Abstract #: 309 **Presented by: Oclla Michele Fletcher, MD, Resident**

Critical Heat Stress Evaluation of Chemical Protective Clothing Ensembles with a Full-Face Negative Pressure Respirator

Oclla Michele Fletcher, MD, College of Public Health (COPH), OMR, Thomas E. Bernard, PhD, COPH, EOH, Candi D. Ashley, PhD, College of Education, Hamisu M. Salihu, MD, PhD, COPH, EPB,USF SERC, University of South Florida, College of Public Health, Dept. of Environmental & Occupational Health

Keywords: heat stress, respirator, WBGT, protective clothing

Objective: Protective clothing ensembles restrict heat loss. The purpose of this study was to determine if there are differences in heat stress (critical wet bulb globe temperature - WBGTcrit) and heat strain (heart rate, core temperature, physiological strain index [PSI]) among four chemical protective ensembles (TAP apron [TAP], TAP with chemical barrier pants [TAP + P], chemical barrier coveralls [VB + CA], all with full-face negative pressure respirator, and chemical barrier coveralls without respirator [VB + CA noR]); all compared to work clothes (WC).

Methods: Four acclimatized adult males wore all five ensembles in a balanced design while walking at a metabolic rate of about 170 W m-2 in a climatic chamber at 50% relative humidity. A progressive heat stress protocol was used to find WBGTcrit, the point at which there was loss of thermal regulatory control. Mixed effects ANOVA was used to assess ensemble effects. Tukey's test was used to determine where differences occurred.

Results: There were no differences among ensembles for core temperature, heart rate, or PSI, which meant that the physiological strain was the same regardless of clothing or respirator. Significantly different WBGTcrit's were found between WC and TAP and for WC and TAP compared to other ensembles (TAP + P, VB + CA, VB + CA noR). No differences were noted with the presence and absence of a respirator.

Conclusion: Progressively increasing heat stress burden was seen when moving from TAP to TAP + P to VB + CA. The type of protective clothing ensemble worn is a major contributor to workplace heat risk, but a respirator is not likely to increase heat stress risk.

Research supported by: URS, U.S. Army, USF Sunshine SERC

Abstract #: 310 **Presented by: Kristle Fuentes, BS, Graduate Student**

Review of Health Impacts of Sludge Incinerator Exposure and Issues of Waste Management Effect on Workers and General Public in Puerto Rico

Fuentes Cruz, Kristle M, Orta, Lida, Industrial Hygiene Program, Department of Environmental Health, Medical Sciences Campus of Puerto Rico, UPR.

Keywords: Risk Management Factors on Incinerators, Sludge Waste Incineration, Landfills, Incineration, Health Risks of Heavy Metal on Incineration

Objective: This literature review assesses health effects, exposure and public concerns of workers, due to sewage waste and sludge incineration. Heavy metals have serious health effects directly concerning workers of the incinerators and indirectly exposing the population living near.

Methods: In Puerto Rico the incineration of dried sludge has been used for years to reduce the substantial volume of waste, converting it to ash. Around 4,000,000 tons/year of solid waste are generated in PR. Landfills serves as PR only means of disposal. Revision of the EPA regulation 40 CFR part 60 and 503 and OSHA standard 29 CFR. 1915.1000 parameters of exposure in the work place were analyzed and compared with results from the incineration of waste water in Puerto Rico and assess the possible risks to workers health.

Results: It was observed that proper maintenance, management and design of modern incinerators have been showed to reduce up to 99.8% of particulate emission. It was noted that if properly conducted risk management plans and evaluation of different routes of exposure are used on the facilities rather than predicting, could discard every operational uncertainty on incinerations of the articles evaluated.

Conclusion: More concise employee exposure information of health risks and diseases should be evaluated. Some severe effects of heavy metals may include reduced growth and development, cancer, organ damage, nervous system damage, and in extreme cases, death.

Sunshine ERC Research Poster Session 2012

in Collaboration with

USF Health Research Day

February 24th, 2012

USF Marshall Center