Taser®: A Comprehensive Analysis

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Introduction and Thesis

Few can argue against a belief that finds those who are living in America exist within a brutal and violent society. America is plagued with a criminal element that insists on victimizing its fellow countrymen, and in response to this element, those within law enforcement must remain poised to swiftly address issues of criminal behavior. Many who operate within this criminal element display little regard for the rights of others, and they exhibit even less regard for those charged with society's protection.

Regardless of the task performed by police officers, Egon Bittner contends that "police intervention means above all making use of the capacity and authority to overpower resistance to an attempted solution in the native habitat of the problem" (cited in McEwen, 1996, p.16). Because the criminal element maintains a propensity to actively defy and resist the efforts of the people tasked to maintain law and order, the nature of law enforcement's mission, at times, includes an inherent need to use physical force to achieve law enforcement's objective: the broad-based protection of society and the enforcement of its laws.

Within the law enforcement community, the use of police force and the situations in which these use of force incidents occur continue to shape the backdrop of America's court systems. Throughout history, police officers have relied upon a vast array of tools to facilitate the deployment of force, and the rules that govern all deployments of force—regardless of the chosen tool—have been largely formulated from the decisions rendered by the courts within America's judicial system. Technology has unveiled new implements of force available to the law enforcement community, and in law enforcement today, Taser has garnered a huge share of the less than lethal force market. The advent of the conducted energy weapon, or the electronic control device (ECD), has provided law enforcement officers with an additional and effective option when confronted with the need to use physical force to overcome resistance. However, the advent of the ECD has also grown to eclipse a large portion of today's focus, debate and research among the courts and law enforcement professionals alike. A large portion of this controversy has been fueled by the theoretical premise behind the ECD's operation: 50,000 volts of electricity.

Today, law enforcement administrators, researchers and policy makers must independently evaluate every use of force option available and determine if the deployment of the particular force option is beneficial to their officers; moreover, these officials must also determine if the benefits associated with the deployment of the particular force option outweigh the dangers therein. To that end, the discussion within this text will surround the evolution of the Taser and examine the ECD's mechanics and the theoretical science that makes this ECD an effective force option; lay a foundation that provides a clearly defined advantage for the broad-based deployment of this ECD while contrasting its deployment against well documented medical research; and provide an in-depth analysis supporting the need for an ECD training program flanked by a well-developed policy containing specific guidelines that further serves to govern the manner in which every law enforcement agency deploys the Taser.

Evolution, Mechanics and Theory of the Taser

During the period of civil unrest in the 1960's, the inventor of the modern day Taser, John Cover, read an article centered upon a hitchhiker who had grabbed a highly charged electrical wire, "became frozen to it for several hours and lived to tell his story" (Laur, 2000,p.3). It has been well documented that society's climate during that era was one of the driving forces that helped spur the advancement towards less than lethal force options in policing. Having read the story of the hitchhiker, Cover became inspired to develop a high voltage, low amperage device capable of delivering a force significant enough to subdue a person without causing physical injury. This inspiration enabled Cover to build the first of its kind electrical weapon he called the Taser: “an acronym for the ‘Thomas A Swift’s Electrical Rifle,’ which was named after the Tom Swift fantasy stories of Cover’s childhood” (Lauer, 2000, p.3).

The mechanics and theoretical science that drive the performance of the Taser is nothing more than electricity. At its simplest form, electricity can be described as the flow of electrons through some kind of conductive element. Theoretically, the science of the Taser is based upon an electrical energy output equal to 50,000 volts, a fact that many within society find startling; however, the ECD’s actual output of electricity as it interfaces with the human body produces a significantly smaller effect within the body. The effective nature of this ECD is not connected to its sheer electrical output, but instead, its effective nature can be attributed to the science behind the delivery of the ECD’s electrical current.

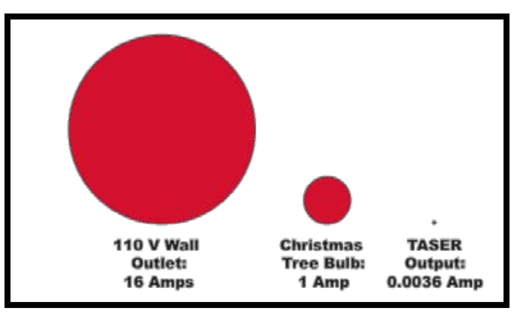

Table 1 Source: (Taser, 2011, p.15)

More than a mere hypothesis, science has proven that electricity's effect within the human body is directly proportional to the amount of electricity delivered. High voltage does not necessarily equate to high danger, as the measure of amperage is a much more critical factor than the measure of voltage. Voltage can best be expressed as the pressure associated with the flow of electrical current, and amperage can be expressed as the rate of the current's flow. If the current can be controlled, the overall effect of the electrical force can be minimized. A great example of this scientific fact can be seen in a machine called the Van de Graff Generator.

