



Firearms Examination Test No. 18-526 Summary Report

Each sample set consisted of three known expended bullets (Item 1) test-fired from a suspect weapon and four questioned expended bullets (Items 2-5). Participants were requested to examine these items and report their findings. Data were returned from 368 participants and are compiled into the following tables:

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This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

Manufacturer's Information

Each sample set contained five items: Item 1 consisted of three bullets fired in the suspect's firearm. Item 2 (recovered from the victim) and Items 3, 4 and 5 (recovered from the scene) each consisted of one bullet. Federal® American Eagle® 40 S&W 180 grain full metal jacket (FMJ) centerfire ammunition was used for all five items. Participants were requested to determine which, if any, of the recovered questioned bullets (Items 2-5) were fired from the same firearm as the known bullets (Item 1).

The bullets in Item 1 were fired in a Beretta PX4 Storm .40 S&W handgun (Serial Number PY79160). Items 2, 3, 4 and 5 were fired in a Beretta PX4 Storm .40 S&W handgun (Serial Number P401299).

ITEM 1: Multiple magazines were loaded with Federal® American Eagle® ammunition for firing with the Beretta PX4 Storm .40 S&W handgun (Serial Number PY79160). After the ammunition was expended, the bullets were collected and packaged together as a batch. This process was repeated until the required number was produced. Out of each batch, the necessary number of bullets was selected and inscribed with a "1" (three bullets), then sealed into their respective jewel boxes.

ITEMS 2, 3, 4, 5 (ELIMINATION): Multiple magazines were loaded with Federal® American Eagle® ammunition for firing with the Beretta PX4 Storm .40 S&W handgun (Serial Number P401299). After the ammunition was expended, the bullets were collected. This process was repeated until the required number was produced. The necessary number of bullets was selected and inscribed with a "2" (one bullet), "3" (one bullet), "4" (one bullet) or "5" (one bullet), then sealed into their respective jewel boxes.

SAMPLE SET ASSEMBLY: For each sample set, Item 1 and elimination Items 2, 3, 4 and 5 were placed in a sample pack box. This process was repeated until all of the sample sets were prepared. Once verification was completed, the sample packs were sealed with evidence tape and initialed "CTS."

VERIFICATION: During test production, 10% of the bullets from each batch were selected and intercompared to confirm that markings were consistent. All three predistribution laboratories reported the expected responses that the Item 2, 3, 4 and 5 bullets were not fired in the same firearm as the known Item 1 bullets.

Summary Comments

This test was designed to allow participants to assess their proficiency in a comparison of expended bullets. Participants were provided with four questioned expended Federal® American Eagle® 40 S&W 180 grain full metal jacket (FMJ) centerfire bullets (Items 2, 3, 4 and 5) which they were requested to compare with three known expended bullets (Item 1) that were fired in the suspect's weapon, a Beretta PX4 Storm .40 S&W handgun. For each sample set, the Item 2, 3, 4 and Item 5 bullets were fired in a different firearm from that which discharged the Item 1 bullets. [Refer to Manufacturer's Information for preparation details.]

In Table 1 Response Summary, 368 of 368 (100%) responding participants eliminated (340) or were inconclusive (28) for Items 2, 3, 4 and 5 as having been fired from the same firearm as the Item 1 test-fired bullets.

Many participants commented that two guns were involved and that Items 2, 3, 4 and 5 were fired from the same, unknown gun.

CTS is aware that many labs will not, as a matter of policy, eliminate without access to the firearm or when class characteristics match.

Examination Results

Were any of the recovered questioned bullets (Items 2-5) fired in the same firearm as the known bullets (Item 1)?

