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Washington State Department of Labor and Industries
Ambient Heat Exposure Rulemaking Committee

Subj: Industry input to rule making on heat exposure

Ref.

- a) WAC 296-62-095 Outdoor heat exposure.
- b) OSHA Technical Manual (OTM) Section III: Chapter 4
- c) GHSA Practice Policy for Heat and Humidity
- d) US Army Public Health Center Fact Sheet FS NO. 12-005-0621 Heat Illness

Committee Members,

I am writing this letter to ask the question, why are we not using WBGT for evaluating agricultural employee heat exposure? There is a large body of information dating back to the 1950's showing the effectiveness of WBGT as a guide to reduce heat illness. It is clear from this data that the use of the WBGT is superior to Heat index for people working in the sun. Heat index it should be noted is calculated for the shade not for direct sunlight.

Following is quoted from the National weather service web site (<https://www.weather.gov/ict/WBGT>) on the two measurement methods

Heat index

“The Heat Index is based on work carried out by Robert G. Steadman in 1979 ("An Assessment of Sultriness, Parts I and II") where he discussed factors that would impact how hot a person would feel under certain conditions. The National Weather Service developed a "simplified" formula from this work using air temperature and relative humidity as the two inputs. This formula became the "heat index".

It is important to note that the heat index is calculated for shady areas. *Direct sunlight can add as much as 15 degrees to the heat index.*”

Inputs:

- Temperature (in shade)
- Relative Humidity

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WBGT

“The WBGT dates back to the 1950s - specifically the United States Marine Corp Recruit Depot on Parris Island, SC. There, recruits were required to perform high intensity exercise in a high humidity, high temperature environment. Many soldiers succumbed to heat related illness. In response, a joint effort between the Department of the Navy and Army doctors studied the effects of heat on exercise performance. The result was the WBGT uses several atmospheric variables for its calculations: temperature, humidity, wind speed, sun angle, and cloud cover. Temperatures are measured in the sunlight.

The military uses the WBGT to gauge the potential for heat related stresses to this day. OSHA and many nations also use the WBGT as a guide to managing workload in direct sunlight, as do athletic departments (college and high school) and events. If you work or exercise in direct sunlight, this is a good element to monitor.”

Inputs:

- Temperature (in sun)
- Relative Humidity
- Wind speed
- Cloud cover
- Sun angle

It would seem to me that we would want to use the method that provides the best information to protect workers and it seems clear that WBGT is the better method.

The use of a WBGT meter in the field where workers are working in direct sunlight is a better tool for measuring the risk of potential heat illness. I think it is relevant that it is used by OSHA, most all athletic departments, the United States military, ACGIH and ISO as the method for evaluating heat stress in an open outdoor working environment. The directives in the WBGT programs established by these various entities are very comprehensive in their scope and are consistent in their application. Further, they establish effective mitigation for different WBGT levels. There are clear criteria for workload, hydration, rest periods and clothing. Most importantly they all provide clear information that is easy to relate to for employees and employers who must use the information to make important decisions. It would not take much effort to adapt these to the agricultural works task and clothing. If heat index cannot be replaced with WBGT, I would ask if it were possible to include the use of WBGT as an option for those who would like to use it in their heat stress program.

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I have personally used WBGT successfully some 40 years ago while serving in the US Coast Guard while assigned to work with the Navy conducting shipboard training exercises in the Caribbean. Because of this experience I know it works. The procedures have only gotten better in the intervening years. I would like the committee to strongly consider the use of WBGT rather than Heat index as I believe it is a better tool to ensure the health and safety of Washington State agricultural workers.

Lastly, I would like to add there is a methodology to estimate the black globe temperature by Dr. Vincent E. Dimiceli, Associate Professor of Mathematics at Oral Roberts University and Steven F. Piltz, Meteorologist-in-Charge National Weather Service. Using this methodology WBGT could be used without the need for expensive instrumentation. Also, WBGT measurement are available at the Nation Weather service web site <https://digital.mdl.nws.noaa.gov/?zoom=7&lat=35.28787&lon=-9.36779&layers=F000BTTTFTT®ion=0&element=8&mxmz=true&barbs=false&su bl=TTFFFF&units=english&wunits=nautical&coords=latlon&tunits=localt>

Respectfully

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