Often seen at museums of science, this machine generates in excess of one million volts of electricity. When touched by a human hand, "the 'pressure' from the voltage seems to push an electrical charge right out to the end of their hair, making it stand on end" (Taser, 2011, p.15). The science behind the Van de Graff Generator's mechanics is connected to the manner in which its electrical current is delivered. Because the delivery of the electricity from the generator is configured in a manner that renders the electrical current insignificant, the person who touches the generator experiences no ill effects from the electricity.

Much of the science involved in the delivery of the ECD's electrical current within the human body is controlled by the electricity's effect on the human nervous system. Simply put, the human body has three separate components that comprise the overall nervous system: the central nervous system, which is comprised of the brain and the spinal cord; the sensory nervous system, which transmits information into the brain; and the motor nervous system, which transmits information from the brain to the individual muscles (Taser, 2011, p.17).

The earliest versions of the ECD were introduced in 1974, and because these early generation ECD's were merely stun weapons, their electrical output only affected the body's sensory nervous system. The sole interaction with the human body's sensory nervous system eventually proved problematic, as these stun weapons merely targeted compliance through pain and were quite ineffective against combative individuals. In 1999, Taser introduced the Advanced Taser M26 which was the first ECD scientifically developed to achieve neuromuscular incapacitation (NMI) within the human body. In 2003, this advanced NMI technology culminated in the production of the most widely used Taser ECD among law enforcement agencies today: the Taser X26.

As can be seen in Table 2 on the following page, the peak arching voltage for both the M26 and the X26 is 50,000 volts; however, the actual peak voltage that occurs across the human body is significantly

Electrical Output	Taser M26	Taser X26
Peak Arching Voltage	50,000 V	50,000 V
Peak Voltage Across the Body	5,000 V	1,200 V
Average Current	Less than .004 A	Less than .004 A
Energy Stored Within the Device	1.76 joules	.036 joules
Energy Delivered per Pulse	.5 joules	.07 joules
***External cardiac defibrillators typically deliver 150 – 400 joules per pulse		

Table 2 Source: (Taser, 2011, p.63)

smaller. Across the human body, the M26 projects a total voltage of 5,000 volts, while the improved X26 projects a mere 1,200 volts of electricity. While even 1,200 volts of electricity might appear to be too excessive for direct human exposure, the table clearly demonstrates the total electrical current delivered from each of these two units is less than .04 amperes. The pictorial images within Table 1 helps one visually comprehend the magnitude of the energy delivery associated with this level of amperage. On the whole, the Taser X26 projects less amperage than a light bulb found on a Christmas tree. As can be seen within Table 2, the .07 joules of energy produced by each independent Taser X26 pulse is miniscule when contrasted against the level of joules delivered from a standard external cardiac defibrillator: 150 to 400 joules per pulse.

The technological advancement from the "stun ECD's" to those ECD's capable of inducing NMI proved to be the "key breakthrough that led to the global adoption of the ECD" (Taser, 2011, p.17). The concept of NMI involves the overt interference, or jamming, of the human nervous system. Although the Taser X26 can be deployed in the drive stun mode, this delivery method only targets the sensory nervous system for the sole purpose of inducing one's compliance through pain. The NMI inducing advantage of the Taser X26 is achieved through the projection of two metal probes connected to a set of insulated wires.

The probes are fired from a nitrogen-charged cartridge at pre-determined angles, and the angle from which these probes travel outward away from the cartridge are predicated on the particular cartridge's maximum effective range. Each probe's maximum effective contact with the human body is made possible by the sharp, barbed ends found at the end of each probe. Taser produces several cartridges that are coded by their effective ranges and include cartridges of 15 feet, 21 feet, 25 feet and 35 feet (Taser, 2011, p.17).

