

**“LESS-LETHAL FORCE”  
A NEEDS BASED STUDY OF THE OPTIONS  
E.M.U. SCHOOL OF POLICE STAFF AND COMMAND**

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An applied research project submitted to the Department of Interdisciplinary Technology  
as part of the School of Police Staff and Command Program

September 20, 2002

## ABSTRACT

In 1985, the Supreme Court Of the United States limited the ability to use deadly force to apprehend criminals. This started a movement in Law Enforcement to attempt to find an alternative weapon to the firearm to deal with lethal force incidents. The National Institute Of Justice (NIJ) has since worked diligently in attempt to come up with options that police can use in lieu of deadly force. This has produced several new weapons and tactics that are commonly referred to as “Less-Lethal” or “Less-than-Lethal” force options. These are tools, that when used against suspects, have a much lower chance of causing serious injury or death. To this date, the technology does not exist in LLF options that would replace the firearm in all cases, in particular, cases where suspects are armed with firearms. There does appear to be a need for LLF options in certain specific cases or incidents where suspects pose no imminent threat to the officer or bystanders but where action to apprehend the suspect is needed. “Suicide By Cop” is a phenomenon that in some cases lends itself to the use of LLF options. Other incidents where suspects are armed with edged or blunt weapons and are contained are another example that begs for a LLF option other than deadly force.

If these cases illustrate the need, then which option, out of the many that have been developed by the NIJ and others, is best suited to meet the challenge? Many other studies have either looked at all options comparing them in an attempt to find one best suited for all deadly force cases. Others have studied LLF options to see if they were applicable to other specific needs such as use on commercial aircraft.

This research paper first looks at the needs of the Brownstown Police Department by looking at several actual incidents where LLF options would have been better suited than

current weapons. An ideal model based on these cases was created and current available LLF options were then compared to this model in attempt to find the one closest to the ideal model. Options that are still in production or found not safe or economical were eliminated from the study.

The outcome of this comparison study showed that the LLF option best suited for the Brownstown Police Department or similar agencies is the category called “Impact Projectiles”. Recommendations are included to further study this category to determine the best “Impact Projectile” weapon system for the agency.

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## INTRODUCTION

The scenario: the police are called to a man with a knife that is threatening suicide in a public park. The police arrive and confront the subject. The person is telling the officers he just wants to die. He tells them he didn't come there to hurt anyone else but if they try to stop him he will do what it takes to keep them away. The park is busy and people are in the vicinity. What do the police do? The well-known reactionary gap for a person with an edged weapon is 21 feet. This person is a definite threat to himself and possibly to citizens in the area. Can the police walk away and leave this person alone? Should they try to approach the person and attempt to disarm him? Should they use lethal force on this person?

Although this is just a scenario, these types of incidents happen in law enforcement too often and illustrate the need for additional tools and tactics to bridge the gap between current intermediate weapons, which require close contact with the suspect, and lethal force. These types of incidents have had police searching for many years to come up with alternatives to current options. This search, and the products of it, has brought to law enforcement what is commonly called "Less Lethal Force Options". These are weapons or tactics that will have a much-reduced chance of causing death when they are deployed. This paper will study the seriousness of the need for less lethal force (LLF) options and will then compare the different options currently available. This comparison will be used in an attempt to find an option that will best suit the needs of modern law enforcement and in particular, the Brownstown Police Department which does not currently utilize any LLF options with the exception of pepper spray (Oleoresin Capsicum). The focus will be on those options that can be effectively deployed at distances that enhance officer and

suspect safety. The question we will attempt to answer is twofold. First: Is there a need for LLF options in modern law enforcement and in particular the Brownstown Police Department? Second: If the need exists, what options are best suited to this agency?