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
22K9ND	Inc	Inc	Inc	Inc	4HZER9	No	No	No	No
246C2C	No	No	No	No	4JWUXE	No	No	No	No
249XP7	Inc	Inc	Inc	Inc	4K66W3	Inc	Inc	Inc	Inc
29GBGC	No	No	No	No	4N73FH	No	No	No	No
2AX7HC	No	No	No	No	4NNV8F	No	No	No	No
2CZDGV	No	No	No	No	4QDHNA	No	No	No	No
2EB3XL	No	No	No	No	4QF3KP	No	No	No	No
2GKW8T	No	No	No	No	4UWKL8	No	No	No	No
2KFU96	No	No	No	No	4YRA6Z	Inc	Inc	Inc	Inc
2PQRWR	No	No	No	No	639PFD	No	No	No	No
32LGCR	No	No	No	No	6DPEG4	No	No	No	No
36FG6T	No	No	No	No	6DQA3U	No	No	No	No
36G98G	No	No	No	No	6DR4LZ	No	No	No	No
3AL6QG	No	No	No	No	6G7Y2X	No	No	No	No
3DVAM4	No	No	No	No	6MVJ6D	No	No	No	No
3DXYR2	No	No	No	No	6PDRZ7	No	No	No	No
3FUL8H	No	No	No	No	6Q8FH3	No	No	No	No
3HPZ4N	No	No	No	No	6QA2F3	No	No	No	No
3L8BZR	No	No	No	No	6QVRB9	No	No	No	No
3NBWLJ	No	No	No	No	6U8L2E	No	No	No	No
3PMR8B	No	No	No	No	6UB8V9	No	No	No	No
3RYBMZ	No	No	No	No	6VHD8A	No	No	No	No
3VE3DT	No	No	No	No	6YB98P	No	No	No	No
3YBLLT	No	No	No	No	72KXRK	No	No	No	No
437U39	No	No	No	No	74PPJX	No	No	No	No
43CRVX	No	No	No	No	77JE6E	No	No	No	No
44ZHL4	No	No	No	No	7DKJ3P	No	No	No	No
46FNEZ	No	No	No	No	7KJ9JU	No	No	No	No
48YULA	No	No	No	No	7LY82X	No	No	No	No
4CECTJ	No	No	No	No	7M9976	No	No	No	No
4DKZPB	No	No	No	No	7NEY66	No	No	No	No
4HH9MR	No	No	No	No	7WD9CX	No	No	No	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
7ZVL2R	No	No	No	No	AVTP4W	No	No	No	No
823ED6	No	No	No	No	AZGHNA	No	No	No	No
83E6D9	No	No	No	No	B2LHEA	No	No	No	No
83W3VZ	No	No	No	No	B9VKUB	No	No	No	No
87RYY8	No	No	No	No	BBQPUA	No	No	No	No
8BMVLD	No	No	No	No	BE32BC	Inc	Inc	Inc	Inc
8DFFXD	No	No	No	No	BMP8XH	No	No	No	No
8KEVRR	No	No	No	No	BQX7LX	No	No	No	No
8KW746	No	No	No	No	BWEXKB	No	No	No	No
8PCK3W	No	No	No	No	BXNYCB	No	No	No	No
8XMPD3	No	No	No	No	BXPY6N	No	No	No	No
8YD9J9	No	No	No	No	BXV339	No	No	No	No
8Z2PPA	No	No	No	No	BYKH44	No	No	No	No
92DLUE	No	No	No	No	C3J79H	No	No	No	No
9434Z7	No	No	No	No	C6MRBW	No	No	No	No
99J2W9	No	No	No	No	C7YNF2	No	No	No	No
9AYACP	No	No	No	No	C8FVRB	No	No	No	No
9CXY3B	No	No	No	No	CHY3WR	No	No	No	No