Upon each probe's contact with the human body, the electrical pulses generated by the Taser ECD impersonate the very electrical signals within the human body that facilitate communication between the brain and the muscles. On the whole, the Taser excites pulsed communication within the human body's nerves and directly interferes with the nervous system's communication pathways (Taser, 2011, p.16). NMI's success can be directly attributed to the interference created within the nerves that stretch from the spinal cord to the muscles, for this interference excites "motor nerves causing uncontrollable muscle contractions that inhibit the affected person's ability to perform coordinated movement" (Taser, 2011, p.17). Simply put, it is this interference that enables a law enforcement officer to gain control of an aggressive individual after deploying a Taser.

Taser's Advantages and Medical Research

As referenced in the introductory section of this paper, police officers maintain an inherent need, at times, to use physical force in order to achieve their mission. Within this inherent need for force, police officers and their administrators must constantly be guided by the fundamental premise that requires all police delivered force to at all times remain the minimum amount of force necessary to bring about a lawful conclusion to the resistance encountered. When considering the totality of a police officer's duty, the deployment of physical force is arguably the primary facet of police work that most often becomes the focus of society's undiscerning eye. Most of those situated outside of the law enforcement community have not developed the overall knowledge necessary to dissect all of the components that culminate within a use of force incident. More importantly, this is complicated by the fact that these types of incidents innately appear unpleasant when viewed by the public, as images from such recordings tend to create a long-lasting impact within the viewer.

During the civil unrest period experienced in the mid 1960's, President Lyndon Johnson formed a blue ribbon commission to examine the methods used by police officers to manage and suppress violence within our country. One of the many recommendations spurred as a result of this commission's work included a request that law enforcement on a broad scale seek new non-lethal methods of responding to acts of violent behavior (Laur, 2000, p.3). Nevertheless, the degree and nature of violence in America forces police officers to respond in kind (IACP, 2000, p.1). Given this nature, deadly force is sometimes the only option available to a police officer. In today's era of policing, police administrators and their officers must rely upon a risk management approach to the use of force that stresses force minimization while optimizing training and equipment.

When developing a risk management approach to the use of police force, administrators must analyze the risk of injury to those affected by the use of physical force. In a general sense, studies have revealed that injuries to suspects resulting from police delivered force occur infrequently and are “relative to the overall number of police-citizen contacts” (Smith et al., 2010, p. 2-3). The 2002 National Survey of Contacts documented by Durose, Schmitt and Langan found that approximately 1.5 percent of the citizens who encountered the police reported that the officers “used or threatened to use force against them”, and 14 percent of these respondents indicated they had sustained an injury (cited in Smith et al., 2010, p.2-3). According to the research conducted by Alpert et al., the cumulative data suggests that most injuries sustained from these types of contacts were minor in nature and consisted of bruising, abrasions, muscle strains and sprains (cited in Smith et al., 2010, p. 2-4).

After analyzing the use of force reports from the Los Angeles Police Department, the data compiled by Meyer clearly demonstrates the deployment of a flashlight as a use of force implement resulted in suspects receiving moderate or major injuries in 80 percent of the analyzed incidents (cited in Smith et al., 2010, p. 2-4). Meyer’s data also revealed that punching suspects resulted in moderate to major injury 64 percent of the time, the deployment of the baton resulted in moderate to major injury 61 percent of the time, and other bodily force resulted in moderate to major injury 46 percent of the time (cited in Smith et al., 2010, p. 2-4). Most importantly, Meyer’s data plainly suggested that deployments of ECD's and chemical irritants yielded no moderate or major injuries to suspects or officers (cited in Smith et al., 2010, p. 2-4). Alpert and Dunham conducted another study in a similar fashion that involved the analysis of data obtained from Miami-Dade. The results of their study revealed the greatest propensity for an officer sustained injury during applications of police force occurred when "officers attempted to subdue a suspect" with a defined level of direct bodily force that included acts of "punching, kicking, take-downs, wrestling and joint locks" (cited in Smith et al., 2010, p. 2-5). Overall, the observed data clearly suggests that officers increase their propensity for injury during use of force incidents that require hand-to-hand combat with suspects.

In addition to the large collection of research material based upon the work of many within the realm of academia, the broad based deployment of ECD's within the law enforcement community has spurred several independent studies conducted by individual law enforcement agencies. Many of these studies targeted the capture of specific data connected to the rates of physical injury during incidents of police use of force. The studies conducted by Austin, Cape Coral, Charolette-Mecklenberg, Cincinnati, Phoenix, South Bend and Topeka police departments analyzed data from incidents of police force prior to their adoption of an ECD force option and contrasted the data against incidents of police force that occurred after the ECD force option was added. The data borne from these studies demonstrates a substantial decline in the rate of officer and suspect injury following the introduction of an ECD force option (cited in Smith et al., 2010, p. 2-8).

