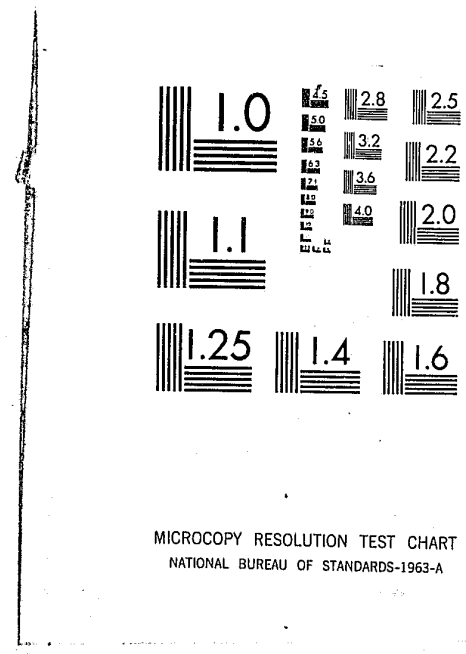

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BODY ARMOR STUDY

Bureau of Planning and Development
Division of Administration
Department of Law Enforcement
August, 1979

BODY ARMOR STUDY

The Bureau of Planning and Development, Division of Administration, with the assistance of the other Divisions in the Department, conducted a study to determine the feasibility of providing hard (over garment) body armor for each squad and/or soft (undergarment) body armor for each officer. In order to fiscally plan for the equipment, it was necessary to ascertain officer preference, effectiveness, availability, and cost of body armor.

A survey (see Appendix A) was developed by Planning and Development and disseminated to all Department of Law Enforcement Officers. The survey asked each officer to indicate body armor type (soft, hard, none) preference, the need for policy pertaining to either wearing or carrying body armor, and whether the officer had personally purchased body armor for use while on duty.

Data concerning the effectiveness of body armor was received from the Ordnance Unit, Division of State Police, the Equipment Technology Center of the International Association of Chiefs of Police, the National Institute of Law Enforcement and Criminal Justice, the Law Enforcement Assistance Administration, the Personal Protective Armor Association, and various body armor manufacturers.

The availability of hard body armor was ascertained by the Logistics Bureau, Division of Administration.

Cost figures were provided by the Logistics Bureau and by various manufacturers of body armor.

SURVEY RESULTS

Body armor surveys, with self-addressed stamped envelopes included, were mailed to 1886 Department of Law Enforcement Officers. The following table delineates the distribution of the surveys.

TABLE I

Division	Number Mailed
State Police	1531
Criminal Investigation	328
Internal Investigation	15
Administration	9
Support Services	3
Total	1886

Responses were grouped by State Police or Investigation categories. All officers assigned to Administration, Support Services and Internal Investigation were included in either DSP or DCI.

Officers who did not specify a rank were included in either the Trooper or Special Agent I category based upon the designated place of assignment.

Percentages may not always add up to 100% due to rounding.

Definitions

Trooper/SA I - Those respondents to the survey who are in the entry level position.

Ranked - Those officers in DSP or DCI who have been promoted or appointed to a rank higher than the entry level position.

Respondents - Those persons completing the survey and returning it to Planning and Development.

Chart 1 illustrates the number of responses mailed and received by Division and by rank. All officers Corporal and above or Special Agent II and above were grouped together in order to determine if there was a difference in the perception of body armor needs.

CHART 1

Surveys Mailed and Returned by Division and Rank

	Mailed	Returned	% Returned
DSP			
TPR	1184	893	75.4%
RANKED	357	297	83.2%
Subtotal	1541	1190	77.7%
DCI			
SA I	190	157	82.6%
RANKED	155	117	75.5%
Subtotal	345	274	79.4%
DLE Total	1886	1464	77.6%

As seen in Chart 1, DCI responses were greater, in relation to the percentage of recipients, than those from DSP. The number of responses used were received by July 16, 1979.

Chart 2 illustrates the responses to question #1 which asked the officer to indicate his/her body armor preference. As seen in the chart, the overwhelming choice of body armor was the soft, undergarment, type.

CHART 2

Body Armor Preference

Response	Soft (%*)	Hard (%*)	None (%*)	Both (%*)	No Answer (%*)
DSP					
TPR	797 (89.2)	37 (4.1)	40 (4.5)	18 (2.0)	1 (0.1)
RANKED	256 (88.3)	15 (5.1)	22 (7.4)	3 (1.0)	1 (0.3)
Subtotal	1053 (88.5)	52 (4.4)	62 (5.2)	21 (1.8)	2 (0.1)
DCI					
SA I	131 (83.4)	16 (10.2)	9 (5.7)	1 (0.6)	0 (0)
RANKED	96 (82.1)	6 (5.1)	10 (8.5)	1 (0.9)	4 (3.4)
Subtotal	227 (82.8)	22 (8.0)	19 (6.9)	2 (0.7)	4 (1.5)
DLE Total	1280 (87.4)	74 (5.1)	81 (5.5)	23 (1.6)	6 (0.4)

* % of total responses from each rank, division, or department total.

The "Both" responses were from those officers who indicated preference for hard (flak jacket) and soft (undergarment) body armor.

As seen in Chart 2 over 87% of the DLE Officers who responded to the survey favor soft body armor. This indicates that the DLE Officers are aware of the types of body armor and if body armor were made available would prefer soft body armor for their use.

The responses to question #2, "Would you favor a policy making it mandatory to wear soft body armor during duty hours?" are depicted in the following chart.

CHART 3

Mandatory Policy to Wear Soft Body Armor

	YES	%*	NO	%*	NO RESPONSE	%*
DSP						
TPR	249	(27.9)	637	(71.3)	7	(0.8)
RANKED	70	(23.6)	225	(75.8)	2	(0.7)
Subtotal	319	(26.8)	862	(72.4)	9	(0.8)
DCI						
SA I	21	(13.4)	134	(83.4)	2	(1.3)
RANKED	12	(10.3)	104	(88.9)	1	(0.8)
Subtotal	33	(12.1)	238	(86.9)	3	(1.1)
DLE Total	352	(24.0)	1100	(75.1)	12	(0.8)

* percentage of total responses by rank, Division and Department.

75% of all DLE officers responding to the survey said that they did not want a policy to mandate the wearing of soft body armor. Approximately 25% of the respondents commented that it should be up to each officer's discretion whether he/she should wear soft body armor.

It is interesting to note that a greater percentage (86.9% to 72.4% for DSP) of those officers against having a mandatory policy were from DCI.

Chart 4 shows the responses by rank, Division, and the Department to question #3, "Would you favor a policy making it mandatory to carry hard body armor in your vehicle?"

CHART 4

Mandatory Policy to Carry Hard Body Armor

	YES	%*	NO	%*	NO RESPONSE	%*
DSP						
TPR	429	(48.0)	434	(48.6)	30	(3.4)
RANKED	124	(41.8)	163	(54.9)	10	(3.3)
Subtotal	553	(46.5)	597	(50.2)	40	(3.4)
DCI						
SA I	81	(51.6)	75	(47.8)	1	(0.6)
RANKED	50	(42.7)	66	(56.4)	1	(0.9)
Subtotal	131	(47.8)	141	(51.5)	2	(0.7)
DLE Total	684	(46.7)	738	(50.4)	42	(2.9)

* Percent of total responses by rank, Division and Department.

As revealed in the chart, the number of officers favoring a mandatory policy to carry hard body armor in their vehicles is almost half of the total responses. However, the majority of officers still are opposed to a mandatory policy.

Among the comments written concerning this question were "there isn't enough room in the trunk now" and "most situations would not allow adequate time for putting it on."

Question #4 asked if the officers had purchased body armor for his/her own use. If so, the officer was asked to indicate the make of the armor and how often it is worn. Chart 5 demonstrates the responses to the first part of the question asking if the officer had purchased body armor.