### **BACKGROUND AND SIGNIFICANCE**

In 1985 the U.S. Supreme Court held in *Tennessee v. Garner* (471 U.S. 1 [1985]) limited the police use of deadly force to apprehend fleeing felons. This decision may have started the quest for LLF options. Lois Pilant (1994) reported in *The Journal* that the National Institute Of Justice (NIJ) took on the responsibility of researching alternatives to deadly force after a conference from Attorney General Edwin Meese. The NIJ has continued to research and evaluate many different alternatives to deadly force, some of which are currently used by law enforcement. The most common example is chemical incapacitants. Since *Tennessee v. Garner*, several high profile cases have fueled the LLF fire including Rodney King and, closer to home, Malice Green.

A phenomenon has also appeared that seems to fuel the quest for effective LLF even more. This phenomenon is commonly referred to as “Suicide By Cop” or “Victim Precipitated Homicide”. This occurs when a person threatens police or others in an attempt to force the police to take their life. Although the reasons why this happens is unclear, studies indicate that not only is “Suicide by Cop” real, but also happens quite often.

As these changes have occurred, the public has become more critical of the way police deal with armed individuals. This turn has forced a change in the way police handle these situations. The NIJ has continued to research, test and evaluate many different types of

alternatives to deadly force, which has provided law enforcement many options to choose from. With these options comes the responsibility of modern police agencies to look at the options in an attempt implement some type of Less Lethal program suited for their own use. As more agencies take on this responsibility and the general public becomes more aware of options available, it is inevitable that the public will become even more critical of agencies that continue to make lethal force their only option.

## **INVESTIGATING THE NEED**

### **Suicide by Cop**

H. Range Hutson MD, Research Director for the Harvard Medical School conducted a study, which examined the suicide by cop phenomenon the findings of which were published in the *Annals Of Emergency Medicine* December 1998. He looked at all of the 437 officer involved shootings that were investigated by the Los Angeles County Sheriffs Office from 1987 to 1997. The findings of this study were startling. Hutson (1998) found that 11% of officer involved shootings and 13% of justifiable homicides by police could be considered suicide by cop (p. 665). Hutson (1998) also reported that knives were used as weapons in 32.6% of the suicide by cop cases and blunt objects in 2.2% of the cases. He also notes that in 65.2% of the cases, the individual only threatened the police and not the public and 56.5% of the cases occurred out in a public place (p. 667).

### **Case Studies**

The following are summaries of actual incidents compiled from police reports from the Brownstown Police Department and interviews with officers involved:

Incident #1, January 1999: Police are called to a boat launch at a State Game Area in reference to a man with a knife. At the scene, the 47-year-old man is found standing at the edge of a dock holding a knife. Distraught and depressed over a recent divorce, he is threatening to stab himself and jump into the river. He begins to beg officers to shoot him and holds police at bay for about 30 minutes at which time he throws the knife in the river and surrenders (Brownstown Police Report, January 1999).

Incident #2, March 1999: Police are called to a housing complex in reference to glass breaking and a woman screaming for help. A crying female meets officers at the front porch. Before they can find out the problem, a subject inside chops out a front screen window and meets them on the porch wielding a machete over his head. He yells that he is going to kill the officers and charges at them from the porch. While charging he repeatedly yells at the police to shoot him stating he will kill them if they don't. Officers are backed from the porch to their patrol vehicles while letting the subject get well within the 21-foot reactionary gap for edged weapons. As he approaches within feet of a retreating officer, another sprays him with pepper spray, which causes him to charge toward the spraying officer. He retreats back into the house eventually surrendering after a long negotiation (Brownstown police reports, March 1999).

Incident #3, April 2001: Police respond to an apartment complex for a domestic dispute. Upon arrival they find the apartment heavily damaged with several broken windows and furniture in disarray. The investigation leads them to the upstairs where they are met by the boyfriend of the victim who is holding a large piece of broken glass like a knife. He

threatens the officers with the glass and then uses it to slash his own wrist. He will not drop the glass even after he is ordered to do so at gunpoint. He is subsequently sprayed with pepper spray and tackled by the officers who disarm him and take him into custody (Brownstown police reports, April 2001).

Incident #4, March 2002: Police respond to a housing complex where a juvenile subject has slit his wrists and ran from the area. At the scene they find that the subject has now returned and is inside the residence. They confront him inside where he is found holding a knife and a razor blade. The subject says he wants to die but eventually is talked into giving up the knife and razor blade and surrenders (Brownstown police reports, March 2002).