When contrasted against the deployment of ECD's, statistics from another study conducted at the Richland County Sheriff's Department revealed the following: "Deputy use of soft hand tactics (joint locks, holding, pushing, etc.) was associated with increased risk of deputy injury, while hard hand tactics (e.g., punching, kicking) were associated with increased risk of suspect injury" (cited in Smith et al., 2010, p. 2-9). Because the Taser provides the officer with an option to deliver the use of force some distance away from the suspect—coupled with the statistical data and the science of NMI cited herein—the force option provided by the Taser in a law enforcement agency's use of force policy can prove to be an invaluable tool in the realm of risk management.

Due in large part to the misguided belief that the Taser shocks people with 50,000 volts of electricity, there have been countless medical studies based upon ECD generated data. The primary focus of many of these medical studies has been centered upon determining whether an ECD exposure induces incidents of ventricular fibrillation within the heart. In an effort to help answer this question, medical researchers conducted a tremendous amount of direct research using sedated dogs or pigs (Smith et al., 2010, p.2-10). In medical studies conducted by Dennis et al., Eqquivel et al., Ho et al., Lakkireddy et al., McDaniel et al., Nanthakumar et al., Roy and Podgorski, Stratbucker et al., and Walter et al., the research found no ventricular fibrillation when using standard electrical discharges of five to fifteen seconds from an ECD (cited in Smith et al., 2010, p. 2-10); however, the studies conducted by Dennis et al., Lakkireddy et al., Stratbucker et al., McDaniel et al., and Walter et al. found elevated levels of electrical discharges from an ECD—fifteen to twenty times the standard—or electrical discharges in excess of two (2) forty second exposures from an ECD caused ventricular fibrillation or an increased heart rhythm in some pigs (cited in Smith et al., 2010, p. 2-9). In the studies conducted by Dennis et al. and Walter et al., exposure to ECD electrical discharges in excess of these periods resulted in ventricular fibrillation induced deaths in three pigs (cited in Smith et al., 2010, p. 2-9).

Medical researchers also conducted numerous medically based studies using healthy humans. In medical studies conducted by Levine et al. (2007), medical researchers "monitored the hearts of 105 police trainees before, during and after exposure to the X26 TASER for approximately 1 to 5 seconds (average=3 seconds)" (cited in Smith et al., 2010, p. 2-11). While these subjects experienced significant increases to their respective heart rates, none of these subjects experienced ventricular fibrillation (cited in Smith et al., 2010, p. 2-11). A medical study conducted by Ho et al. (2008) found medical researchers monitoring the hearts of eighteen volunteer human subjects during a twenty “second exposure from TASER’s new wireless extended Range Electronic Projectile (EXREP)” (cited in Smith et al., 2010, p. 2-11). Much the same as the other study, this study only found increases in the heart rates of the subjects. The conditions of the medical study failed to induce ventricular fibrillation in any of the subjects.

In an effort to imitate the conditions most often found in the field during exposures to ECD, Vike et al. (2007) caused eight human subjects to undergo a five second electrical shock from a Taser X26 following rigorous exercise. For a period of sixty minutes following the delivery of these ECD exposures, the researchers monitored the cardiac functions and blood pressure rates of those who were affected. The researchers found no clinical indicators of variations within the cardiovascular levels of the subjects (cited in Smith et al., 2010, p. 2-12). Ho, Johnson and Dawes (2007) “simulated physiologic states”—including acidosis, exercise induced exhaustion, and alcohol poisoning—in a set of volunteer human subjects; on the whole, the exposures to the Taser X26 failed to negatively impact “blood acidosis levels, respiration, or cardiac function” (cited in Smith et al., 2010, p. 2-12).