CHART 5

Body Armor Purchases

	YES	%*	NO	%*	NO RESPONSE	%*
DSP						
TPR	250	(30.0)	640	(71.7)	3	(0.3)
RANKED	31	(10.4)	266	(89.6)	0	(0.0)
Subtotal	281	(23.6)	906	(76.1)	3	(0.3)
DCI						
SA I	20	(12.7)	137	(87.3)	0	(0.0)
RANKED	10	(8.5)	107	(91.5)	0	(0.0)
Subtotal	30	(10.9)	244	(89.1)	0	(0.0)
DLE Total	311	(21.2)	1150	(78.6)	3	(0.2)

*% of total responses by rank, Division or Department.

From this chart, it can be discerned that 89% of those in DSP who have body armor are of the Trooper rank and that 66.7% of those in DCI who have body armor are at the Special Agent I rank.

Utilizing the total number (1886) of DLE officers, 16.4% (n=311) of the force have body armor. In the same manner, it can be determined that 21.1% (n=250) of the total number of Troopers (1184), 8.6% (n=31) of the total number of ranked DSP officers (Corporal through Deputy Superintendent = 357), 10.5% (n=20) of the Special Agent I (n=190), and 6.6% (n=10) of the ranked DCI Special Agents (n=155) have purchased body armor for their personal use.

Of further interest is the fact that over 50% of those owning body armor (n=141) from DSP are from five (5) Districts, i.e., Districts 2 (n=36), 3 (n=28), 6 (n=25), 9 (n=23) and 12 (n=29). Those responding affirmatively to this question from DCI are more evenly divided through the Zones/Bureaus.

Because of the large number of "Second Chance" responses to question 4A which asked those respondents who have body armor to specify the type of body armor purchased, two categories, "Second Chance" and "Other", were selected as the answer choices. Chart 6 illustrates the responses to this question.

CHART 6

Type of Body Armor Purchased

	Second Chance	% *	Other	%*
DSP				
TPR	219	(87.6)	31	(12.4)
RANKED	29	(93.5)	2	(6.5)
Subtotal	248	(88.3)	33	(11.7)
DCI				
SA I	17	(85.0)	3	(15.0)
RANKED	8	(80.0)	2	(20.0)
Subtotal	25	(83.3)	5	(16.7)
DLE Total	273	(87.8)	38	(12.2)

*% of total "yes" responses to question #4 by rank, Division and Department.

These responses indicate that the great majority of DLE officers prefer "Second Chance" body armor. However, there are several unknown factors involved. While it is apparent that 87.8% of the officers owning body armor have purchased "Second Chance" models, one must question if the purchases were made because the armor is better than the other types, more reasonable in cost than the other types, if the salesman is more persuasive and aggressive than those from other manufacturers, or if the purchase was the result of "word-of-mouth" praise for a certain product.

It is known that "Second Chance" was one of the first manufacturers to develop soft body armor for use by law enforcement officers. For this reason, the assumption can be made that this type was "on the street" first, and of "name" influence. However, comments made by several officers indicated that, in their opinion, the "Second Chance" vest is better than any other.

The responses to last part of question 4, asking officers to specify when they wear their personally owned body armor, are demonstrated in the following chart.

CHART 7

Frequency of Wearing Body Armor

	All Duty Hours		No Duty Hours		Certain Assignments		Unknown	
DSP		%*		%*		%*		%*
TPR	188	(75.2)	4	(1.1)	51	(20.4)	7	2.8)
RANKED	15	(48.4)	0	(0.0)	15	(48.4)	1	(3.2)
Subtotal	203	(72.2)	4	(1.4)	66	(23.5)	8	(2.8)
DCI								
SA I	2	(10.0)	0	(0.0)	18	(90.0)	0	(0.0)
RANKED	0	(0.0)	0	(0.0)	9	(90.0)	1	(10.0)
Subtotal	2	(6.7)	0	(0.0)	27	(90.0)	1	(3.3)
DLE Total	205	(65.9)	4	(1.3)	93	(29.9)	9	(2.9)

* percentage of the total number of respondents indicating purchase of body armor for each rank, Division, and Department grouping.

From this chart, it can be determined that the majority of State Police officers who have purchased their own body armor wear it during all duty hours, while the majority of Special Agents owning body armor wear it only for certain assignments. The most frequently specified certain assignments were arrests, raids, and riot duty.

Police Body Armor Need

Between 1973 and 1977, 599 law enforcement officers were killed in the United States. Over 93% of those officers (n=559) were killed by firearms. The following tables provide breakdowns of the location of fatal wounds (see Table 2) and the distance between the victim officer and the offender (see Table 3).

TABLE 2

Location of Fatal Wounds

	YEAR						
Location	1973	1974	1975	1976	1977	1973-1977	% of Total
Head	60	54	49	30	32	225	40.3%
Upper Torso	58	65	63	56	45	287	51.3%
Below Waist	9	9	15	8	6	47	8.4%
Total	127	128	127	94	83	559	100%

As shown in the table, over 50% of the officers slain between 1973 and 1977 died of wounds to the upper torso.

TABLE 3

Distance Between Victim Officer and Offender

	YEAR						
Feet	1973	1974	1975	1976	1977	1973-1977	% of Total
0-5	66	71	62	53	41	293	56.2%
6-10	30	28	24	17	19	118	22.7%
11-20	13	14	18	14	8	67	12.8%
21-50	8	9	14	4	8	43	8.3%

This table demonstrates that the majority (56.2%) of victim officers were between 0 and 5 feet of their assailants and 78.9% were 10 feet or less from the offender.

Preliminary figures for 1978 from the Federal Bureau of Investigation reveal that 89, or almost 97% of the 92 officers slain that year were killed by firearms. Over 76% (n=68) were killed by handguns.[3] The following table illustrates the type of firearms used between 1973-1978.

TABLE 4

Law Enforcement Officers Killed by Type of Firearm[4]

	YEAR							
Firearm Type	1973	1974	1975	1976	1977	1978	Total	% of Total
Handgun	93	95	93	66	59	68	474	73.1%
Rifle	21	12	21	12	13	11	90	13.9%
Shotgun	13	21	13	16	11	10	84	13.0%
Total Firearm	127	128	127	94	83	89	648	100%

The large number and percentage of officers killed by firearms has consistently reinforced the need for ballistic protection for law enforcement officers. Over 70% of firearms used are handguns and the majority of those handguns are .38 caliber or less. The .38 caliber revolver and the .22 caliber pistol are the most common types of firearms confiscated from offenders.[5] For this reason, any type of body armor purchased for Department officers must be able to protect the officer from .22 and .38 caliber threats.[6]

Almost 80% of those officers killed between 1973 and 1977 were involved in patrol duties, i.e., responding to alarms or disturbance calls, pursuing subjects, transporting/handling prisoners, and traffic stops, similar to the duties performed by Division of State Police and Division of Criminal Investigation officers. 73% of those persons identified in the killing of law enforcement officers were persons with at least one (1) prior arrest for a criminal charge.[7] Many people that DLE Officers come into contact with during their duty hours are known criminals. The need for ballistic protection for DLE Officers becomes more apparent with the addition of these facts. DLE Officer safety must be of prime importance to Department administration in planning for equipment needs.