Incident #5, April 2002: Police respond to the same location as described above for the same subject who is again threatening suicide this time with a razor blade. Officers confront the subject who threatens to slit their throats if they try to approach. After locking himself in a bathroom, he is talked into the next room where after being pepper sprayed, he is tackled by a waiting officer who surprises him (Brownstown police reports, April 2002).

The evidence found in the suicide by cop study indicates that at least in the Los Angeles Sheriffs Office area, the problem is a real one that occurs more often than expected. An examination of the Brownstown case studies indicates that the problem does exist here as well. In all of the Brownstown cases looked at, some type of edged weapon was used. In

3 of the five cases officers used some type of close range tactics on the subject, which caused them to breach the 21-foot reactionary gap to deploy it. In 4 of the five cases the officers were within the 21-foot reactionary gap either to negotiate or deploy tactics. In two of the cases, officers were forced to use hand-to-hand tactics to disarm and secure the subject. It appears through an examination of these cases that officers chose not to use deadly force where they may have been justified in doing so. One factor in this decision had to have been the fact that they had no alternative that could be safely deployed at a distance. The decision to not use deadly force certainly affected a better outcome for the subject but put the officers in jeopardy.

### **LITERATURE REVIEW**

The quest for LLF options has lead to different writings on the subject. A review of some of these writings is in order to establish why this paper focuses on certain options and not others. Many LLF options have either been found to be impractical, don't work, are not lawful in Michigan or haven't been fully developed or studied enough to make them feasible.

Acting Staff Sergeant Peter D. Button of the Metropolitan Toronto Police Service looked at this topic in his Thesis titled *Less-Lethal Force Technology*, which is a study of LLF options available. This was an attempt to find options that could be carried by first line officers to be utilized in lieu of the firearm in response to deadly force situations. Button (1997) concluded that there is no ideal LLF option that can replace the firearm in response to all lethal force encounters but rather can only be useful as a supplement in certain cases where the time and situation allows for deployment (p. 74). Button looked

at all options that were currently available to law enforcement and some that were in development. His conclusion mirrors what another text on deadly force had to say about the issue as well. Button quotes the following from the 1992 work of William Geller and Michael Scott in their book title *Deadly Force: What We Know*,

It was tempting then, and remains so now, to hope for technological and scientific solutions to human problems, whether hunger, poverty, disease, or violence. Technology and science may eventually provide police with a tool that nonviolently and instantly immobilizes adversaries-like the “phasers” or ray guns of science fiction fame. In the near term, however, less-lethal devices clearly have been conceived as supplements to, rather than substitutes for, firearms..... At the same time, all who advocate the merits of less-lethal weapons readily acknowledge that some encounters are life and death struggles calling for the prompt and decisive use of deadly force. (Geller and Scott, 1992a, p. 358)

More recently, Sarah V. Hart, Director of the National Institute of Justice (NIJ) reported on May 2, 2002 about the recent work of NIJ on LLF options during her *Statement Before The Subcommittee On Aviation, Committee On Transportation And Infrastructure, U.S. House Of Representatives*. Hart was reporting on LLF with regards to its use on U.S. aircraft in the wake of the September 11<sup>th</sup> attacks.

Hart (2002) reported that currently there are six categories of LLF weapons; electric shock, chemical, impact projectile, physical restraint, light and acoustic. She compared each category in an effort to find if there was one option that was suited for use on commercial aircraft in the event of a hijacking. Hart concluded that electrical shock weapons showed the most promise for use on airplanes but much more work was needed to determine if this weapon would be safe to utilize around the very intricate electronics found on commercial aircraft.