The growing controversy regarding ECD deployment caused the American Association of Emergency Medicine to analyze the following "Clinical Practice Statement: What Evaluations are Needed in Emergency Department Patients After a TASER Device Activation?" (Vike, Chan & Bozeman, 2010, ¶ 1). Within their publication, this organization concluded there was no supporting "literature" that indicated "dangerous laboratory abnormalities, physiologic changes or immediate or delayed cardiac ischemia or dysrhythmias after exposure to CEW" (Conducted Energy Weapon) "electrical discharges of up to 15 seconds" (Vike, Chan & Bozeman, 2010, ¶ 9). As a result, this panel further concluded there was no requirement on the part of medical experts to prolong "Emergency Department (ED) observation or hospitalization for ongoing cardiac monitoring after CEW exposure in an otherwise asymptomatic awake and alert patient" (Vike, Chan & Bozeman, 2010, ¶ 9). The panel did indicate, however, that such testing for "cardiac conduction or injury, or other physiological effects of CEW's" may be prudent in the event the patient's medical history indicates cardiac problems or symptoms such as chest pain, "shortness of breath or palpitations suggestive of cardiac" complications, pain that might otherwise indicate muscle strains, or prolonged CEW exposure in excess of fifteen seconds (Vike, Chan & Bozeman, 2010, ¶ 10). This panel's published opinion would certainly suggest that an ECD exposure by itself—for periods of fifteen seconds or less—is not likely to induce ventricular fibrillation or any other cardiac irregularity; however, ECD exposures in excess of the fifteen second window could certainly induce medical problems.

Although the available medical research regarding the deployment of ECD's seems to suggest that these implements of force are relatively safe, medical researchers are quick to mention that ECD deployments do not come without risk. Researchers Strote & Hudson (2008) "point out that ECD's may cause physiologic and metabolic changes that are clinically insignificant in healthy individuals but that could be harmful or even life-threatening in at-rick populations (e.g., obese subjects with heart disease and/or intoxicated on drugs who struggle with police" (cited in Smith et al., 2010, p. 2-12).

Taser Policy and Training Considerations

The pervasive nature of cell phones, cameras and social media within our culture frequently places police officers and their conduct while engaged in incidents of force under increasing scrutiny. The problem with this type of post-incident scrutiny is simple: taken on their face value, most use of force incidents have an unpleasant appearance when viewed by the public's undiscerning eye on a video recording. This does not often bode well for police officers who become ensnared within this post-incident scrutiny that, quite frankly, often becomes the irrational basis of stressful internal affairs investigations and cost prohibitive lawsuits. In an effort to combat this persistent risk, it is imperative for law enforcement administrators and their supervisors to closely examine their agency's use of force policy to ensure it contains the elements that provide the officers within their agency the guidance they need and the essential safeguards necessary to withstand court scrutiny. In addition, when deploying ECD's within their respective use of force continuums, agencies must ensure their policies are supported by a well documented training program.

According to Bell et al. (2001), the sheer number of court decisions, coupled with the "litigious contemporary society" and a movement that holds "public officials more accountable for their actions", is primarily responsible for the increased number of court actions brought against police officers (cited in FBI Law Enforcement Bulletin, 2005, p.25). According to the Center for State Courts, Ostrom, Kauder and LaFountain (2001) determined the "number of lawsuits filed nationally increased 40 percent in some courts and 21 percent in others" between the years 1984 and 2000 (cited in FBI Law Enforcement Bulletin, 2005, p.25). The statistics clearly reveal that increased standards of accountability and an increased eagerness on the part of society to bring civil action against police officers can be directly connected to the overall growth of this trend within our society (FBI Law Enforcement Bulletin, 2005, p.25). In light of this trend, law enforcement agencies should refrain from deploying an ECD unless the weapon is integrated with a camera capable of recording each and every deployment to include the date, time, and length of each independent electronic cycle. Every use of force policy should include specific language that defines the frequency in which the recorded files are downloaded for evidentiary storage.

First and foremost, all agencies should adopt a philosophy within their respective use of force policy that clearly places the value of human life above all other functions. When addressing less than lethal force options, every use of force policy must clearly establish the type and degree of force available to police officers to overcome a level of resistance (Texarkana Police Department, 2011, p.2). More importantly, use of force policies and procedures must be comprehensive, as law enforcement administrators need to integrate well-formed “training curricula” for ECD deployment into the “agency’s overall use of force policy” (PERF, 2011, p.17). Additionally, law enforcement administrators should introduce “scenario and judgment based training that recognizes the limitations” of ECD deployment while providing the proper knowledge needed for their “personnel to be prepared to transition to another force option” when necessary (PERF, 2011, p.18).