Police Body Armor Effectiveness

The National Institute of Law Enforcement and Criminal Justice (NILECJ) established body armor standards for ballistic resistance. The following Table illustrates the performance requirements and test variables for each body armor type manufactured. (see page 9)

The Equipment Technology Center, International Association of Chiefs of Police, published a report in December 1978 which announced the results of the testing of various types of body armor (See Appendix B). Since this report has been published, reports challenging the IACP tests have been written. Dr. Anthony N. Scacco, Jr., in an article written for Law and Order Magazine in December 1978, questioned the large discrepancies between the H.P. White laboratory and the Denver Research Institute in their test results. Concern was also raised because the weight and size of garments tested were not considered or specified.[9]

Another matter of interest to law enforcement officials is the effect of "blunt trauma" or the damage caused by the impact of the stopped bullet. According to some researchers, the blunt trauma effect may cause internal damage and could kill the officer. In rebuttal to this argument, the case histories of police officers shot while wearing soft body armor provides evidence that most police officers are walking away from the hospital examinations with an external bruise and little or no internal damage.[10]

TABLE 5 Test Summary[7]

Armor Type	Test Ammunition	Test Variables: Nominal Bullet Mass	Test Variables: Suggested Barrel Length	Test Variables: Required Bullet Velocity	Performance Requirements: Required Fair Hits Per Armor Part	Performance Requirements: Permitted Penetrations	Performance Requirements: Maximum Depth of Deformation
I	22 LRHV Lead	2.6 grams 40 grains	15 to 16.5 cm 6 to 6.5 in	320 ± 12 m/s 1050 ± 40 ft/s	5*	0	44 mm 1.73 in
	38 Special RN Lead	10.2 grams 158 grains	15 to 16.5 cm 6 to 6.5 in	259 ± 15 m/s 850 ± 50 ft/s	5*	0	44 mm 1.73 in
II-A	357 Magnum JSP	10.2 grams 158 grains	10 to 12 cm 4 to 4.75 in	381 ± 15 m/s 1250 ± 50 ft/s	5*	0	44 mm 1.73 in
	9 mm FMJ	8.0 grams 124 grains	10 to 12 cm 4 to 4.75 in	322 ± 15 m/s 1090 ± 50 ft/s	5*	0	44 mm 1.73 in
II	357 Magnum JSP	10.2 grams 158 grains	15 to 16.5 cm 6 to 6.5 in	425 ± 15 m/s 1395 ± 50 ft/s	5*	0	44 mm 1.73 in
	9 mm FMJ	8.0 grams 124 grains	10 to 12 cm 4 to 4.75 in	358 ± 15 m/s 1175 ± 50 ft/s	5*	0	44 mm 1.73 in
III	7.62 mm (308 Winchester) FMJ	9.7 grams 150 grains	56 cm 22 in	873 ± 46 m/s 2863 ± 151 ft/s	5*	0	44 mm 1.73
IV	30-06 AP	10.8 grams 166 grains	56 cm 22 in	838 ± 15 m/s 2750 ± 50 ft/s	1	0	44 mm 1.73 in

*Armor parts covering the torso front and torso back, with or without side coverage, shall be impacted with the indicated number of fair hits. Armor parts covering the groin and coccyx shall each be impacted with 3 fair hits. The deformations due to the first two fair hits shall be measured to determine compliance.

At the option of the tester, a type I, II-A or II armor part which has successfully withstood 5 fair hits with one test ammunition may there upon be tested with the second test ammunition. However, if failure occurs with the second test ammunition a retest shall be conducted. A second specimen of that armor part shall be tested with the second test ammunition and the results of that test shall govern.

Abbreviations: AP-Armor Piercing FMJ-Full Metal Jacket JSP-Jacketed Soft Point LRHV-Long Rifle High Velocity RN-Round Nose

Preliminary studies have also shown that the wearing of body armor provides back support for the officer while driving and chest and back support for the officer in the event of an automobile accident.[11]

Police Body Armor Cost

The estimated cost of soft body armor with sidepanels for the 1886 officers in the Department would be approximately $120 each or $226,320. While this amount is great, the cost of one officer being shot and killed while on duty is even greater, as illustrated below.

In this example, an officer, 30 years of age, with 8 years experience, is killed in the line of duty while stopping an offender in the process of transporting a stolen car across the Indiana/Illinois border. The State and Federal Government will pay, to his 29 year old wife and her 3 year old daughter and 6 month old son, the following sums:

$ 50,000		lump sum from the Federal Government.
20,000		lump sum from the Illinois Attorney General.
1,000		lump sum from the State
105,000	@	$500 a month for surviving spouse and children (6 months old to child's age of 18)
97,200	@	$300 a month for surviving spouse from age 47-74 (27 years)
32,400	@	$60 a month to spouse for her lifetime (74-29=45 years) from the retirement system
19,200	@	$1200 a semester maximum for 8 semesters at an accredited State institution for 2 children
Total $324,800		

The total figure of $324,800 would be the minimum that the government would pay in the event that an officer is killed in the line of duty. This figure could be even greater if the Industrial Commission awards the surviving spouse a lump sum and/or weekly/monthly benefits exceeding that amount awarded by the State or if survivor's benefits are raised by the legislature. Obviously, the saving of one life would more than pay for the initial cost of furnishing soft body armor to each officer.

If an officer were wounded in an area of his/her body that could be covered by a soft body armor vest during a shoot-out, that officer would receive disability pay, use of 60+ sick days, Workman's Compensation, and insurance costs that would amount to $13,000 minimum per injury.[12] If 18 injuries were prevented in five (5) years, the savings would pay for the initial purchase of body armor.

Other intangible areas which result in expense to the Department from the death or injury to an officer include training costs, experience of the officer, and the value of that person's life.

Police Body Armor Availability

There are over 18 manufacturers of body armor in the United States. Since the State operates on a "bid" process in its purchases, the manufacturer "winning" the bid would have to be able to make the necessary body armor.

Hard body armor has been purchased from Military surplus in the past, however, the armor presently available from the Military is approximately 20 years old and not of suitable quality for law enforcement purposes because the jacket casings are becoming worn and would no longer hold the "ceramic" inserts.

CONCLUSIONS

The survey responses clearly indicate that the overwhelming preference (87%) of body armor is the soft, or undergarment, type. There was basically no difference between the ranked/entry level officers or between officers in DSP or DCI in the choice of armor.

This leads to the major gap in the survey, however. There was no determination of the officers' willingness to wear the armor if it were available. The only conclusion that could be made concerning this subject is that those officers (n=81) who indicate "None" in response to question #1 would not wear the body armor. A policy mandating the wearing of body armor would probably be ignored or abused by the officers for at least two reasons:

1. The majority of officers responding to the survey indicated that they were not in favor of a policy which would mandate wearing body armor.

2. As seen from previous experiences (cigarette smoking, seat belt use, dieting, etc.) it is practically impossible to force someone to do something that would ultimately benefit him/her.

Even with this awareness, however, there is a definite need for soft body armor for use by DLE officers. The officers are aware of the increasing number of assaults on law enforcement personnel and realize that each time they stop a violator on the road they could be facing a gun.

As mentioned before, the majority of DLE officers responding to the survey indicated that they did not favor a policy which would mandate the wearing of body armor. Most officers indicated that the officer should have the discretion to decide when to wear the body armor.

In response to question #3 asking if the officers would favor a policy mandating carrying of hard body armor in the vehicle, a slight majority of the respondents indicated that they did not favor this policy. There were a few officers who crossed out the word "hard" and replaced it with "soft". This does seem to indicate that the officers feel that some type of body armor should be available for their use.

Question #4 asked if the officer had purchased body armor for his/her own use. Although only 21% of those respondents indicated that they had purchased body armor, several officers indicated that the cost kept them from buying armor.

In order to determine cost and effectiveness of body armor, the Department must first set the standards for the effectiveness and protection desired for the officers.

RECOMMENDATIONS

1. No Publicity

If the decision is made to purchase body armor for all DLE officers, there must be no public announcement made of this fact. Every officer wearing body armor does so with the intent of saving his/her life. In cities where the public has become aware that police officers are wearing body armor, there has been an increase in the number of shots fired at the heads of law enforcement officers. The fact that the "bad guys" utilize this type of information in furthering their "careers" (crime), causes legitimate concern for law enforcement officers and was expressed by many DLE officers in their responses on the survey. It is the responsiblity of the Department administration and management, as well as the officers themselves, to ensure that there is no publicity relating to the proposed or actual purchase of body armor.

2. Purchase Soft Body Armor

A. The Department should budget for the purchase of soft body armor for all DLE officers. The soft body armor purchased should meet the Type II Armor requirements; that is, it should stop the 357 Magnum and 9 mm threats. DLE officers carry Smith and Wesson handguns which utilize either the 9 mm jacketed softpoint bullet with a muzzle velocity of 1375 feet per second or the 357 magnum semi-jacketed hollowpoint bullet with a muzzle velocity of 1150 feet per second. These ammunitions fall within the Type II Armor classificaton for performance requirements.