This paper will explore these options in a different light. Button looked at LLF from the standpoint of replacing the firearm in all lethal force encounters. Hart focused on the use

on commercial aircraft while reporting on NIJ work on LLF. Unlike Button, this paper will work on the premise that there is no LLF replacement currently for the firearm when police are faced with most lethal force situations, instead, there is a specific need for LLF in some limited situations. These situations were explored earlier when we looked at suicide by cop and the specific cases where police encountered edged weapons. We will compare the same options that Button and Hart both outlined but we will look at it from the point of view of finding the right LLF weapon that can be utilized by the patrol officer in these very specific situations. Hart's report was similar in narrowing the focus to a specific type of incident, but we will not look at the need for its use on aircraft since Brownstown does not have any airports within its jurisdiction.

## **PROCEDURES**

The procedures used in this comparative study was to first establish performance standards that each LLF option must meet to be effective for the specific need that we have already outlined. These standards were used to prepare an ideal model of what is expected from the LLF weapon. Next, a list was made of all current options using the previous studies and NIJ reports on available LLF weapons. We then eliminated those options that were not feasible due to legal, safety or economical reasons etc. The remaining options were then compared to the ideal model to determine which best suits the needs of the Brownstown Police Department with regards to dealing with incidents such as the ones that were discussed earlier. The comparison was made by taking each remaining LLF option and assigning a score of 1-5 for each of the seven qualities that were built into the ideal LLF model then totaling these numbers for a combined score.

The score will range from a “0” being no match to a “5” being an exact match. Each category is to be added up for a total score. The highest score would theoretically represent the LLF option closest to the ideal model.

### **The Ideal Less Lethal Force Model**

To build the ideal LLF model we must look at the need. The ideal LLF must possess certain qualities. A review of the need provides the following: First the type of adversary must be looked at as well as the weapon possessed. We should immediately eliminate firearms from the list of weapons that we could consider using LLF against. Firearms would require that the LLF option be able to immediately incapacitate the subject and also be able to be deployed within a split second such as the current service revolver.

Since the earlier stated literature review indicated that there is no current replacement for the service firearm, we will not include this as part of our needs assessment. This would leave adversaries armed with other weapons that have life threatening potential. The best example is an edged weapon for example; a knife, razor or other sharp object capable of cutting or stabbing. Other weapons would include; blunt objects, baseball bats, tire irons, boards etc. The next consideration should be the reaction time. How much time does the officer have to respond to the threat. Is the subject attempting to assault the officer or other or is he just keeping them at bay? Does the officer have time to obtain and deploy some type of LLF option? The specific incident type used is one that includes edged or blunt weapons, the subject is not immediately attempting to attack the officer or other person and the officer has the time to deploy some type of LLF option. The officer must be able to stay outside the reactionary gap as well. The reactionary gap for edged weapons is well known in law enforcement and defensive tactics circles to be 21 feet.

This is the minimum distance that an officer should be to subjects armed with edged or blunt weapons that allows the officer to have time to draw and fire his service weapon.

If we use the above criteria for our model incident to design our model LLF option, the following is what is required of the LLF option to be effective:

1. **Deployment distance:** It must be able to be deployed at distances greater than 21 feet (beyond the reactionary gap).
2. **Incapacitation:** It must be able to incapacitate the subject long enough for the officer to approach to deploy follow up control and secure the person.
3. **Effectiveness:** It must have a high probability of incapacitation with one deployment.
4. **Injury factor:** It must have a low probability of causing serious injury or death.
5. **Target specificity:** It must be target specific (affects only the intended target).
6. **Recovery factor:** The effects must be temporary.
7. **Training / Availability:** Must be able to be deployed with a minimal amount of training and be available to a large number of first responders.

### **Eliminated Less Lethal Force Options**

Although a long list of LLF options currently exists, some are just not feasible to the average police department for a list of reasons. Because of this, several options were not considered for this study.

With regards to the whole host of electronic devices such as “tasers”, “stun guns” etc., the *Michigan Penal Code* prohibits the use, sale or possession of these devices to any person with the exception of the department of state police who may use them for testing

purposes only (Michigan Penal Code 750.224a). These have not been authorized by the state of Michigan as a legitimate law enforcement tool. For this reason, none of these devices were considered. Currently there are no agencies in Michigan using this technology.