In order to accomplish lawful objectives, police officers must understand they may only use the type and degree of force necessary based upon the circumstances available to the officer at the time the decision to use force is made. As stated earlier within this text, officers will inevitably be required to use force during the course of their duties; moreover, the level of force needed to bring about a lawful conclusion to any use of force incident must always be based upon several factors that work to influence every officer in an independent manner. Every use of force policy should clearly delineate all levels of resistance likely to be encountered by officers and then connect each level of resistance with an acceptable force option. The levels of resistance—which are listed in ascending order—include the following: psychological intimidation; verbal non-compliance; passive resistance; defensive resistance; active aggression; and aggravated active aggression (Texarkana Police Department, 2011, p.3).

Since the inception of the ECD's broad based deployment in the law enforcement community, a huge amount of debate has surrounded the classification levels of resistance in order to determine which specific level of resistance satisfies the objective reasonableness threshold for an ECD deployment. Much of this debate has been addressed in a host of court decisions, and these court decisions must remain the basis that governs all incidents of force. In *Scott v. Harris*, the court determined one of the key factors in "judging whether an officer's actions were reasonable" included a consideration of "the risk of bodily harm" the officer's actions "posed to the suspect in light of the threat to the public the officer was trying to eliminate" (*Scott v. Harris*, 2008).

Graham v. Connor was the landmark decision that projected an objective reasonableness standard in all use of force incidents, and the court established a set of key factors that must be utilized to determine the reasonableness of all use of force incidents: the severity of the crime at issue; whether the suspect poses an immediate threat to the safety of the officers or others; whether the suspect is actively resisting arrest or attempting to evade arrest by flight; and split-second judgments that are tense, uncertain, and rapidly evolving about the amount of force necessary in a particular situation (*Graham v. Connor*, 1989). In Smith v. City of Hemet, a U.S. Federal Court in the 9th Circuit determined "the availability of alternative methods of capturing or subduing a suspect" could also be considered in determining the reasonableness of a use of force incident (*Smith v. City of Hemet*, 2005). Another important court decision involving the use of police force can be found in *Deorle v. Rutherford*. In this case, the court determined it may "consider what officers know about the suspect's health, mental condition or other relevant frailties" when analyzing the reasonableness of the officer's actions; in addition, when considering the specific language "immediate threat" versus "possible threat" cited within the *Graham* decision, the court concluded that "a simple statement by an officer that he fears for his safety or the safety of others is not enough; there must be objective factors to justify such a concern" (Deorle v. Rutherford, 2001).

In the Police Executive Research Forum's 2011 Electronic Control Weapons Guidelines, PERF determined that most law enforcement agencies placed their ECD's "in the intermediate range" on their agency's use of force continuum at a point "either equal to or just below chemical incapacitants, chemical/kinetic hybrids, and strike batons" (p.26). PERF's 2011 research indicated a "significant majority" of law enforcement agencies authorized the deployment of ECD's "when officers encountered active resistance (80%) or aggressive resistance (91%)" (p.26).

When considering the deployment of ECD's, the research—as well as the vast array of court rendered use of force criteria—clearly supports the adoption of a use of force policy that limits the deployment of ECD's on those suspects who are, at a minimum, displaying acts of defensive resistance. Table 4 depicts a use of force continuum containing a Taser as a force option. While many police agencies today are trending away from use of force continuums, those departments that continue to operate within the confines of such a continuum should place ECD deployments equal to or just beyond the use of chemical irritants. An example of the various levels of resistance and their definitions can be found in Table 3. These levels of resistance begin at the stage of

Levels of Resistance	
Psychological Intimidation	**Non-verbal clues indicating subject's attitude, appearance and physical readiness**
Verbal Non-Compliance	**Verbal responses indicating belligerent unwillingness or threats**
Passive Resistance	**Physical actions of the subject that do not prevent the officer's attempt of control**
Defensive Resistance	**Physical actions which attempt to prevent the officer's control but never attempt to harm the officer.**
Active Aggression	**Actions indicating intent to cause harm or disregard for the officer's safety.**
Aggravated Active Aggression	**A physical assault and/or the use of deadly force.**

Table 3 Source: TAPD, 2011, P. 3

Use of Force Continuum	
Level 1	**Command Presence—An officer's presence and identification of authority.**
Level 2	**Verbal Direction—Verbal directions or voice commands.**
Level 3	**Aerosol spray weapons that contain OC or OC/CS; chemical irritants**
Level 4	**Electronic Control Device (Taser), soft hands techniques, joint manipulations, takedowns and/or control techniques (physical strength and skill) and police canines.**
Level 5	**Intermediate weapons—SIMS, expandable ASP baton, riot baton, flashlight, hand deployed specialty munitions, compressed air operated chemical irritant weapon (non-lethal areas)**
Level 6	**Deadly Force—Use of firearms or other weapons in a reasonable manner and in accordance with Department policy and state law.**

Table 4 Source: TAPD, 2011, P. 3

psychological intimidation and extend to the degree of aggravated active aggression. The defensive resistance category—which is highlighted in red—arguably represents the desired level at which proper and justified Taser deployment should be considered by all law enforcement administrators.