9LLRE8	No	No	No	No	CLVXAY	No	No	No	No
9MUZAK	No	No	No	No	CPRK23	No	No	No	No
9P4UJR	No	No	No	No	D3D2ME	No	No	No	No
9UGQAM	No	No	No	No	D3WZMX	Inc	Inc	Inc	Inc
9W3JZV	Inc	Inc	Inc	Inc	D8LJL	No	No	No	No
A6FT64	No	No	No	No	DBQANF	No	No	No	No
A7BGER	No	No	No	No	DCKRBB	Inc	Inc	Inc	Inc
AD36NA	No	No	No	No	DE6WGY	No	No	No	No
AFA72U	No	No	No	No	DF27TP	No	No	No	No
AJYLJ3	No	No	No	No	DFNKC2	No	No	No	No
AK43QK	No	No	No	No	DGKXYT	No	No	No	No
AKL9VC	No	No	No	No	DKHGY7	No	No	No	No
AKU6NP	No	No	No	No	DNZTMB	No	No	No	No
ALGUH3	No	No	No	No	DPVGVX	No	No	No	No
ANUDRY	No	No	No	No	DQMHT9	No	No	No	No
ARP3Z7	No	No	No	No	DTQ92A	No	No	No	No
AT2VYE	No	No	No	No	DY9LKG	No	No	No	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
E2Y86J	No	No	No	No	GMBTX3	No	No	No	No
E4RWVR	No	No	No	No	GPLGMT	No	No	No	No
E6YDR3	No	No	No	No	GU7T8N	No	No	No	No
EE4AL8	No	No	No	No	GUCXVD	No	No	No	No
EFZLPM	No	No	No	No	GYABYQ	No	No	No	No
EH2VBP	No	No	No	No	GYHU27	No	No	No	No
EHP3PM	No	No	No	No	GYPWBD	No	No	No	No
ENTZ7E	No	No	No	No	H47WKW	No	No	No	No
EQ23JX	No	No	No	No	H8ACMU	No	No	No	No
ERFL6G	No	No	No	No	H9L69V	No	No	No	No
ETUX78	No	No	No	No	HDH3NE	No	No	No	No
EVQV4C	No	No	No	No	HGEQ4L	No	No	No	No
EVUBKJ	No	No	No	No	HGJWRB	No	No	No	No
EY9VJR	No	No	No	No	HLPTY6	No	No	No	No
EYDARM	No	No	No	No	HMNQTY	No	No	No	No
F6ANTE	No	No	No	No	HNUC8X	No	No	No	No
F6FMHH	No	No	No	No	HQ474X	No	No	No	No
FB3TLH	No	No	No	No	HZBYGY	No	No	No	No
FBEE6R	No	No	No	No	HZWHDJ	Inc	Inc	Inc	Inc
FDPEAY	No	No	No	No	J3YNMX	No	No	No	No
FEDVF2	No	No	No	No	J4AKXU	No	No	No	No
FGA7V3	No	No	No	No	J968T4	No	No	No	No
FGRYR7	No	No	No	No	JAEGGU	No	No	No	No
FHXQ9K	No	No	No	No	JC2A4W	No	No	No	No
FM83Y7	No	No	No	No	JMM38E	No	No	No	No
FPHQQJ	No	No	No	No	JPCJ8E	No	No	No	No
FQFXFQ	No	No	No	No	JU2ZKZ	No	No	No	No
FQWZXX	No	No	No	No	JYYKMN	No	No	No	No
FRLF4Z	No	No	No	No	K7ZY76	No	No	No	No
FT7CNZ	No	No	No	No	KDZGLG	No	No	No	No
G4W97Z	No	No	No	No	KEKG8Q	Inc	Inc	Inc	Inc
G9QDRG	No	No	No	No	KGBHDE	No	No	No	No
GAXK3W	No	No	No	No	KGWA9J	No	No	No	No
GH2LK4	Inc	Inc	Inc	Inc	KHNA7V	No	No	No	No
GK4DLP	Inc	Inc	Inc	Inc	KK963V	Inc	Inc	Inc	Inc