Several devices or systems that were looked at were found to be ineffective or unsafe. The NIJ has tested drugs that could be delivered through darts or paintballs fired from launchers. The problem is drugs require dosage proportionate to the individual. Large subjects would obviously require higher doses. Small subjects may be killed or seriously affected by a dose large enough to incapacitate a larger person. Also antidotes would be required to reverse the effects of the drug. The NIJ is also looking at such things as a thermal gun that could raise the body temperature of the subject up to 107 degrees instantaneously which would incapacitate without delay. They are also looking at high intensity lights and acoustic sounds that could incapacitate a subject (Hart, 2002 p. 5,6). These are still in the development stage and therefore are not included in this paper. If we use the NIJ categories of LLF options that are currently available or under development, these eliminated options would fall under the “Electric Shock”, “Light” and “Acoustics” headings.

### **LESS LETHAL FORCE OPTIONS COMPARISON**

Using the NIJ categories to classify LLF options, after we eliminate the earlier listed options these categories remain: 1) Chemical, 2) Impact Projectiles, 3) Physical Restraints. This study will add one category not specified by the NIJ which we will call:

4) combination chemical / impact projectile. The following is a description of each and a comparison to the LLF ideal model.

### **Chemical**

These include the tear gas, pepper sprays that are commonly used in law enforcement.

Hart (2002) did report that there are also some chemicals being developed that would act as an anesthetic or calmative. The effectiveness and safety of these is still being tested (p.4). Because of this, for the purposes of this study we will not include them.

The most common of these chemical options is currently Oleoresin Capsicum (OC), which is more commonly called pepper spray. This chemical is derived from hot pepper plants and works by irritating the mucus membranes and affecting the respiratory system. The delivery of these chemicals is usually in the form of an aerosol spray however, there are delivery systems available that launch the substance contained in a paintball that explodes upon impact. This delivery has a dual effect that may enhance the effectiveness by causing a pain and sometimes stunning upon impact. Because this option utilizes two separate LLF categories, chemical and impact projectiles, we will evaluate this separately.

The following is the comparison to the seven LLF model qualities and related score for chemical LLF options.

- 1. Deployment distance:** Most belt carried OC sprays have an effective distance of about 3-10 feet. Some larger canisters are said to be good for up to 20 feet but are more designed for crowd control. Because these are both within the 21-foot reactionary gap we set for the standard, we will give this LLF option a score of **2**.

- 2. Incapacitation:** Button (1997) compared effective rates from the Metropolitan Toronto Police Service (92%), the Victoria State Police of Australia (90%), the New York City Police Department (90%) and the Las Angeles Police Department (90%) (p. 38). The effects usually last until the subject is decontaminated which is plenty of time for follow up control. It should be noted that on highly motivated or prepared subjects, they might be able to work through the effects. It should also be noted that these are only effective if the target area of the face is hit. Without this, the effects are minimal. If we use these effectiveness rates, and time of effect, the score for incapacitation would be a **3**.
- 3. Effectiveness:** See above #2 for explanation, score is **4**.
- 4. Injury factor:** There have been allegations of deaths caused from the use of chemicals however, Button (1997) reports that out of the studies that have been done, no in custody deaths have been shown to be directly related to the use of OC. Most of these were found to have been caused from a condition known as positional asphyxia (p. 37). Aside from these allegations, OC can normally be used with no lasting ill effects and doesn't normally require medical attention. The score is **4**.
- 5. Target specificity:** Because of it being an aerosol and because of its wide coverage area at longer distances, it is extremely difficult to affect only the intended target. When used in confined areas, it has great potential to have at least a minimal effect on officers in the area and those assigned to follow up control. For these reasons, the score is **1**.
- 6. Recovery factor:** See number 4. Score is **5**.

- 7. Training availability:** Many patrol officers across this country and in others already carry this LLF option and the training required to become proficient is minimal. Because of this the score is **5**.

