

D1.3

Title: *Judgment and Decision-Making in Hazardous Work Environments: A Critical Skill*

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Constantly unpredictable, hazardous environments demand heightened judgment and decision-making skills. Decisions made in volatile work settings have a direct impact on job performance, productivity, and the health and safety of the worker. Research has shown that dynamic environments, particularly emergency situations such as natural or man-made disasters are stressful events for the worker, yet decisions must be made rapidly, often without adequate information.

Accepting the premise that hazardous work environments may be viewed on a continuum, the idea that there are constants along that continuum follows. For example, in a mining or construction environment there would be patterns of behavior and constants similar to those found in a natural disaster environment, or a terrorism incident or even in a war environment. These environments on the continuum would be different in some dimensions such as intensity, exposure, and other, as yet undefined areas. Yet, the environments would be similar in that they may share individual and organizational preparedness and response patterns. This author suggests that judgment and decision-making under the stress of a hazardous environment is one of the common tenets. This presentation discusses some of the current thinking on decision-making under stress, with knowledge gleaned from various disciplines, including: the sociological, psychological, physiological, medical, and risk assessment literature.

The relationship of stress to judgment and decision-making is an aspect of human behavior that is under-explored. In addition, training requirements for workers in emergent, hazardous or stressful environments are inadequately understood. The Pittsburgh Research Laboratory (NIOSH) has conducted research on the performance of miners exposed to smoke in underground mines and on human behavior in underground mine fires. Miners with previous training reported less stress and anxiety, and performed better in escape from smoke in a mine simulation training exercise than those with no previous training. Understanding judgment and decision-making under stress may contribute to better decisions for workers in exceptionally hazardous environments.

D1.4

Title: *Prevention and Mitigation of Traumatic Incident Stress After Exposure to Hazardous Conditions*

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Terrorism involving weapons of mass destruction (WMD) may have powerful psychosocial consequences. This paper will focus on how exposure to hazardous conditions can induce stress. Traumatic incident stress has been observed for over a century under a variety of names, including traumatic neuroses, railway spine, shell shock, combat exhaustion, and disaster fatigue. This paper will review the research on traumatic incident stress after chemical, biological, radiological or nuclear (CBRN) accidents and intentional use and how traumatic stress might be prevented or mitigated.

Traumatic incident stress may produce large numbers of casualties who present with flu-like symptoms (e.g., fatigue, malaise, headache, arthralgia, myalgia, dizziness, dyspnea, and weakness) similar to prodromal symptoms seen after exposure to chemical, radiological, or biological weapons. Hyperventilation syndrome may be a physiological explanation for some of the non-specific symptoms. Stress reactions may occur in the absence of physical injury, but can also exacerbate symptoms and distress in those physically injured by a WMD or accidental exposure.

Unlike physical injuries, psychological stress has the stigma of mental illness. However, military experience with battle fatigue or combat stress demonstrate that such reactions are not due to mental illness, but are a normal reaction to an abnormal and overwhelming stimulus. In the military, traumatic stress is treated using the acronym PIE – proximity, immediacy, expectancy. Soldiers are treated close to the battle front, as soon as they become symptomatic, and with a positive expectancy that they will recover and be able to return to their unit. Stress control measures for civilians often speak of the 5 R's – Reassurance of normality, Rest (respite from the situation), Replenish physiologic needs (food, water, sleep), Restore confidence, and Return to duty and reunite with their work team. Breath training to counteract hyperventilation may also be useful.

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