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
KKMK8W	No	No	No	No	NEX66M	No	No	No	No
KL3TKQ	Inc	Inc	Inc	Inc	NHDKR9	No	No	No	No
KL6HPN	No	No	No	No	NLNMLQ	No	No	No	No
KQYHXH	No	No	No	No	NR4AG9	No	No	No	No
KRPKQY	No	No	No	No	NRGQEU	No	No	No	No
L6D9AP	No	No	No	No	NWAYR2	No	No	No	No
L74B6R	Inc	Inc	Inc	Inc	NXH7ZW	No	No	No	No
L78NWU	No	No	No	No	NXNE3H	No	No	No	No
L83ER2	No	No	No	No	P27QPQ	No	No	No	No
L864WX	No	No	No	No	P2ZQEP	Inc	Inc	Inc	Inc
LAMFK2	No	No	No	No	P3UEVY	No	No	No	No
LCF8YT	No	No	No	No	PADMEP	No	No	No	No
LCR27T	No	No	No	No	PAFCJM	No	No	No	No
LFXBPB	No	No	No	No	PBAZ3H	No	No	No	No
LJVR4Q	No	No	No	No	PBQ6KF	No	No	No	No
LK3AWU	No	No	No	No	PF2383	No	No	No	No
LLYMJM	No	No	No	No	PLLEUH	Inc	Inc	Inc	Inc
LMV292	No	No	No	No	PW324J	Inc	Inc	Inc	Inc
LNDZFW	No	No	No	No	PX4VZW	No	No	No	No
LP2EZZ	No	No	No	No	PZUYQH	No	No	No	No
LR3K3Z	No	No	No	No	Q4KURN	No	No	No	No
LRTKBY	No	No	No	No	Q86MXP	No	No	No	No
LXHZ2R	No	No	No	No	Q8AYN7	No	No	No	No
LZHG2T	No	No	No	No	Q8Q9HT	No	No	No	No
LZMH7E	No	No	No	No	Q9ZBEY	No	No	No	No
M3N9ME	No	No	No	No	QAUOVA	No	No	No	No
M6BRK6	No	No	No	No	QBQKET	No	No	No	No
MCACTT	No	No	No	No	QJKP8U	No	No	No	No
MHFZBZ	No	No	No	No	QK8DFM	No	No	No	No
MK4J8R	Inc	Inc	Inc	Inc	QKUQ2E	No	No	No	No
MPH2P9	No	No	No	No	QNUTAP	No	No	No	No
MTU6B6	No	No	No	No	QP3AZ8	No	No	No	No
MUNPAW	No	No	No	No	QW68ZX	No	No	No	No
N37C27	No	No	No	No	QWX47T	No	No	No	No
N97XME	Inc	Inc	Inc	Inc	RAAP67	No	No	No	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
RHHB8E	No	No	No	No	VTZBYQ	No	No	No	No
RR9ULM	No	No	No	No	VUET6H	No	No	No	No
RRRQZ8	No	No	No	No	VUYFR7	No	No	No	No
RT3H6H	No	No	No	No	VYD3G6	No	No	No	No
RVYF3N	No	No	No	No	W399DL	No	No	No	No
RWMD29	No	No	No	No	W3CKBQ	No	No	No	No
RZHA6F	Inc	Inc	Inc	Inc	W4AVJZ	No	No	No	No