**Total score=19**

### **Impact Projectiles**

Beanbags and rubber bullets are probably the most common forms of the LLF options under the category impact projectiles. These work by launching a projectile from a platform (usually a 12 gauge shotgun) that strikes the subject causing blunt force trauma that incapacitates the person. Many different versions exist but all work on the same principle of hitting with enough force to incapacitate without penetrating and severely injuring the target. The most common of these is the beanbag round fired from a standard or slightly modified pump action shotgun. Larkin Fourkiller (2002) reported in *Police Magazine* that these rounds range in velocity from 230 to 300 feet per second with an impact energy of 71 to 120 foot-pounds (p. 20). The target areas to hit are similar to those used for impact weapons (baton, riot sticks etc.) which are the muscle groups of the legs. The lower abdomen can also be targeted with extreme caution. The following is how impact projectiles match up against the ideal model:

- 1. Deployment distance:** According to Fourkiller (2002) the effective range of these devices ranges from 45 feet at the low end to 100 feet at the high end (p. 24). These effective ranges put the officer well outside of the 21 foot reactionary gap giving the score of **5**.

- 2. Incapacitation:** Properly placed rounds have been reported to be highly effective in incapacitating subjects. This affect normally lasts at least several seconds. This is all that should be needed for officers to move in for follow up control. The score is **4**.
- 3. Effectiveness:** As noted in number 2 above, the properly placed rounds have a high probability of being effective on the first deployment. This is due to many factors. The pain caused by an impact of one of these projectiles and the blunt trauma is significant. On top of this, there is a psychological factor to consider. Since many of these projectiles are launched from platforms that could be perceived to be deadly weapons, many subjects think they have been shot and may react accordingly by giving up. Because of these factors, the score is **4**.
- 4. Injury factor:** There have been 12 deaths related to impact projectiles. Many of these were do to improper targets being struck such as the head or chest. Another problem has been that the square type beanbags that were commonly used didn't open up enough when fired at very close ranges, which in turn inhibited the projectiles ability to distribute the kinetic energy over a big enough area to deter penetration. Better-designed projectiles and training in the proper target areas should reduce this area of risk. Most cases do not involve death (death has only occurred in 1% of the cases) but rather involve bruising or abrasions and most people fully recover from these injuries. When compared to lethal force in these cases, we would have to give the score of **4**.
- 5. Target specificity:** The nature of the option makes this option very target specific. Not only are they able to be deployed at longer ranges, they can target

- specific body parts with much consistency. The effect on non-targeted bystanders and assisting officers is nil. The score is **5**.
- 6. Recovery factor:** Most policies will mandate medical treatment anytime impact projectiles are deployed however; the effects are very temporary most of the time. Score **4**.
- 7. Training / Availability:** When you look at the fact that most police academies train recruits in the use of the 12 gauge shotgun and that most police agencies still utilize the 12 gauge pump shotgun in normal patrol practices, training the officer in its use would be conducted with ease. The training in the proper target zones of the human body and the proper times to deploy and use these weapons would be the only restraint on the agency. Much of this training will be required regardless of the LLF option chosen. For these reasons, the score will be **4**.

**Total score=30**

### **Physical Restraints**

Many of the physical restraints that the NIJ includes in this category are eliminated such as sticky foam. This product is still in the development stages do to a lack of an antidote that can reduce and remove the foam after the incident without harming the subject.

Others are not included for safety concerns. These are the normal restraining devices such as handcuffs. These are more for follow up control and should never be used as the primary tool in cases involving armed individuals for obvious reasons. The only remaining LLF tool that can be evaluated under this type of category is the capture net.

This is a net that can be launched from a firearm-like platform that surrounds the subject preventing movement and escape. We will compare this tool to the ideal model.

