



DEPARTMENT OF THE ARMY
US ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
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MCHB-TS-OHH

07 February 2005

MEMORANDUM FOR U.S. Army Armament Research, Development and Engineering Center (AMSRD-AAR-QEW/Mr. Paul Chiodo), Building 92, Picatinny, NJ 07806-5000

SUBJECT: The U.S. Army Center for Health Promotion and Preventive Medicine's Position on whether TASER® Electro Muscular Incapacitation Launched Electrode Stun Weapons are Safe to use on U.S. Army Military and Civilian Personnel during Training

1. References. A list of references used in this memorandum is contained in Appendix A.
2. Purpose. The purpose of this memorandum is to identify the U.S. Army Center For Health Promotion and Preventive Medicine's (USACHPPM) position on whether Taser® Electro Muscular Incapacitation (EMI) Launched Electrode Stun Weapons (LESW) are safe to use on U.S. Army military and civilian personnel during training, the process by which this position is reached, and the associated human effects data requirements necessary to assess emerging EMI materiel capabilities (reference 1).
3. Background.
 - a. Tasers are known as EMI LESW and are considered Non-Lethal Weapons (NLW). The DOD Policy Directive 3000.3 defines NLW as "weapons that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property, and the environment". This policy also states, "NLW shall not be required to have a zero probability of producing fatalities or permanent injuries" (reference 2).
 - b. Tasers are designed to use the effects of electrical pulses to non-lethally incapacitate individuals. They are battery powered and use a low current, high voltage (50,000 volt) impulse to provide incapacitation. The Taser uses compressed nitrogen to propel two stainless-steel probes to a maximum distance of 21 feet at rate of 180 feet per second. The probes receive power via two thin, insulated wires. The probes, similar to a barbed fishhook, attach themselves to the skin or clothing of the targeted individual. Once attached, the current can then be passed along the wires. The weapon is also designed to be operated in a "stun" manner after the nitrogen cartridge has been expended by placing the end of the weapon on the targeted individual. Once a circuit has been established, the device will send a metered and pulsed

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current into the targeted individual. The current can be pulsed each time the device's trigger is depressed or continuously by holding the trigger down. The discharged current results in involuntary muscle spasms and severe loss of motor control (references 3-5).

c. The U.S. Army has conducted three Urgent Materiel Releases (UMR) of the Taser (references 3-5). To support the UMR process, the U.S. Army has relied on Mobile Training Teams (MTT), made up of Taser International Inc., certified master instructors, to train U.S. Army Soldiers. These MTTs follow civilian Law Enforcement Agency (LEA) training procedures currently in use for Taser. The LEA training procedures require trainees to personally experience the Taser EMI effect in order to instill trainee confidence in the effect and effectiveness of this Taser EMI capability and to be certified as trained (references 1, and 3-6).

d. There is limited data available concerning the health effects of Taser exposure. On 8 October 2004, the Joint Non-Lethal Weapons (JNLW) Human Effects Center of Excellence (HECOE) released a formal, independent Human Effectiveness Risk Characterization (HERC) for the TASER EMI LESW. This report stated that there are significant data gaps resulting in 15 areas that require further evaluation or data collection before a conclusion can be reached regarding (target health) effects or risk (reference 6). The JNLW HECOE HERC Taser report gives a limited but favorable endorsement to procure and deploy the M26 and X26E Taser systems for use on target populations. The endorsement is limited due to a lack of well-defined scientific investigation into the effects of the Taser and the report's reliance on mostly anecdotal evidence based on extensive use by civilian law enforcement (references 1 and 6).

e. The JNLW HECOE HERC Taser report states, "these weapons are effective for their intended use, but also may cause several unintended effects". The intended uses of these weapons are to incapacitate combative personnel. The JNLW HECOE HERC Taser report gave their endorsement to use EMI LESW technology to incapacitate combative personnel (reference 6).

4. Identification of Potential Health Hazards as a Result of Using Tasers on U.S. Army Military and Civilians during Training.

a. Electrical pulse (The Taser uses a low current, high voltage (50,000 volt) impulse to provide incapacitation of the targeted individual).

b. Biological substances (The Taser electrodes may become contaminated if they embed in the targeted individual).