According to PERF's 2011 published guidelines, ECD's should only be deployed on those "subjects who are exhibiting active aggression or who are actively resisting in a manner that, in the officer's judgment, is likely to result in injuries to themselves or others" (p.20). In addition, these guidelines clearly suggest that the act of fleeing "should not be the sole justification" for an ECD deployment; instead, PERF cites some of the key points in *Graham v. Connor* by asserting officers should "consider the severity of the offense, the suspect's threat level to others, and the risk of serious injury to the subject before deciding" to deploy an ECD against a fleeing suspect (2011, P.20).

Law enforcement administrators and policy makers who categorically justify the deployment of the Taser at the level of passive resistance create an extremely risky environment for their respective officers; moreover, such a policy could easily result in a department being forced to defend itself against a claim of deliberate indifference. A relatively recent U.S. Court of Appeals case in the 8th Circuit addressed this very issue. In Brown v. City of Golden Valley, the court applied the tenets of the *Graham* decision when considering the reasonableness of a Taser deployment. The facts of the case involve a female passenger of a vehicle who refused to obey a police officer's commands to end a cell phone conversation with a police dispatcher. The female—who was exhibiting acts of passive resistance and general disobedience towards the officer—refused these demands, and as a response, the officer deployed a Taser against the woman in the drive stun mode. When the court evaluated the facts of this case, the court entered the following statement:

> We evaluate the reasonableness of an officer's use of force "from the perspective of a reasonable officer on the scene, rather than with the 20/20 vision of hindsight." Graham, 490 U.S. at 396. This calculus allows "for the fact that police officers are often forced to make split-second decisions—in circumstances that are tense, uncertain, and rapidly evolving—about the amount of force that is necessary in a particular situation." Id. at 397. The reasonableness inquiry, however, is an objective one: "the question is whether the officers' actions are 'objectively reasonable' in light of the facts and circumstances confronting them." Id. Circumstances relevant to the reasonableness of the officer's conduct include "the severity of the crime at issue, whether the suspect poses an immediate threat to the safety of the officers or others, and whether he is actively resisting arrest or attempting to evade arrest by flight." Id. at 396; see also Howard v. Kansas City Police Dep't, No. 08-2448, 2009 WL 1885495 at *3 (8th Cir. July 2, 2009). (*Brown v. City of Golden Valley*, 2009).

The court concluded they were "not convinced" the officer's "use of force was objectionably reasonable as a matter of law" and cited their assertion that the plaintiff's "conduct did not amount to a severe or violent crime”; furthermore; the court concluded the plaintiff “posed at most a minimal safety threat to” the officers involved “and was not actively resisting or attempting to flee” (*Brown v. City of Golden Valley*, 2009). The court also concluded the circumstances of this incident could not “fairly be described as constituting a ‘tense, uncertain and rapidly evolving’ situation” (*Brown v. City of Golden Valley*, 2009).

All police personnel should be trained to deploy the Taser for “one standard” five-second cycle and then “evaluate the situation to determine if subsequent cycles are necessary” (PERF, 2011, P. 18). PERF’s guidelines continue by asserting “training protocols should emphasize that multiple applications or continuous cycling” of an ECD resulting in exposures that cumulatively exceed fifteen seconds “may increase the risk of serious injury or death and should be avoided” (2011, P.18). Because of the heightened risk associated with continuous or repeated ECD exposures, law enforcement administrators should strongly consider limiting all ECD deployments to a maximum of three, five-second cycles. After delivering three cycles from an ECD, officers should be trained to transition to another force option. Police officers need to be mindful of the fact that each and every ECD cycle—also referred to as a trigger pull—is a separate and independent use of force iteration that must withstand the reasonableness doctrine as outlined within *Graham*.

Another important training topic includes officers applying handcuffs simultaneous to the delivery of an ECD cycle. This, of course, involves a secondary officer who should be designated as the handcuffing officer. Applying handcuffs while the ECD is under power helps to limit the number of ECD cycles delivered to the subject while ensuring maximum safety to the officers involved in the subject's apprehension.