In 1977, 15% of the law enforcement officers in the U.S. (n=9) slain by offenders utilizing handguns were killed with their own weapons. Although no one likes to admit that a DLE officer could have his/her weapon taken away, it is always a possibility. For these reasons, any body armor purchased must provide, at the minimum, this amount of protection. Approximate cost of body armor for all DLE Officers would be $226,320.

B. The Ordnance Unit, Division of State Police, in conjunction with ballistics experts from the Bureau of Scientific Services, Division of Support Services, should test the various types of soft body armor that are manufactured.

Although IACP tested body armor, the Ordnance Unit should also test the armor. Because of the importance of these vests, the officers would have more confidence in a product tested and approved by members of their own Department.

The Ordnance Unit would also have flexibility in expanding the test procedures to include the suitability of the armor for close encounters. A representative of the FBI Academy in a letter to the State Police in 1975, stated that the FBI utilizes a distance of 10 feet in testing body armor rather than the 5 meters used by NILECJ. The reasoning for this is "because our statistics reveal that most Agent and police officer battles occur within 3 and 20 feet. A secondary reason for this distance is that the yaw has diminished and the projectile stabilized at ten feet from the muzzle."

The body armor may also be tried on and worn by various members of the Ordnance Unit. The body armor that is the most comfortable and lightweight, as well as providing needed protection could then be recommended. This is an important aspect in determining the type of body armor to purchase. If the body armor is too heavy or uncomfortable, it will not be worn by the officers.

C. Plan for minimal replacement of body armor. Any time an officer is wearing the vest and is involved in a shooting or knifing where the vest receives the impact of the bullet or knife, the vest should be replaced. Vests should also be checked if the officer is involved in a serious automobile accident where he receives chest and/or back injuries.

3. Purchase Hard Body Armor

The Department should purchase sufficient numbers of hard body armor so that the subposts and zone offices will have the equipment available when needed. In certain situations (snipers, man with a gun calls, riots) hard body armor is needed and should be available at all DLE operations facilities in the State. Although the hard body armor could be transported to the scene from the District headquarters, in many cases time is an important factor in resolving these situations. Since hard body armor virtually never wears out, with a lifespan of approximately 20 years, this would be a one-time investment that would greatly assist the officer in the field. Only if the hard body armor is hit by a projectile, causing the "ceramic" insert to crack or break, therein making the armor less than 100% safe, would it be necessary to replace this type of body armor.

Cost of hard body armor is estimated at $450 each from a body armor manufacturer. Hard body armor purchased from the military would cost considerably less, but would involve the purchase of replacement material and threads as well as the time for refurbishing these jackets.

4. No Mandatory Policy

Since a policy requiring the mandatory wearing of body armor would be next to impossible to enforce, and because officers are responsible for their own lives, there should be no policy written which would require the wearing of body armor. There are too many exemptions which would have to be made, i.e., desk duty, administrative responsibilities, etc., that would also result in difficulty in enforcement. However, there should be encouragement from upper level management for the wearing of body armor. Being ensured of positive reinforcement from the managers and administrators by DLE will result in greater utilization of the body armor.

ALTERNATIVES

These alternatives provide administration with options which could be implemented alone or in conjunction with any of the other alternatives/recommendations.

1. Lump Sum Payment

   Provide each officer with a one-time lump sum of $100 to assist in the purchase of his/her own body armor. This would cost the Department a total $188,600, which would be less than the cost of purchasing body armor for each officer. This alternative has certain advantages in that each officer may select the type of body armor preferred rather than being "forced" to accept the choice of management. The officer would probably have to expend some of his/her own money to pay for the armor in full, and, therefore, would be more apt to wear it. This would also provide partial reimbursement to those officers who have already purchased body armor.

2. Provide Hard Body Armor Only

   The Department should purchase enough hard body armor for those DLE facilities presently without this type of armor for those reasons mentioned in #3 in the Recommendations Section. Statistics from the survey indicate that the purchase of hard body armor for each DLE Officer is not required.

3. Purchase Armor for Those Who Would Wear It

   Provide soft body armor only for those who would wear it. This alternative should ensure that the body armor would be used by the DLE Officers. There are, however, several points which should be considered before acting upon this alternative.

   A. Individual surveys would have to be conducted with each DLE Officer to determine whether he/she would wear the body armor.

   B. The term "wear" would have to be defined. Does it mean "all duty hours", "certain assignments", "midnights", etc.?

   C. There would be no way to ensure that the officers actually wear the armor. This would be subject to the same limitations that any policy regarding mandatory wearing of body armor would have.

4. Mandatory Policy for all DLE Officers

   A policy should be written which would require all DLE Officers, regardless of their assignments, to wear body armor during all duty hours. Since the equipment is provided to save the officers' lives, much the same as the firearm and radio equipment, it should be mandatory that it is worn.

5. Mandatory Policy for Selected DLE Officers

   A policy should be written which would require the wearing of soft body armor by line State Police Officers during all duty hours and by Special Agents who are involved in arrest/raid situations. Certain positions could be exempted from the requirement, e.g. administrators and managers, because of the type of work done. The exempt positions could be determined by the Director, Superintendent and Deputy Directors if this alternative were selected.

FOOTNOTES

1. Federal Bureau of Investigation, Law Enforcement Officers Killed Summary, (Washington, D.C.: U.S. Government Printing Office, 1973-1977) p. 23.
2. Ibid., p. 23.
3. Ibid., p. 24.
4. Phone conversation with Uniform Crime Reports representative, Federal Bureau of Investigation, July 1979.
5. Aerospace Corporation, Body Armor Program: Executive Summary, (Washington, D.C.: National Institute of Law Enforcement and Criminal Justice, 1977)
6. FBI, op. cit., p. 27.
7. Law Enforcement Standards Program, The Ballistic Resistance of Police Body Armor, (Washington, D.C.: National Institute of Law Enforcement and Criminal Justice, December, 1978) p. 6.
8. Anthony N. Scacco, Jr., "In Defense of Soft Body Armor," Law and Order, Volume 26, Number 12, pp. 72-74.
9. Massad F. Ayoob, "The Blunt Truth About Blunt Trauma," Law and Order, Volume 26, Number 12, pp 18-19.
10. Body Armor Program, op cit.
11. Second Chance, Second Chance Magazine, Volume 16, Number 1, Spring 1979, passim.
12. Body Armor Program, op cit.

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Second Chance, "Second Chance Magazine," Volume 16, Number 1, Spring 1979.

APPENDIX A

OFFICE MEMORANDUM — DEPARTMENT OF LAW ENFORCEMENT

To: (Name, Division and Offices)

ALL DLE OFFICERS

From: (Name, Division and Offices)

Director Dan K. Webb

DKW

DKW:pf

Subject:

Body Armor Survey

Date:

June 6, 1979

The Division of Administration is currently researching the feasibility of providing body armor to Departmental officers. Your responses to this survey will be utilized as a significant part of the feasibility study.

Please return your completed questionnaire in the enclosed envelope by June 27, 1979.

_____ Rank

_____ District/Zone/Place of Assignment

_____ Years of Service

1. If body armor were available to you, which type would you prefer:

   A. Soft (under garment) _____

   B. Hard (flak jacket) _____

   C. None _____

2. Would you favor a policy making it mandatory to wear soft body armor during duty hours?

   _____ Yes _____ No

   Comments: _____

3. Would you favor a policy making it mandatory to carry hard body armor in your vehicle?

   _____ Yes _____ No

   Comments: _____

4. Have you purchased body armor for yourself? _____ Yes _____ No

   A. If yes, specify the type, make, and model number. _____

   B. If yes, do you wear the armor during duty hours?

      _____ All duty hours

      _____ No duty hours

      _____ Only for certain assignments - specify: _____

DLE1-18 (9/77)

APPENDIX B

TEST RESULTS

POLICE BODY ARMOR TEST RESULTS

The following tables summarize the results of the ballistic evaluation of the police body armor that was submitted for testing to the Denver Research Institute (D) and the H. P. White Laboratory (HP).