T4WDJP	No	No	No	No	WAVT9M	No	No	No	No
T4YYDJ	No	No	No	No	WDC4WR	No	No	No	No
TKM6UP	No	No	No	No	WHJNQP	No	No	No	No
TLCP89	No	No	No	No	WLJZLP	No	No	No	No
TMAZ4C	No	No	No	No	WLQY2L	No	No	No	No
TQK2XU	No	No	No	No	WMZ9UH	Inc	Inc	Inc	Inc
TTFQBN	No	No	No	No	WP7HWN	No	No	No	No
U2MJJH	No	No	No	No	WRU6GN	No	No	No	No
U93GYP	No	No	No	No	WRXMG9	No	No	No	No
UGWJ3L	No	No	No	No	WUXR42	No	No	No	No
UJLY9N	Inc	Inc	Inc	Inc	WW4CUL	No	No	No	No
UMJDVD	Inc	Inc	Inc	Inc	WZG7FK	Inc	Inc	Inc	Inc
UQ3GTB	No	No	No	No	X3PH99	No	No	No	No
UVEHMT	No	No	No	No	X8KJ2A	No	No	No	No
UWDDU4	No	No	No	No	XCF2QM	No	No	No	No
UWDJ9D	No	No	No	No	XCVGRH	No	No	No	No
UWQ9YH	No	No	No	No	XE76H9	No	No	No	No
UYG6RJ	No	No	No	No	XFBYUK	No	No	No	No
UYJXM7	No	No	No	No	XJC8YV	No	No	No	No
V49WE7	No	No	No	No	XJPTGJ	No	No	No	No
VADL6Q	Inc	Inc	Inc	Inc	XMBLKY	No	No	No	No
VBR44Q	No	No	No	No	XNRLW2	No	No	No	No
VC6REP	No	No	No	No	XNTGF8	No	No	No	No
VJPFKT	Inc	Inc	Inc	Inc	XQ9Z8N	No	No	No	No
VKQZTK	No	No	No	No	XXY2ZN	No	No	No	No
VMX2VJ	No	No	No	No	XY7HZF	No	No	No	No
VQHXP	No	No	No	No	XZVW76	No	No	No	No
VTVMYT	No	No	No	No	XZYN3R	No	No	No	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
Y2CBK7	No	No	No	No					
Y2P4UE	No	No	No	No					
Y3ZXQE	No	No	No	No					
Y4ZUCV	No	No	No	No					
Y74MBV	No	No	No	No					
Y7H9KX	No	No	No	No					
YCT8AA	No	No	No	No					
YDMPGD	Inc	Inc	Inc	Inc					
YK8474	No	No	No	No					
YL2RNY	No	No	No	No					
YLXC8R	No	No	No	No					
YTFH4Y	No	No	No	No					
YVMZ3V	No	No	No	No					
YZFRKP	No	No	No	No					
Z77FYV	No	No	No	No					
Z968EL	No	No	No	No					
ZC8W9F	No	No	No	No					
ZDCR9K	No	No	No	No					
ZF6BKK	No	No	No	No					
ZNW2WE	No	No	No	No					
ZTHF6M	No	No	No	No					
ZYKPBF	No	No	No	No					
ZZ7DCU	No	No	No	No					
ZZ9CGN	No	No	No	No					