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c. Eye trauma (The Taser electrodes may strike the eye(s) of the targeted individual).

d. Non-ionizing radiation (laser/optical radiation) (The Taser may be capable of containing a 635-670 nm laser diode for aiming and pointing at the targeted individual).

5. Assessment of Potential Health Hazards as a Result of Using Tasers on U.S. Army Military and Civilians during Training.

a. Potential health effects relate to intended and unintended effects to targets, users, and bystanders. During the EMI, the intended effect (tetany) causes severe loss of motor control that may be associated with chipped teeth, concussions, or lacerations. The skin penetration by the barbs may be associated with lacerations, puncture injury, potential infection, and bruising. Although not a clearly demonstrated risk, any activity that involves skin penetration raises the issues of blood borne pathogen control and risk. An individual with documented osteoporosis who suffered a compression fracture of his thoracic vertebrae secondary to the muscle contraction has filed one lawsuit against the company. Although the training typically involves individuals be hit in the back with the probes, circumstantial injury to the eye (globe), scrotum, or other areas is a potential. Additionally, seizures and ventricular fibrillation can be induced by the electric current. Individuals with heart disease and drug intoxication are considered more susceptible and the JNLW HECOIE HERC Taser report notes "data are too limited to evaluate the probabilities for susceptible populations". Estimated rates for all events listed above are reported to be less than 1 percent. Available data for which to make these assessments were "from human experience and animal studies" (reference 6).

b. The Taser International Inc., provides the rate of 1 in 500 (0.2 percent) for falls due to the loss of muscular control. Four severe injuries occurred. However, this data is not rigorously collected or evaluated. The need to do so "before conclusions can be reached regarding potential effects or risks" is stated in the JNLW HECOIE HERC Taser report. Other key areas of uncertainty include thresholds for outcomes, effects of scale, dose-response for intended effects, effects of pre-existing morbidity, increased duration of stimulation, and impacts on pregnancy and reproduction, among others. Two incidences of miscarriage have been at least theoretically linked to Taser effects (reference 6).

c. The Taser operating manual specifies that the weapon be aimed only at the target's torso. This would preclude eye and groin injuries. The effects resulting from exposure to the electrical current are more problematic. Since 2001, many deaths have been linked to TASER use. Approximately 20 fatalities had documentation of proximity to the event reported at autopsy. Most individuals who died after being struck by a Taser were compromised by the use of illegal stimulant drugs (PCP, amphetamine, cocaine, or crack-cocaine) (reference 6). The Taser

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probably caused convulsions, ventricular fibrillation, elevated body temperature, and dramatic changes in blood flow and blood pressure.

d. Laser radiation occupies that portion of the electromagnetic spectrum from 100 nanometers (nm) in the extreme ultraviolet to 1 millimeter (mm) in the extreme infrared. Laser radiation is emitted by a large variety of Army systems. These systems are used for aiming/pointing, illumination, fire control, target acquisition, training, and communications. The Taser will be capable of containing a 635-670 nm laser diode for aiming and pointing. The Laser/Optical Radiation Program of this Center should be notified prior to the use of a laser-equipped Taser, so that they may evaluate the item/system and make recommendations to minimize/eliminate the exposure of personnel to potentially hazardous optical radiation (reference 7). Requests should be submitted to this Center's Laser/Optical Radiation Program.

e. Tasers have been used on a wide range of age groups and populations. There are reports of individuals as young as 13 and as old as 71 being struck by a Taser. There are no significant gender or race specific reported problems (reference 6).

6. Conclusions. Use of Tasers should consider technical feasibility, likely effectiveness, safe operational use, and policy acceptability. Tasers have been shown to be technically feasible and effective for the intended purpose. Safe operational use in training scenarios where individuals serve as targets is another issue. The risk characterization report created by the JNLW HECOIE concluded that "overall, the results indicate that the use of M26 and X26E Taser as intended would generally be effective in inducing the desired EMI effect without presenting a significant risk of unintended severe effects. Although likely to be uncommon, severe unintended effects might occur. In some cases, key data gaps and uncertainties preclude the development of effectiveness and risk probabilities". Of note, they state "...an additional aspect of the analysis is the comparative risk. Analyses provided by law enforcement agencies indicate that increased use of the M26 and X26E (Tasers) may likely decrease the overall injury rate of both police officers and suspects in the conflict situations when compared to alternatives in the use of force continuum" (reference 6). While this is a valid point for situations where actual competing risks exist, training situations are not conflict situations and thus the incremental risk of adverse potential health effects to trainees is not justified. Assuming that they can familiarize themselves with the equipment and its operation using other than human subjects, there seems to be limited incremental benefit to exposing them to risk of injury when they serve as targets during training.