"X" in a column of a table is used to indicate the "Threat Level" for which a model of body armor has been tested; also to show whether that model was found to be in "full compliance" or "noncompliance" with the standard.

If a model is marked with "X" in the "Noncompliance" column, an additional notation has been made in the "Noncompliance Data" column to show what test the model did not meet: for example; penetration or deformation, wet or dry, or other pertinent data.

A few comments are in order concerning use of the body armor test data. By now it becomes apparent that the lower threat-level garments are relatively comfortable (weight-wise) to wear. As higher threat levels are addressed, the garments become increasingly heavy and less comfortable to wear. In other words, the officer must sacrifice comfort and wearability to attain protection against higher threat levels.

No garment manufactured is "bullet proof." The term "bullet proof vest" has been used since crime shows on radio and TV have become popular. Just about anything worn by a police officer as body armor can be "defeated." When it is defeated, the results are usually disastrous. What this report provides (as all future equipment testing reports will provide) is an opportunity for the police executive to make a decision based on *all available information*.

The police executive who purchases armor designed for the higher threat levels may sometimes discover that it is being "worn" in the trunk of the police car. It may be better to protect against the "common threat" (Levels I or IIA) and be certain of at least some protection. The choice, of course, is up to the chief police executive.

The summary of test results which follows will aid the law enforcement officer in selecting from the list of manufacturers and their tested armors the particular threat level garment which is most comfortable to wear in the climate of his geographical area.

POLICE BODY ARMOR
SUMMARY OF TEST RESULTS ALPHABETICALLY BY MANUFACTURER

Manufacturer	Model	Threat Level					Compliance		Noncompliance Data
		I	IIA	II	III	IV	Full	Non	
A & B Industries, Inc.	102	X						X	Deformation (dry)
	202		X					X	Deformation (dry)
	300			X			X		
	302			X			X		
American Body Armor & Equipment Co.	K27MC[1]			X				X	Penetration (dry)
	K27HD			X				X	Penetration (dry)
	K15			X				X	Penetration (dry)
Armour of America	Ultrathin	X					X		
	Armorhide		X					X	Penetration (wet)
	Armorhide-P			X			X		
	GP588					X	X		
	GP588				X			X	Penetration (dry)
Blauer Mfg. Co., Inc.	12516	X						X	Penetration (dry)
	12532		X					X	Penetration (wet)
Burlington Industries, Inc.	Not Designated	X					X		
	78002		X				X		
	26018			X			X		
General Ordnance Equipment Co.	120			X[1]				X	Penetration in nylon area of Level II not covered by steel plate (wet)
	217			X				X	(Same as above) (dry)
	434C			X				X	(Same as above) (dry)
International Protectors, Inc.	Mini MK15	X					X		
	MiniProtector		X				X		
	Mini Protector			X			X		
	Mini Protector/ Steel Insert				X		X		
Magnum Armor	1000	X						X	Deformation (wet)
	2000			X			X		
Norton Co.	FSN8470-926-1574					X	X		
Point Blank Body Armor	10	X					X		
	15		X				X		
	20			X				X	Deformation (dry)
Progressive Apparel Co.	ES8	X						X	Deformation (wet)
	ES15		X					X	Penetration (wet)
	ES23			X			X		
Protective Apparel Corp. of America	PGC-10	X					X		
	PGC-10(F)	X					X		
	PGC-18		X				X		
	PGC-18(F)		X					X	Deformation (female bust area) (dry)
	PGC-20			X				X	Penetration (dry)
	PGC-22			X				X	Penetration (dry)
	PGC-1			X			X		
Protective Materials Co., Inc.	Featherflex	X					X		
	Not Designated		X					X	Penetration (dry)
	Not Designated			X				X	Penetration (wet)
	PA500					X	X		
	PA500AP					X	X		
Safariland Ballistics, Inc.	M1-2W	X					X		
	M2-2W		X				X		
	M2A-2W			X				X	Penetration (wet)
	M3-2W			X			X		
Second Chance Body Armor, Inc.	X	X						X	Penetration (wet)
	Y		X					X	Deformation (wet)
	Z			X				X	Deformation (dry)
Technipol International Corp.	KXX+1			X			X		

[1] Type II Front, Type I Back

SUMMARY OF TEST RESULTS—BY THREAT LEVEL

Threat Level I

Manufacturer	Model	Compliance		Noncompliance Data
		Full	Non	
A & B Industries, Inc.	102		X	Deformation (dry)
Armour of America	Ultrathin	X		
Blauer Mfg. Co., Inc.	12516		X	Penetration (dry)
Burlington Industries, Inc.	Not Designated	X		
International Protectors, Inc.	Mini MK15	X		
Magnum Armor	1000		X	Deformation (wet)
Point Blank Body Armor	10	X		
Progressive Apparel Co.	ES8		X	Deformation (wet)
Protective Apparel Corp. of America	PGC-10 PGC-10(F)	X X		
Protective Materials Co., Inc.	Featherflex	X		
Safariland Ballistics, Inc.	M1-2W	X		
Second Chance Body Armor, Inc.	X		X	Penetration (wet)

Threat Level IIA

Manufacturer	Model	Compliance		Noncompliance Data
		Full	Non	
A & B Industries, Inc.	202		X	Deformation (dry)
Armour of America	Armorhide		X	Penetration (wet)
Blauer Mfg. Co., Inc.	12532		X	Penetration (wet)
Burlington Industries, Inc.	78002	X		
International Protectors, Inc.	Mini Protector	X		
Point Blank Body Armor	15	X		
Progressive Apparel Co.	ES15		X	Penetration (wet)
Protective Apparel Corp. of America	PGC-18 PGC-18(F)	X	X	Deformation (female bust area) (dry)
Protective Materials Co., Inc.	Not Designated		X	Penetration (dry)
Safariland Ballistics, Inc.	M2-2W	X		
Second Chance Body Armor, Inc.			X	Deformation (wet)

SUMMARY OF TEST RESULTS—BY THREAT LEVEL

Threat Level II

Manufacturer	Model	Compliance		Noncompliance Data
		Full	Non	
A & B Industries, Inc.	300 302	X X		
American Body Armor & Equipment Co.	K27MC K27HD K15		X X X	Penetration (dry) Penetration (dry) Penetration (dry)
Armour of America	Armorhide-P	X		
Burlington Industries, Inc.	26018	X		
General Ordnance Equipment Co.	120 217 434C		X X X	Penetration in nylon area of Level II (front) not covered by steel plate (wet) (Same as above) (dry) (Same as above) (dry)
International Protectors, Inc.	Mini Protector	X		
Magnum Armor	2000	X		
Point Blank Body Armor	20		X	Deformation (dry)
Progressive Apparel Co.	ES23	X		
Protective Apparel Corp. of America	PGC-20 PGC-22 PGC-1	 X	X X	Penetration (dry) Penetration (dry)
Protective Materials Co., Inc.	Not Designated		X	Penetration (wet)
Safariland Ballistics, Inc.	M2A-2W M3-2W	X	X	Penetration (wet)
Second Chance Body Armor, Inc.	Z		X	Deformation (dry)
Technipol International Corp.	KXX+1	X		

Threat Level III

Manufacturer	Model	Compliance		Noncompliance Data
		Full	Non	
Armour of America	GP588		X	Penetration (dry)
International Protectors, Inc.	Mini Protection Steel Insert	X		

Threat Level IV

Manufacturer	Model	Compliance		Noncompliance Data
		Full	Non	
Armour of America	GP588	X		
Norton Co.	FSN 8470-926-1574	X		
Protective Materials Co., Inc.	PA500 PA500AP	X X		