Response Summary					Participants: 368
<i>Were any of the recovered questioned bullets (Items 2-5) fired in the same firearm as the known bullets (Item 1)?</i>					
Responses		<u>Item 2</u>	<u>Item 3</u>	<u>Item 4</u>	<u>Item 5</u>
	Yes	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	No	340 (92.4%)	340 (92.4%)	340 (92.4%)	340 (92.4%)
	Inc	28 (7.6%)	28 (7.6%)	28 (7.6%)	28 (7.6%)

Conclusions

TABLE 2

WebCode	Conclusions
22K9ND	A comparison of the projectiles in Items 2 through 5 to the test fired projectiles from Item 1 revealed that Item 2 through 5 bear similar class characteristics to the test fired projectiles of Item 1, but did not have sufficient corresponding individual microscopic marks to allow an identification with each other. Therefore, no conclusion could be reached as to whether or not they were fired from the same firearm. However, further comparisons of Items 2 through 5 were conducted and it was determined, based on macroscopic and microscopic characteristics, that Items 2 through 5 were fired in the same firearm.
246C2C	3. On 2018-06-07 during the performance of my official duties I received a sealed evidence bag with number PA4002342050 from Case Administration of the Ballistics Section, containing the following items: 3.1 Item 1 containing the following: 3.1.1 Three (3) .45 calibre fired bullets marked "1". 3.2 Item 2 containing the following: 3.2.1 One (1) .45 calibre fired bullet marked "2". 3.3 Item 3 containing the following: 3.3.1 One (1) .45 calibre fired bullet marked "3". 3.4 Item 4 containing the following: 3.4.1 One (1) .45 calibre fired bullet marked "4". 3.5 Item 5 containing the following: 3.5.1 One (1) .45 calibre fired bullet marked "5". 4. The intention and scope of this forensic examination comprises of the following: 5.1 The examination and identification of fired bullets. 5.2 Microscopic individualization of fired bullets. 6. I examined the fired bullets mentioned in paragraphs 3.1.1, 3.2.1, 3.3.1, 3.4.1 and 3.5.1 and compared the individual and class characteristics markings on them using a comparison microscope and found: 6.1 The bullets mentioned in paragraphs 3.2.1, 3.3.1, 3.4.1 and 3.5.1 were fired from a first (1st) firearm. 6.2 The bullets mentioned in paragraph 3.1.1 were fired from a second (2nd) firearm.
249XP7	The projectiles in Items 2,3,4 and 5 bear class characteristics consistent with the projectiles in Item 1. However, no significant similarities in individual characteristics were observed
29GBGC	The reference projectiles fired from the Beretta pistol, specimen #1, were microscopically compared to the copper jacketed projectiles, specimen #2 through #5. It was determined that specimens #2 through #5 were fired from the same weapon; however, they were not fired from the Beretta pistol, specimen #1, due to differences in the individual striations. Further examination revealed that specimens #2 through #5 were consistent with .40 caliber class ammunition (which includes .40 S&W, etc.) and were fired from the barrel of a firearm that possessed six lands and grooves with a right twist.
2AX7HC	The submission 002-02, 003-03, 004-04 and 005-05 projectiles were identified as having been fired from the same unknown firearm. These projectiles were eliminated as having been fired from the same firearm that fired the submission 001 test-fires, based on differences in individual characteristics. Firearms that could have fired the submission 002,003, 004, and 005 projectiles include, but are not limited to firearms manufactured by Beretta, Smith & Wesson, and Taurus. Other possibilities may also exist. All identifications were based on microscopic comparison and the correspondence of individual characteristics.
2CZDGV	Examinations showed Items 2 through 5 were discharged from the same unknown firearm. Examinations showed Items 2 through 5 were not discharged from the same firearm as Item 1.
2EB3XL	ITEM 2, ITEM 3, ITEM 4 AND ITEM 5 WERE DISCHARGED FROM THE SAME PISTOL, DIFFERENT OF ITEM 1 PISTOL
2GKW8T	Based on the sufficient agreement of marks, Exhibits 2 through 5 were identified as having been fired in the same firearm. Based on the significant differences of the marks, Exhibits 2 through 5 were eliminated as having been fired in the same firearm that fired the Exhibit 1 bullets.
2KFU96	Items 2 through 5 were fired in the same firearm, however they were not fired in the same firearm as the item 1 test fires.