Within their published guidelines, PERF also recommends that every use of force policy should "discourage" the deployment of an ECD in the drive stun mode (2011, p.19). As mentioned earlier in this text, the drive stun mode only involves the excitement of the sensory nervous system whose targeted effect is nothing more than pain compliance. Some of the research has shown this pain compliance technique does little more than aggravate an already uncontrollable person which could progress into additional amounts of applied force. Unless exigent circumstances are presented to the officer, the deployment of the ECD in the drive stun mode should be greatly discouraged. In general, the deployment of the Taser X26 in the drive stun mode should be reserved for the following conditions: following a probe release, one of the two probes is rendered ineffective, and the officer must re-establish the ECD's circuit for effective NMI induction; or during those instances in which the officer is in close quarters, and for safety reasons, the officer must either protect themselves or create distance away from the threat.

Some medical research has concluded that one of the factors influencing ventricular fibrillation induction following an ECD exposure is directly correlated to the linear distance between the imbedded ECD probe and the subject's heart. To combat this potential issue, law enforcement agencies should adjust their preferred ECD target locations within their use of force policy. For example, when an officer perceives the likelihood of an ECD deployment—and when the officer is afforded an advanced opportunity—the officer should position himself in a manner that affords the region surrounding the suspect's upper back area as the target area for deployment, as this should be the preferred target location. Should the officer encounter a situation that necessitates the quick deployment of an ECD, and the only available target area afforded by the suspect consists of the suspect's frontal silhouette, the officer deploying the TASER should aim a few inches below a horizontal line that extends across the suspect's breast line. The lowered, frontal target area is preferred when confronted with a frontal silhouette, as it will also reduce the potential for injury to the regions that encompass the head, face, neck and breasts.

All subjects who have been exposed to an ECD should receive a medical evaluation by "emergency medical responders in the field or at a medical facility" (PERF, 2011, P.21). All subjects who have undergone an ECD exposure lasting longer than fifteen seconds should be transported to a medical facility for evaluation. On the whole, all subjects who have undergone an ECD exposure should at all times be continuously monitored while in police custody. It is highly recommended police administrators develop an ECD protocol that incorporates notifications to jail personnel whenever the incarceration of any subject involves the deployment of an ECD during the arrest.

Conclusion

The law enforcement community's mission is vast, and America's social order is becoming more complex, dangerous and violent as time progresses. In order to better meet the threats of today's society, law enforcement agencies must remain poised to address the criminal element in society. Police officers must periodically use force during the pursuit of their mission, and technology has answered the call.

Electronic control devices have provided another layer to the use of force options available today. These devices rely upon the science of conductive energy to temporarily incapacitate threatening or disruptive people. While these devices are not considered one-hundred percent safe, the vast array of the scientific material available—which includes medical studies—has concluded these devices are safe enough to deploy in the field. When deployed in accordance with proper training and concrete fundamental guidelines, the benefits associated with ECD deployment clearly out-weigh the relevant amount of danger to those who become the target of an ECD deployment.

One of the most misunderstood fundamentals of an ECD's interaction with the human body is the misguided belief the Taser shoots 50,000 volts of electricity into the unfortunate person on the receiving end. This is simply not true. As stated earlier in this text, the beauty of the Taser is not it connected to its absolute electrical output; instead, the Taser's effective nature is connected to the manner in which its electrical pulses are distributed. When considering the science of electricity, the measure of voltage is always connected to pressure, and the measure of amperage is always connected to the current's rate of delivery. A good analogy can be found when considering the degree of saturation a person experiences when found in a rain storm without an umbrella: the degree of saturation on one's clothing is not dependent upon the cumulative volume of water contained in the storm, it is instead dependent upon how many rain drops strike the individual's clothing. The 50,000 volts of electrical pressure is necessary to propel the electrical pulses some distance away from the Taser; however, as demonstrated in this text, the Taser electrical pulses produce less than an already meager .004 amperes.

A huge percentage of law enforcement agencies in this country have already incorporated ECD's into their use of force protocol. Law enforcement administrators whose agencies have not moved in this direction should strongly consider implementing an ECD force option. Every agency's ECD protocol must be completely supported by good training and a well-developed policy that contains specific guidelines governing all ECD deployments. Administrators must ensure the guidelines used to formulate their respective ECD policy originate from scientifically validated medical and technical publications obtained from credible sources. A failure on the part of administrators to use such information in the formulation of their policies could prove very problematic and extremely costly.

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