SUMMARY OF BALLISTIC TEST DATA

Manufacturer of Armor	Model No.	IACP No.	Threat Level Tested	Test Lab.	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Ballistic Material In Vest (K-Kevlar N-Nylon)
A & B Industries Inc.	102	2018	I	D	.38		X		1.87[1]	866	1	8K
		2019	I	D	.38	X	X		1.78[1]	881	1	8K
	202	2023	IIA	HP	.357		X		1.95[1]	1220	1	11K
	300[2]	2021	II	D	9mm	X			1.46	1215		26K
		——	II	D	.357	X			1.63	1362		26K
	302[2]	2020	II	D	9mm		X		1.35	1219		26K
			II	D	.357		X		1.56	1427		26K
American Body Armor & Equipment Co.	K27-MC	2076	II	HP	.357		X	X	——	1400	5	16K 2N Steel Plate
	K27-HD	2077	II	HP	9mm		X		0.80	1170		16K 2N
		2088	II	HP	.357		X	X	——	1419	1	16K 2N
	K15	2078	II	HP	9mm		X		1.20	1128		16K 2N
		2087	II	HR	.357		X	X	——	1399	5	16K 2N
Armour of America	Ultrathin	1907	I	HP	.38	X			1.65	888		11K
		2024	I	HP	.22		X		0.70	1138		11K
		——	I	HP	.38		X		1.20	882		11K
		2025	I	HP	.22	X			0.60	1059		11K
	Armor-hide	2028	IIA	D	9mm		X		1.48	1077		15K
		——	IIA	D	.357		X		1.70	1269		15K
		1917	IIA	D	9mm	X		X	——	1088	1	15K
	Armor-hide P	2027[4]	II	D	.357		X		1.65	1440		17K
	GP588A/ 90629[5]	2030	IV	HP	30.06		X		——	2755		Ceramic-N
	GP588/ 86039A[5]	2031	III	HP	7.62		X	X	——	2823	4	Ceramic-N

[1] Deformation is greater than 1.73 inches allowed by NILECJ-STD-0101.01
[2] Armors have same ballistic construction
[3] Type II Front, Type I Back
[4] Dry Test only
[5] Same Model tested at Levels III and IV

SUMMARY OF BALLISTIC TEST DATA (Continued)

Manufacturer of Armor	Model No.	IACP No.	Threat Level Tested	Test Lab.	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Ballistic Material In Vest (K-Kevlar N-Nylon)
Blauer Mfg. Co., Inc.	12516	2090	I	HP	.22		X	X	——	1053	3	8K
	12532	2091	IIA	HP	.357		X		1.65	1273		16K
		2092	IIA	HP	9mm		X		1.25	1107		16K
		1908	IIA	HP	9mm	X		X	——	1078	4	16K
Burlington Industries, Inc.	Not Designated	2032	I	D	.22	X			0.92	1065		10K
		——			.38	X			1.60	860		10K
		2033	I	D	.22		X		0.61	1055		10K
		——			.38		X		1.52	862		10K
	78002	2034	IIA	D	9mm		X		1.46	1115		16K
		——			.357		X		1.73	1244		16K
		2035	IIA	D	9mm	X			1.67	1028		16K
		——			.357	X			1.62	1300		16K
	26018/5328	2036	II	HP	9mm		X		1.40	1176		21K-18P-2N
		——		HP	.357		X		1.50	1360		21K-18P-2N
		2037	II	HP	9mm	X			1.10	1143		21K-18P-2N
		——		HP	.357	X			1.50	1370		21K-18P-2N
General Ordnance Equipment Co.	120	2012	II(F)	HP	9mm		X		0.00	1143		steel-N
		——	I(B)	HP	.38		X		0.75	883		steel-N
		2013	II(F)	HP	.357		X		1.00	1367		steel-N
		——	I(B)	HP	.22		X		0.20	1050		steel-N
		1913	II	HP	.357	X			0.80	1387		steel-N
		——	II	HP	.357	X			0.80	1385		groin pad & vest
		1914	II(F)	HP	9mm	X		X[1]	——	1148	1	steel-N
	217	2010	II	HP	.357	X		X[1]	——	1403	4	steel-N
		2011	II	HP	9mm		X	X[1]	——	1146	1	steel-N
	434-C	2008	II	HP	9mm		X	X[1]	——	1157	2	steel-N
		2009	II	HP	.357		X	X[1]	——	1377	1	steel-N

[1] Penetration was in nylon area not covered by steel plate.

SUMMARY OF BALLISTIC TEST DATA (Continued)

Manufacturer of Armor	Model No.	IACP No.	Threat Level Tested	Test Lab	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Ballistic Material In Vest (K-Kevlar N-Nylon)
International Protectors Inc.	Mini MK15	2079	I	HP	.22		X		0.50	1037		15K
		——	I	HP	.38		X		1.45	891		15K
		2080	I	HP	.22	X			0.65	1069		15K
		2096	I	HP	.38	X			1.30	890		15K
	Mini Protector	2081	IIA	HP	9mm		X		1.30	1084		20K
		——	IIA	HP	.357		X		1.30	1289		20K
		2082	IIA	HP	9mm	X			1.40	1053		20K
		2097	IIA	HP	.357	X			1.60	1297		20K
	Mini Protector	2093	II	HP	.357	X			1.65	1367		20K
		2094	II	HP	9mm	X			1.50	1148		20K
		2095	II	HP	9mm		X		1.25	1142		20K
		2083	II	HP	.357		X		1.55	1418		20K
	Mini Protector/ Steel Insert	2084	III	HP	7.62		X		0.00	2824		K with steel Insert
Magnum Armor	1000	1921	I	HP	.38	X			2.30[1]	898	2	12K
		2054	I	HP	.22		X		0.75	1073		12K
		——	I	HP	.38		X		1.30	876		12K
		2055	I	HP	.22	X			0.60	1036		12K
	2000	2057[2]	II	D	.357		X		1.73	1445		18K
Norton Co.	FSN8470	2058	IV	HP	30.06	X				2748		Unknown
	926-1574	2059	IV	HP	30.06		X			2766		Unknown
Point Blank Body Armor	10	1911	I	HP	.38	X			1.60	898		10K
		2047	I	HP	.22	X			0.60	1021		10K
		2046	I	HP	.38		X		1.60	873		10K
		——	I	HP	.22		X		0.90	1035		10K
	15	2044	IIA	D	9mm		X		1.38	1072		17K
		——	IIA	D	.357		X		1.61	1206		17K
		2045	IIA	D	9mm	X			1.38	1123		17K
		——	IIA	D	.357	X			1.67	1297		17K
	20	1912	II	HP	.357		X		1.80[1]	1383	2	16K

[1] Deformation is greater than 1.73 inches allowed by NILECJ STD-0101.01.
[2] Dry Test only

SUMMARY OF BALLISTIC TEST DATA (Continued)

Manufacturer of Armor	Model No.	IACP No.	Threat Level Tested	Test Lab.	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Ballistic Material In Vest (K-Kevlar N-Nylon)
Progressive Apparel Co.	ES8	2016	I	HP	.22		X		1.05	1060		8K
		——	I	HP	.38		X		1.60	896		8K
		2017	I	HP	.22	X			0.85	1031		8K
		1903	I	HP	.38	X			1.60	899	1	8K
	ES15	1922	IIA	HP	9mm		X		1.35	1133		15K
		——	IIA	HP	.357		X		1.55	1212		15K
		1923	IIA	HP	9mm	X			1.45	1186		15K
		——	IIA	HP	.357		X		1.60	1283		15K
		1928	IIA	HP	9mm	X			1.45	1094		15K
		1926	IIA	HP	.357	X		X	——	1291	1	15K
	ES23	1904	II	D	9mm	X			1.32	1182		23K
		——	II	D	.357	X			1.51	1438		23K
		1905	II	D	9mm		X		0.95	1136		23K
		——	II	D	.357		X		1.53	1373		23K
Protective Apparel Corp. of America	PGC-10	2050	I	D	.22		X		0.81	1073		10K
		——	I	D	.38		X		1.51	875		10K
		2051	I	D	.22	X			0.82	1053		10K
		——	I	D	.38	X			1.52	864		10K
	PGC-10(F)	1919	I	HP	.22	X			0.55	1030		10K
		——	I	HP	.38	X			1.65	877		10K
		——	I	HP	.22		X		0.90	1068		10K
		——	I	HP	.38		X		1.60	897		10K
	PGC-18	2052	IIA	HP	9mm		X		1.20	1128		18K
		——	IIA	HP	.357		X		1.30	1264		18K
		2053	IIA	HP	9mm	X			1.25	1084		18K
		1906	IIA	HP	.357	X			1.40	1239		18K
	PGC-18(F)	1920	IIA	HP	9mm		X		1.20	1154		18K
		1924	IIA	HP	.357		X		2.10[2]	1255	2	18K
	PGC-20	1925	II	HP	.357	X		X	——	1420	1	20K
		1915	II	HP	9mm		X	X	——	1182	5	20K
	PGC-22	1916	II	HP	9mm		X		1.10	1143		22K
		1916A	II	HP	.357		X	X	——	1443	3	22K
	PGC-1	2048	II	D	9mm	X			1.02	1208		27K
		——	II	D	.357	X			1.49	1429		27K
		2049	II	D	9mm		X		1.12	1215		27K
		——	II	D	.357		X		1.51	1418		27K