TABLE 2

WebCode	Conclusions
2PQRWR	The bullets listed under Items# 2, 3, 4, 5 were not fired from the same firearm as the bullets listed under Item #1. The exclusion is based on differences of individual characteristics. The bullets listed under Items# 2, 3, 4, 5 were all fired from the same firearm based on sufficient agreement of class and individual characteristics of the land impression marks.
32LGCR	The following findings reflect the professional opinion of the examiner authoring this report. Examination of the three (3) fired full metal jacket bullets (Item 1) revealed they are 40 caliber and fired through a firearm barrel rifled with six (6) lands and grooves with a right hand twist. Examination of the four (4) fired full metal jacket bullets (Items 2 through 5) revealed they are 40 caliber and fired through a firearm barrel rifled with six (6) lands and grooves with a right hand twist. Microscopic examination of Item 1 with Items 2 through 5 revealed Items 2 through 5 were not fired through the same barrel as Item 1.
36FG6T	A microscopic examination and comparison of the evidence described above revealed the following: Bullets (2-5) are identified as having been discharged from the same firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Test fires (1.1-1.3) and Bullets (2-5) are eliminated as having been discharged from the same firearm based on the observed disagreement of individual characteristics.
36G98G	After examination of fired bullets, I compare the individual and class characteristics markings using a comparison microscope and found: (1) The bullets marked item 2 to item 5 were fired from the same firearm but they are negative with the bullets marked item 1. (2) Therefore bullets marked item 2 - item 5 were fired from the same firearm and item 1 bullets were fired from another firearm.
3AL6QG	I examined the fired bullets received and compared the individual and class characteristics markings on them using a comparison microscope and found: 2.1 The bullets marked Item 2 to Item 5 were fired from one firearm. 2.2 The bullets marked Item 2 to Item 5 were not fired in the same firearm as Item 1.
3DVAM4	#001-2 through #001-5 were microscopically compared & identified as having been fired from the same firearm. #001-2 through #001-5 were microscopically compared to #001-1-1 through #001-1-3. #001-2 through #001-5 were eliminated from having been fired from the same firearm as #001-1-1 through #001-1-3 due to a disagreement of individual characteristics. #001-2 is a .40/10mm caliber class fired bullet bearing (6) land and groove impressions with a right hand twist. Firearms with this rifling pattern include, but are not limited to, those manufactured under the brand name Beretta, CZ, Heritage, Iberia Arms, Sig Sauer, Smith & Wesson, Steyr-Mannlicher and Taurus; however any suspect weapon should be submitted with the above evidence for examination & comparison.
3DXR2	Comparison microscope examinations were conducted on the evidence listed above. The findings of this examiner are the following: 1- Exhibits 2 through 5 are spent bullets consistent with .40 caliber class projectiles normally loaded in .40 S&W caliber cartridges. 2- Exhibits 2 through 5 were fired in the same firearm based on agreement of individual characteristics. 3- Exhibits 2 through 5 were not fired in exhibit 1 (test fires from .40 S&W caliber Beretta model PX4 Storm) based on difference of individual characteristics. 4 The following is an investigative lead only and not intended to exclude all other makes of firearms. Based on class characteristics of the submitted evidence, the possible firearm used to fire exhibits 2 through 5 include .40 S&W caliber Beretta model PX4 Storm pistol.
3FUL8H	After the examination, the bullets recovered from the crime scene, show common marks among them, therefore we can conclude that the whole items have been fired through the same pistol. This semiautomatic pistol is not the same that the recovered firearm (Beretta).
3HPZ4N	Three projectiles are marked as Test No. 18-526 Item 1 according to information are patterns taken from the gun type gun Beretta px4 Storm caliber .40, with grooved firearm barrel with six grooves and six lands with direction of rotation to the right that which they match between

