

Highlights of the NIOSH Health Hazard Evaluation

Evaluation of Heat Stress in Grand Canyon Park Rangers

In Sept. 1999, and June/July 2000, NIOSH representatives conducted health hazard evaluations at Grand Canyon National Park. We looked into management and employee concerns about park rangers' exposures to high temperatures while patrolling and hiking into and out of the canyon.

What NIOSH Did

- We measured the outdoor temperatures in the canyon and on the rim. We also measured how much work (work load) the rangers did.
- We weighed the rangers before and after their hikes to test for dehydration (not enough water in their bodies). We took blood to look for signs of hyponatremia (not enough sodium in the blood).
- We measured the heart rates and body temperatures of the rangers while they hiked in and out of the canyon and patrolled the inner canyon and the South Rim.
- We talked to the rangers about their jobs and asked them to tell us their health concerns.

What NIOSH Found

- Inner-canyon and south rim temperatures and ranger work loads caused rangers to be exposed to excess heat stress and increased their risk of getting heat sickness.
- None of the rangers were acclimatized (used to working in the hot weather) and many were not used to working so hard.
- Every ranger had heat strain, which means that their heart rates, and/or body temperatures were so high during parts of their work shifts that they were in danger of becoming seriously ill.
- Most rangers were mildly dehydrated before and during their hikes, but none got sick.
- There were not enough rangers to work at inner-canyon stations when other rangers needed to rest or get used to the heat.
- There is no formal heat stress management program at the park.

What Park Managers Can Do

- Decrease the work load of those hiking out by using mules or helicopter transportation.
- Create a heat stress program that will:
 - ▶ assess employees for medical fitness before they begin hard work and especially during the hot season;
 - ▶ allow employees to get used to the heat (acclimate) before they work in it full time;
 - ▶ train employees to know the dangers of and protect themselves from working in extreme heat;
 - ▶ encourage employees to report any heat stress symptoms and signs;
 - ▶ keep systematic records of employee reports of heat stress illnesses;
 - ▶ teach employees to monitor their own and others' heat stress and strain signs.
- Install outdoor showers and/or use ice vests to prevent employee heat stress and strain.

What Park Employees Can Do

- Take more time to complete hard work, such as hiking out, by taking longer breaks more often.
- Wait to do hard work until it's cooler.
- Soak your body and clothes in the shower or the creek during hot weather before you leave the station for rescues or patrol.
- Learn to monitor yourselves and co-workers for heat stress, and heed the warning signs of heat stress by taking breaks and rehydrating when needed.
- Take care of personal needs before those of victims for safer, more effective rescues.
- Report and record any heat-related illnesses and other concerns.



What To Do For More Information:

We encourage you to read the full report. If you would like a copy, either ask your health and safety representative to make you a copy or call 1-513/841-4252 and ask for HETA Report # 99-0321-2873

