the leather boot. The other two injuries were located on the calf above the top of the

leather boots. Past incidents show that firefighters wearing Kevlar pants had fallen into similar pits on other fires but had not sustained burns, suggesting that Kevlar pants may provide greater protection against these types of burn injuries.

Burn Injury SOP: Interagency firefighter burn injury protocols are outlined in the *Interagency Standards for Fire and Fire Aviation* (Red Book), Chapter 7, pages 7-21 and 7-22 (http://www.nifc.gov/policies/red_book.htm). Because a physician referral is necessary for admission to a burn center and delays in referrals to burn centers have occurred in the past, the burn injury SOPs call for a firefighter's representative or medical personnel to facilitate the medical referral to a burn center and ensure timely care. When transporting the injured firefighter to a local medical facility, if the treating physician does not believe the victim should go to a burn center, it is the agency designee's responsibility to coordinate with the attending physician to ensure that a firefighter whose injuries might meet any of the burn injury criteria listed in the firefighter burn injury protocol is immediately referred to the nearest burn center. In all three of these cases, the firefighters were treated and released from the burn center, and it was determined that immediate evacuation to the burn center was the most appropriate action to take in the best interest of the employee's health and safety and not risk infection had they not been transported to a burn center.

The chance of full recovery from a burn injury is much higher if immediately transported to a burn center or the local physician attending the injured firefighter at a local medical facility provides a referral to a burn center in a timely manner. **Local and assigned incident managers must know where the closest burn center is. In preparation for fire season, visit local medical clinics to discuss treatment and transfer of burn patients to minimize delays caused by staff unfamiliar with DOI and USDA burn injury protocols. Here is a list of possible burn care facilities:** <http://www.blm.gov/nifc/st/en/prog/fire/im.html>.

Other Possible Influences: Underground ash pits not visible from the surface are created by the combustion of organic matter buried under a layer of mineral soil. Steam from the ash pits can significantly increased the severity of these burns. The presence of emergency medical personnel and medivac transportation, contributed to successful evacuation and treatment in all three cases. Morning safety briefings on these hazards did occur on these incidents, but firefighters still fell into them, mainly due to the fact that these pits were not easily recognizable.

It is also possible that one or more of the injured parties delayed notification of their injury to a supervisor until which time the burn became worse. This resulted in not only delaying their medical care but also resulted in alternative modes of transportation having to be considered since it was dark and aircraft could no longer be considered. It is critical that any burn injury be communicated immediately to the incident leadership and medical personnel, as not to waste precious time. Ash pits are not just a hazard in the Southwest Area and fire managers and firefighters across the country need to be aware of their dangers.

As the April 2011 Regional Forester's Letter of Intent so clearly articulates, "It's crucial that we not expose our incident responders to unnecessary risk and to always put them in the safest conditions possible. " We encourage the continued and diligent use of the risk decision framework when making critical decisions and applaud your efforts in keeping our personnel healthy and safe.

For more information on this Safety Advisory, please contact Bequi Livingston, USFS R3 Fire Operations Health and Safety Specialist at 505/842-3412 or blivingston@fs.fed.us .