[1] Deformation is greater than 1.73 inches allowed by NILECJ STD-0101.01.
[2] Deformation is greater than 1.73 inches allowed by NILECJ STD-0101.01. Deformation occurred on impact over bust area unsupported by clay backing.

SUMMARY OF BALLISTIC TEST DATA (Continued)

Manufacturer of Armor	Model No.	IACP No.	Threat Level Tested	Test Lab	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Ballistic Material In Vest (K-Kevlar N-Nylon)
Protective Materials Co., Inc.	Featherflex	2067	I	HP	.22		X		0.97	1110		8K
		——	I	HP	.38		X		1.50	848		8K
		2067A	I	HP	.38	X			1.60	834		8K
		2066	I	HP	.22	X			1.00	1075		8K
	Not Designated	2071	IIA	HP	9mm		X	X	——	1078	2	14K
	Not Designated	2068	II	HP	9mm		X		1.60	1144		19K
		——	II	HP	.357		X		1.55	1370		19K
		2069	II	HP	9mm	X		X	——	1165	2	19K
	PA500	2072	IV	HP	30.06		X		0.00	2701		Unknown
		——	IV	HP	30.06		X		0.00	2727		Unknown
		2073	IV	HP	30.06		X		0.30	2769		Unknown
		——	IV	HP	30.06		X		0.00	2773		Unknown
	PA500AP	2074	IV	HP	30.06		X		0.85	2776		Unknown
Safariland Ballistics, Inc.	M1-2W	2000	I	D	.22		X		0.56	1056		12K-8 Plastic
		——	I	D	.38		X		1.17	875		12K-8 Plastic
		2001	I	D	.22	X			0.48	1020		12K-8 Plastic
		——	I	D	.38	X			1.15	846		12K-8 Plastic
	M2-2W	2002	IIA	D	9mm	X			1.08	1095		20K-8 Plastic
		——	IIA	D	.357	X			1.49	1264		20K-8 Plastic
		2003	IIA	D	9mm		X		1.22	1138		20K-8 Plastic
		——	IIA	D	.357		X		1.25	1241		20K-8 Plastic
	M2A-2W	2004	II	HP	9mm		X		0.70	1134		24K-8 Plastic
		——	II	HP	.357		X		1.45	1367		24K-8 Plastic
		2005	II	HP	9mm		X		1.05	1131		24K-8 Plastic
		2099	II	HP	.357	X			1.50	1364		24K-8 Plastic
		2098	II	HP	9mm	X		X	——	1164	3	24K-8 Plastic
	M3-2W	2006	II	D	9mm		X		1.03	1172		24K-8 Plastic
		——	II	D	.357		X		1.33	1475		24K-8 Plastic
		2007	II	D	9mm	X			1.03	1219		24K-8 Plastic
		——	II	D	.357	X			1.37	1368		24K-8 Plastic

SUMMARY OF BALLISTIC TEST DATA (Continued)

Manufacturer of Armor	Model No.	IACP No.	Threat Level Tested	Test Lab.	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Ballistic Material In Vest (K-Kevlar N-Nylon)
Second Chance Body Armor, Inc.	X	2064	I	D	.22		X		0.70	1089		3N-8K-3N
		——	I	D	.38		X		1.25	856		3N-8K-3N
		2065	I	D	.38	X		X	——	881	1	3N-8K-3N
	Y	2062	IIA	HP	.357		X		1.70	1230		18K
		——	IIA	HP	.357	X			2.00[1]	1215	1	18K
		2063	IIA	HP	9mm		X		1.60	1135		18K
	Z	2061	II	D	.357		X		2.05[1]	1354	1	26K
Technipol International Corp.	KXX+1	1929	II	HP	9mm	X			1.40	1137		18K
		——	II	HP	.357		X		1.60	1392		18K
		2039	II	HP	9mm		X		0.93	1132		18K
		——	II	HP	.357		X		1.30	1370		18K

[1] Deformation is greater than 1.73 inches allowed by NILECJ STD-0101.01

Manufacturer of Armor	Model No.	Threat Level Tested	Test Ammo Used	Wet Test	Dry Test	Pene-tration	Defor-mation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Se-quence	Compliance Full	Compliance Non	Ballistic Material
American Body Armor & Equipment Company (continued)	K27 MC	IIA front	9mm		X		1.10	1051		X		14K-1N
			.357		X		1.60	1311		X		14K-1N
			9mm	X			1.00	1047		X		14K-1N
			.357	X			1.55	1299		X		14K-1N
	K27 MC	I back	.38		X		0.90	847		X		8K-1N
			.22		X		0.60	1054		X		8K-1N
			.38	X			0.90	881		X		8K-1N
			.22	X			0.45	1054		X		8K-1N
	K27 HD	IIA	9mm		X		1.10	1061		X		14K-1N
			.357		X		1.30	1325		X		14K-1N
			9mm	X			1.00	1132		X		14K-1N
			.357	X			1.30	1290		X		14K-1N
	K15 HD	II	9mm		X		1.25	1156		X		19K-1N
			.357		X		1.50	1347		X		19K-1N
			9mm	X			1.00	1146		X		19K-1N
			.357	X			1.20	1352		X		19K-1N
	K27 HD (sp)	II	9mm		X		1.45	1132		X		19K-1N
			.357		X		1.25	1381		X		19K-1N
			9mm	X			0.60	1150		X		19K-1N
			.357	X			1.30	1385		X		19K-1N
Protective Materials Corp.	Tufflex	IIA	9mm		X		1.05	1090		X		10SK-5DK
			.357		X		1.50	1239		X		10SK-5DK
			9mm	X			1.30	1134		X		10SK-5DK
			.357	X			1.60	1273		X		10SK-5DK

CORRECTIONS

On page 9 of the *Police Body Armor Consumer Product Report,* the Required Bullet Velocity is incorrectly shown in all instances. In each case, the velocity should read ± instead of +. We regret this oversight.

We have been informed by Technipol International Corporation that their Model KXX+1 shown on page 20 of the *Consumer Product Report* contains 20 layers of Kevlar rather than 18 layers as reported.