- 1. Deployment distance:** These nets can be deployed at distances at least equal to the 21-foot reactionary gap. For this reason the score is **5**.
- 2. Incapacitation:** Since these nets don't incapacitate but only contain the suspect it can be expected that at least in the case of a suicidal individual, they would still be able to carry out the threat of harming themselves. They could also still stab through the net at approaching officers who attempt to further restrain them. For these reasons, the score will be **2**.
- 3. Effectiveness:** For the same reasons listed in number 2, the score will be **2**.
- 4. Injury factor:** Minimal injuries occur from the launching of the net but it needs to be noted that since incapacitation is minimal at best, the risk of injuries upon attempting follow up control would tend to be higher to both the subject and the officer. The score is **3**.
- 5. Target specificity:** If the target person is alone, the problem of target specificity is not a factor. However, if others such as a hostage are involved, target specificity is not possible if the other person is in close proximity of the target. The score is **3**.
- 6. Recovery factor:** Since there is no incapacitation of the subject, there is no recover factor to be concerned with. Score is **5**.
- 7. Training / Availability:** These devices are very cumbersome, expensive and difficult to deploy. They appear to require extensive specialized training that

would be expensive do to the cost of launching the net over and over. This cost factor would likely reduce the availability to the road officer. The score will be **2**.

**Total score=22**

### **Combination Chemical / Impact Projectile**

These are very specialized weapons that utilize qualities from each of two other categories that have already been discussed. These are chemicals and impact projectiles.

These are weapons that fire or launch a paintball like projectile that is not filled with paint but rather contains OC that breaks upon impact causing the effects of both the impact (too a much less degree) and the OC. Following is the comparison to the ideal LLF model:

- 1. Deployment distance:** These can be deployed at distances greater than the 21-foot reactionary gap although the accuracy hasn't been established. The score is **4**.
- 2. Incapacitation:** With both chemical and impact effects at work, we could safely score this one at **4**.
- 3. Effectiveness:** The effectiveness has been stated above however it should be noted with regards to the need for multiple rounds that the manufacturers of these devices advise that these are most effective when multiple projectiles are fired at the subject. The kinetic energy disbursed by these projectiles is substantially less at about 25 foot-pounds. The score will be **3**.
- 4. Injury factor:** Because of the lower kinetic energy and the documented safe affects of OC, the score would be **4**.

5. **Target specificity:** The projectile can be launched accurately only impacting the intended target however, the residual effect of the OC after impact would pose the same problems as chemicals with others in close proximity to the target. The score is **3**.
6. **Recovery factor:** Similar to those discussed in the chemical comparison, the score is **5**.
7. **Training / Availability:** These weapons will require more training than those of both the chemical option and the impact projectile simply because it is a different weapon system than most officers have been trained on. Training will be necessary in the effects of both impact injuries as well as the effects of OC and the decontamination process. The score is **3**.

**Total score=26**

## **RESULTS**

When comparing the results of the comparison to the ideal model, they rank from highest to lowest as follows:

**Impact projectiles=30**

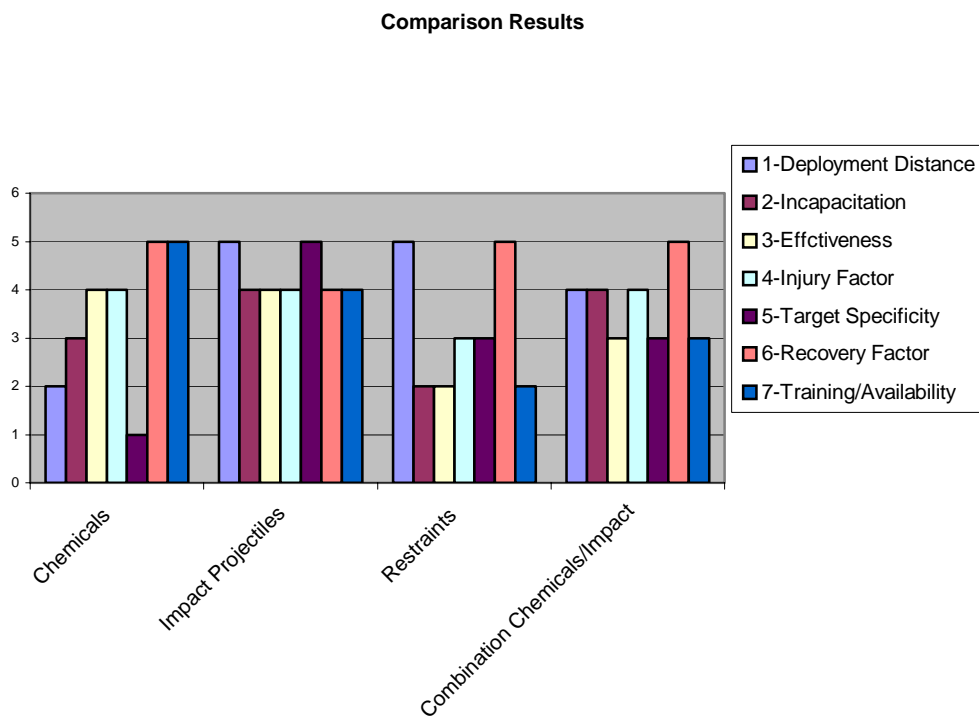
**Combination chemical / impact options=26**