7. Recommendations. Data indicates that the use of Tasers as a NLW by U.S. Army military and civilian forces is feasible and effective. The practice of using these weapons on U.S. Army military and civilian forces in training is not recommended given the potential risks. Data gaps and uncertainties prohibit unrestricted medical clearance for this practice. The growing number

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of press reports identifying adverse health effects associated with the use of Tasers in the civilian sector will continue to draw attention to this practice. If use of Tasers on U.S. Army military and civilian forces for training purposes is adopted, it is recommended that documentation of injuries, rigorous reporting of adverse events, and analysis of said results is conducted.

8. Our points of contact for this memorandum at the USACHPPM are MAJ Timothy A. Kluchinsky, Jr., Health Hazard Assessment (HHA) Program Manager, or CPT Christopher P. Haynes, HHA Project Officer, commercial 410-436-2925, or DSN 584-2925. Dr. Coleen Weese, Environmental Medicine Program Manager, provided the medical assessment and review, commercial 410-436-2714, or DSN 584-2714. Ms. Penelope Galoff of the Laser/Optical Radiation Program provided the laser/optical input, commercial 410-436-5058, or DSN 584-5058.

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MEDCOM (MCPO-SA)
TRADOC (ATBO-M)
ODCS-G1 (DAPE-MR)
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APPENDIX A

References

1. Memorandum, ARDEC, AMSRD-AAR-QEW, 14 Dec 04, subject: Request for the Medical Research Materiel Command's (MRMC) Position on Whether TASER® Electro Muscular Incapacitation (EMI) Launched Electrode Stun Weapons (LESW) are Safe to use on U.S. Army Military and Civilian Personnel during Training.
2. DODI 3000.3, Policy for Non-Lethal Weapons, 9 Jul 96.
3. Memorandum, Office of the Project Manager for Close Combat Systems, SFAE-AM0-CCS (70-17b), 3 Jun 03, subject: Memorandum of Notification (MON) and Request for Acceptance of Conditions for Urgent Materiel Release of 42 Advanced TASERS® Electro-Muscular Disruptor (EMD) and 2,100 Model 44200 21' Police Air Cartridges to CFLCC, ARCENT Kuwait in support of Operation Iraqi Freedom.
4. Memorandum, Office of the Project Manager for Close Combat Systems, SFAE-AM0-CCS (70-17b), 13 Apr 04, subject: Memorandum of Notification (MON) and Request for Acceptance of Conditions for Urgent Materiel Release of 25 X26E TASERS® with X-Rail (M4 Rail Adaptor) and 2500 each 21' Police Air Cartridges and 50 Digital Power Modules (DPMs) for Combined Joint Task Force Seven (CJTF-7)/Coalition Forces Land Component Command (CFLCC), Camp Victory, Iraq in support of Operation Iraqi Freedom.
5. Memorandum, Office of the Project Manager for Close Combat Systems, SFAE-AM0-CCS (70-17b), 7 Sep 04, subject: Memorandum of Notification (MON) and Request for Acceptance of Conditions for Urgent Materiel Release of 325 X26E TASERS® with X-Rail (M4 Rail Adaptor) and 11,700 each 21' Police Air Cartridges and 325 Digital Power Modules (DPMs) for Multi National Corps - Iraq (MNC-I)/Coalition Forces Land Component Command (CFLCC), Camp Victory, Iraq in support of Operation Iraqi Freedom.
6. Joint Non-Lethal Weapons Human Effects Center of Excellence, Human Effectiveness and Risk Characterization of the Electromuscular Incapacitation Device - TASER®, 8 Oct 04.
7. E-mail, USACHPPM, MCHB-TS-OLO, Ms. Penelope K. Galoff, 26 Jan 05, subject: Tasers.