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INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE
ELEVEN FIRSTFIELD ROAD
GAITHERSBURG, MARYLAND 20760
(800) 638-4080

Manufacturer of Armor	Model No.	Threat Level Tested	Test Ammo Used	Wet Test	Dry Test	Pene-tration	Defor-mation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Se-quence	Compliance Full	Compliance Non	Ballistic Material
	120	II	9mm		X		0.20	1148		X		Steel Impact
			.357		X		0.40	1353		X		Steel Impact
			9mm	X			0.10	1139		X		Steel Impact
			.357	X			0.70	1390		X		Steel Impact
General Ordnance Equipment Co. (Smith & Wesson) (Continued)	434C	I	.38		X		0.50	861		X		15N-Steel Plate-2K
			.22		X		0.00	1070		X		15N-Steel Plate-2K
			.38	X			0.50	856		X		15N-Steel Plate-2K
			.22	X			0.20	1066		X		15N-Steel Plate-2K
	434C	II	9mm		X		0.00	1212		X		Steel Impact
			.357		X		0.00	1362		X		Steel Impact
			9mm	X			0.05	1208		X		Steel Impact
			.357	X			0.00	1382		X		Steel Impact
Lightweight Body Armor Ltd.	S-8	IIA	9mm		X		0.40	1154[4]		X		8K
			.357		X		1.25	1369[4]		X		8K
			9mm	X			0.85	1166[4]		X		8K
			.357	X			0.55	1325[4]		X		8K
Point Blank Body Armor Inc.	20	II	9mm		X		1.00	1142		X		16K
			.357		X		1.60	1353		X		16K
			9mm	X			1.15	1151		X		16K
			.357	X			1.35	1374		X		16K

[1] Lot number
[2] NG = Not given
[3] Manufacturer has stated that he will attach to each garment a label which identifies the threat level of protection in accordance with NILECJ Standard 0101.01.
[4] Under the standard, bullets above specified velocities are considered fair hits if no penetration occurs.

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Police Body Armor
Consumer Product Report

Supplement No. 1
January 1979

Subsequent to the publication of the initial *Police Body Armor Consumer Product Report* by the International Association of Chiefs of Police in December 1978, additional body armor models have been tested in accordance with the requirements and procedures of NILECJ-STD-0101.01, "Ballistic Resistance of Police Body Armor." Reports of tests conducted at the H. P. White, Inc. testing laboratory are summarized in this supplement. Complete test data can be obtained upon request to the IACP Equipment Technology Center.

This supplement should be affixed to one of the blank pages of the *Police Body Armor Consumer Product Report* to maintain the report in current status. Additional supplements will be issued periodically. Also, you may contact the IACP Equipment Technology Center at any time to insure that you have received the latest body armor test data available.

SUMMARY OF BALLISTIC TEST DATA

Manufacturer of Armor	Model No.	Threat Level Tested	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Ballistic Material In Vest (K-Kevlar N-Nylon)
Protective Materials Co., Inc.	Standard Flex IIA	IIA	357		X		1.50	1290		7K (Single)
			9mm		X		1.15	1111		3K (Double)
			357	X			1.50	1279		1K (Impregnated)
			9mm	X			1.10	1147		
	Standard Flex II	II	357		X		1.50	1352		12K (Single)
			9mm		X		1.20	1162		3K (Double)
			357	X			1.40	1390		1K (Impregnated)
			9mm	X			1.30	1163		

The above submitted garments were found to be in full compliance with NILECJ-STD-0101.01.

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INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE
ELEVEN FIRSTFIELD ROAD
GAITHERSBURG, MARYLAND 20760
(800) 638-4080

Police Body Armor
Consumer Product Report

Supplement No. 2
March 1979

Subsequent to the publication of the initial *Police Body Armor Consumer Product Report* by the International Association of Chiefs of Police in December 1978, additional body armor models have been tested in accordance with the requirements and procedures of NILECJ-STD-0101.01, "Ballistic Resistance of Police Body Armor." Reports of tests conducted at the H. P. White, Inc. testing laboratory are summarized in this supplement. Complete test data can be obtained upon request to the IACP Equipment Technology Center.

This supplement should be affixed to one of the blank pages of the *Police Body Armor Consumer Product Report* to maintain the report in current status. Additional supplements will be issued periodically. Also, you may contact the IACP Equipment Technology Center at any time to insure that you have received the latest body armor test data available.

Ballistic composition of the armors tested is summarized only in terms of layer count and the general types of materials used. Materials are coded as follows: K—Kevlar; N—nylon; S—single layer; D—double layer; I—impregnated layer.

SUMMARY OF BALLISTIC TEST DATA

Manufacturer of Armor	Model No.	Threat Level Tested	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (Inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Compliance Full	Compliance Non	Ballistic Material
A & B Industries	102	I	.38		X		1.46	841		X		10K
			.22		X		0.65	1066		X		10K
			.38	X			1.38	858		X		10K
			.22	X			0.65	1046		X		10K
	202	IIA	9mm		X		1.08	1050		X		18K
			.357		X		1.59	1234		X		18K
			9mm	X			1.24	1051		X		18K
			.357	X			1.38	1253		X		18K
	202	IIA front	.357	X			1.53	1232		X		16K
	202	IIA back	.357		X		1.48	1228		X		16K
	500	IV	30.06AP		X		1.46	2713		X		Ceramic
American Body Armor & Equipment Company	K10	I	.38		X		1.00	875		X		8K-1N
			.22		X		0.60	1077		X		8K-1N
			.38	X			0.90	838		X		8K-1N
			.22	X			0.60	1067		X		8K-1N
	K10 MC	I	.38		X		0.85	869		X		8K-1N
			.22		X		0.55	1045		X		8K-1N
			.38	X			0.95	867		X		8K-1N
			.22	X			0.40	1050		X		8K-1N
	K15	IIA	9mm		X		1.00	1115		X		14K-1N
			.357		X		1.50	1298		X		14K-1N
			9mm	X			1.35	1150		X		14K-1N
			.357	X			1.45	1354		X		14K-1N

Police Body Armor
Consumer Product Report

Supplement No. 3
May 1979

Subsequent to the publication of the initial *Police Body Armor Consumer Product Report* by the International Association of Chiefs of Police in December 1978, additional body armor models have been tested in accordance with the requirements and procedures of NILECJ-STD-0101.01, "Ballistic Resistance of Police Body Armor." Reports of additional tests conducted to date are summarized in this and prior Supplements. Complete test data can be obtained upon request to the IACP Equipment Technology Center.

This supplement should be affixed to one of the blank pages of the *Police Body Armor Consumer Product Report* to maintain the report in current status. Additional supplements will be issued periodically. Also, you may contact the IACP Equipment Technology Center at any time to insure that you have received the latest body armor test data available.

Ballistic composition of the armors tested is summarized only in terms of layer count and the general types of materials used. Materials are coded as follows: K—Kevlar; N—nylon; S—single layer; D—double layer; I—impregnated layer.

SUMMARY OF BALLISTIC TEST DATA

Manufacturer of Armor	Model No.	Threat Level Tested	Test Ammo Used	Wet Test	Dry Test	Penetration	Deformation (inches)	Muzzle Velocity (Ft./Sec.)	Shot Sequence	Compliance: Full	Compliance: Non	Ballistic Material
Blauer Manufacturing Company[3]	12516[1]	I	.38		X		1.58	806		X		8K
	NG[2]	I	.38	X			1.69	886		X		8K
	12516[1]	I	.22		X		0.88	1047		X		8K
	NG[2]	I	.22	X			0.83	1012		X		8K
	12532[1]	IIA	9mm		X		1.33	1042		X		16K
	NG[2]	IIA	9mm	X			1.39	1118		X		16K
	12532[1]	IIA	.357		X		1.58	1210		X		16K
	NG[2]	IIA	.357	X			1.68	1292		X		16K
General Ordnance Equipment Co. (Smith & Wesson)	217	I	.38		X		0.90	897		X		15N-Steel Plate
			.22		X		0.50	1053		X		15N-Steel Plate
			.38	X			0.30	877		X		15N-Steel Plate
			.22	X			0.00	1018		X		15N-Steel Plate
	217	II	9mm		X		0.20	1337		X		Steel Impact
			.357		X		0.80	1350		X		Steel Impact
			9mm	X			0.40	1132		X		Steel Impact
			.357	X			0.60	1356		X		Steel Impact
	120	I	.38		X		0.65	859		X		15N-Steel Plate
			.22		X		0.10	1019		X		15N-Steel Plate
			.38	X			0.60	878		X		15N-Steel Plate
			.22	X			0.10	1050		X		15N-Steel Plate

END