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FROM : National Wildfire Coordinating Group

REPLY TO : NWCG@nifc.gov

DATE : 08/12/2005

SUBJECT : SAFETY BULLETIN : Appropriate Fluid Intake

Please note correspondence from Dr. Brian Sharkey, MTDC, regarding appropriate fluid intake.

Along with the US Army, we do not recommend lots and lots of water in the heat. Based on our studies we recommend 1/3 to 1/2 of fluid intake be in carbohydrate/electrolyte drinks (sports drinks), and that FF drink a quart of fluid each hour of work. The electrolytes help avoid losing lots of fluid in urine.

Too much water could lead to hyponatremia. The following will be in a coming report.

Hyponatremia – Excess water intake (water intoxication) can lead to a disturbance in fluid-electrolyte balance and an abnormally low level of plasma sodium (under 135 mmoles/liter). The risk is more pronounced during long-duration exertion in the heat, in events like the marathon, Ironman triathlon, and prolonged work (wildland firefighting, military). When excess water intake is combined with loss of sodium in sweat the risk grows (sodium loss for a participant in the Ironman triathlon could approach 1 gram per hour of a 12 hour event). A moderate decline in plasma sodium may cause gastrointestinal symptoms or nausea. A more pronounced drop may cause unusual fatigue, confusion, disorientation, throbbing headache, vomiting, wheezy breathing, swollen hands and feet. Seizures, coma, and death are possible at very low levels (below 120 mmoles/liter).

Those at greatest risk are small, slower athletes, those who sweat a lot and those who lose lots of salt, drink lots of water before and during the event, and fail to replace electrolytes, especially sodium. A small body means it takes less water to dilute body fluids, and a slow athlete spends more time on the course. Twenty-six cases were found during several San Diego marathons, and average finishing time was 5 hours and 38 minutes.

Nine US Marine recruits experienced hyponatremia on the same day, drinking 10 to 22

quarts of water over a few hours of exertion. All survived after emergency treatment (Military Medicine, 2002).

You can drink too much water!

Hyponatremia – Sodium is available in fire camp meals, but it may not be sufficient during extremely hot weather. To avoid hyponatremia include carbohydrate/electrolyte (sport) drinks or put electrolytes (especially salt) in water to ensure sodium intake.

- Drink half a quart of fluid (water and sport drink) 2 to 3 hours before exertion in the heat.
- Drink a pint of fluid (water and sport drink) 10 to 20 minutes before exercise
- Replace fluids lost in sweat by drinking 6 to 12 oz of fluid (water and sport drink) every 15 to 20 minutes during exertion
- During meals, long breaks and after exertion replace fluids to restore fluid balance, electrolytes, and carbohydrates.

Our advice for wildland firefighters: consume a quart (liter) of fluid (water and sport drink) for each hour of work in the heat. We recommend you use sport drinks for 1/3 to 1/2 of fluid needs (see issue #8 of this report on the MTDC web page).

When hyponatremia is suspected, provide electrolyte fluids – not water.