**Restrains (net launchers)=22**

**Chemicals=19**

The one that appears to be the most feasible and closest to the ideal model would be the impact projectile category with a score of 30 out of 35. This seems to be the option that would be best picked for these specific incidents that are outlined in the needs portion of

this paper and would appear to be the most applicable to the Brownstown Police Department as a tool in dealing with these specific incidents. The following chart illustrates the individual performance of each LLF option broken down by performance on each of the ideal models seven categories.



## DISCUSSION

It must be noted that given other model incidents to use as a comparison, other LLF options would likely score higher. Other agencies should look at their specific needs to come up with their own incident model and then apply an ideal model to it. The

specialized nature of each specific LLF option tends to make them each applicable to certain types of incidents and therefore make them useful for some and not for others. It should also be noted that a considerable amount of subjectivity went into evaluating how each LLF measured up to the ideal model. Every effort was made to keep out individual opinions. Agencies considering similar studies may consider utilizing more than one evaluator working towards an average.

Hart (2002) outlined a similar study by the NIJ focusing efforts on finding the ideal LLF option to use on commercial aircraft. This study surely was not totally free of subjectivity. It also highlights the need for needs assessment prior to attempting evaluations for options.

Button (1997) in his work attempted to find the perfect LLF option to work in all cases where officers were faced with deadly force decisions (p. 74). His work was very helpful in pointing out the advantages and disadvantages to each option that would be helpful to others who are also attempting need specific evaluations.

This study should have great significance to the Brownstown Police department. The investigation into the need was in part a direct study of actual Brownstown case files. Current LLF options at this agency include only OC spray and batons, both which have been demonstrated to be ineffective at longer ranges. This study should be helpful to the decisions makers at this agency with regards to implementation of additional LLF options which should bridge the gap between current intermediate weapons and lethal force.

## RECOMMENDATIONS

This study points to impact projectiles as the most applicable option for use at the Brownstown Police Department or for other departments who may have similar needs with regards to LLF. The recommendation at this point would be to further investigate and research the many different available launchers and projectiles that are available to determine the best system to implement. Most of the thought on evaluating these projectiles was based on the assumption that the 12-gauge shotgun was used as a launching platform. This system does seem to be the best choice with regards to economic and training issues since the main part of the system is already owned by the agency. There are many different types of projectiles that could be used and much improvement has been made in designing more safe and effective rounds. This should be the focus of further research with regards to implementation. Many of the early problems experienced may be reduced by the new projectile technology including the over penetration problems that had a role in deaths. This research should be followed by an in house test of different projectiles and modification to the shotgun such as choke size changes and sight systems. The agency should also consider the method of deployment. Who will be trained? Who will carry the weapon? Who makes the decision to deploy? What new policies and procedures need to be implemented?

With some further research, an economical and effective LLF option can and should be added to the tool chest of the agency.

While this is taking place, this agency and others who are also investigating options should keep close tabs with what is taking place at the National Institute Of Justice. They have ongoing research into the topic of LLF options that has been accelerated since the

attacks on September 11<sup>th</sup>, 2001. Technology is moving at a faster pace and we may someday have that ultimate LLF tool that may take the place of the duty sidearm in deadly force encounters.

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