TABLE 2

WebCode	Conclusions
	<p>them. Four projectiles are marked as Test No. 18-526 item 2; item 3; item 4 and item 5 were fired on a .40 caliber pistol-type firearm, with grooved firearm barrel with six grooves and six lands with direction of rotation to the right, most common brands Pietro Beretta, Glock, Heckler and Koch, among others. Projectiles comparison are related between: P4/7 (Item 2 recovered by medical examiner), P5/7, P6/7 and P7/7 (Item 3, Item 4 and Item 5 recovered at the scene) caliber .40, with projectiles obtained as a sample pattern of the firearm, gun type, marked P1/7, P2/7, P3/4 (Item 1). They not match.</p>
3L8BZR	<p>Test fired bullets in Item 1 were microscopically examined with the bullets in Item 2, Item 3, Item 4, and Item 5. Based on these comparative examinations, it was determined that: A)The bullets in Item 2, Item 3, Item 4, and Item 5 all share the same class characteristics as the test fired bullets in Item 1. However, there are no marks to link the bullets in Item 2, Item 3, Item 4, and Item 5 as having been fired in the same firearm as the test fired bullets in Item 1. B) The bullets in Item 2, Item 3, Item 4, and Item 5 had all been fired in the same 40 S&W caliber firearm. The 6-right rifling characteristics present are common to a variety of 40 S&W caliber firearms. Some of the more common brands include: Beretta, H&K, Ruger, Taurus, and others. Suspect firearms should be submitted for comparison.</p>
3NBWLJ	<p>The Items 2 through 5 fired bullets were compared to the Item 1 tests. All of Items 2 through 5 were eliminated as being fired from the firearm that fired the Item 1 tests. Comparison of Items 2 through 5 to each other disclosed they were all identified as being fired from the same (unidentified) firearm.</p>
3PMR8B	<p>Comparative examinations of Items 2 through 5 (four bullets) against Item 1 (bullets test fired from the recovered firearm) showed the presence of different features. This means that the recovered firearm used to test fire Item 1, in its present condition, did not fire Items 2 through 5. Comparative examination of Item 2 against Items 3, 4 and 5 showed the presence of matching features. This indicates that Items 2 through 5 were fired by the same firearm.</p>
3RYBMZ	<p>Test bullets #1 through #3 (Item 1) were compared microscopically to items 2, 3, 4 and 5. The examinations determined Items 2, 3, 4 and 5 were fired from a different firearm than Item 1 due to a disagreement of individual characteristics. Items 2, 3, 4 and 5 were compared microscopically to each other. The examinations determined that Items 2, 3, 4 and 5 were fired from the same firearm due to sufficient agreement between striations.</p>
3VE3DT	<p>See Report [Attachment not provided by participant]</p>
3YBLLT	<p>Test Fires (1.1, 1.2, 1.3) were microscopically examined and compared: Test Fires (1.1 1.2, 1.3), from above listed firearm, are identified as having been discharged from the SAME firearm, based on the observed agreement of their class and sufficient agreement of their individual characteristics. Bullets (2, 3, 4, 5) were microscopically examined and compared: Bullets (2, 3, 4, 5) are identified as having been discharged from the SAME firearm, based on the observed agreement of their class and sufficient agreement of their individual characteristics. Test Fires (1.1, 1.2, 1.3) and Bullets (2, 3, 4, 5) were microscopically examined and compared: Test Fires (1.1 1.2, 1.3), from above listed firearm, and Bullets (2, 3, 4, 5) are ELIMINATED as having been discharged from the same firearm based on the observed disagreement of individual characteristics.</p>
437U39	<p>Items 001-B through 001-E were compared microscopically to the test fires in Item 001-A. It was determined that Items 001-B through 001-E were not fired from the same firearm as the Item 001-A test fires. Items 001-B through 001-E were compared microscopically to each other. It was determined that Items 001-B through 001-E were fired from the same firearm. Examinations of Items 001-B through 001-E showed these recovered projectiles to be consistent in size, shape, weight, and material with .40 caliber FMJ projectiles fired from a firearm rifled with six lands and grooves with a right hand twist. A search of the FBI General Rifling Characteristics database indicates that Items 001-B through 001-E may have been fired</p>

TABLE 2

WebCode	Conclusions
	from a firearm marketed by Ceska Zbrojovka, Iberia Arms, Smith & Wesson, Steyr-Mannlicher, or any other firearm exhibiting similar characteristics.
43CRVX	The 40 caliber class bullets (Items 2, 3, 4 and 5) were all fired from the same firearm. The 40 caliber class bullets (Items 2, 3, 4 and 5) were not fired from the same firearm as the three 40 caliber class bullets fired using the recovered firearm (Item 1).
44ZHL4	The fired bullets, Items 2, 3, 4 and 5, were microscopically examined and compared versus the known test fired bullets, Item 1. There is observed agreement of their class characteristics. However, based on observed disagreement of individual characteristics, Items 2, 3, 4 and 5 were not identified as having been fired from the same firearm as Item 1.
46FNEZ	The Items 2, 3, 4 and 5 bullets were NOT fired by the same firearm as the Item 1 "tests", based on a different pattern of rifling characteristics. Items 2, 3, 4 and 5 display corresponding characteristics suggesting that they were all fired by one unknown firearm, and could be possibly be conclusively identified if the suspect firearm were available for examination. Manufacturers/brands of firearms that could have fired these bullets include Beretta, CZ, SigArms and Taurus.
48YULA	Items 2, 3, 4 and 5 bullets were fired from one firearm and are consistent with bullets commonly found loaded in some 40 S&W and 10mm Auto caliber ammunition. These bullets were not fired from the same firearm that fired the Item 1 test-fired bullets. See the attachment for a list of firearm manufacturers/origins that may have fired Items 2 through 5. Note this list may not be all inclusive. [Attachment not provided by participant]
4CECTJ	The four (4) 40 Smith and Wesson caliber missiles - items #2, #3, #4, and #5 were microscopically examined and were determined to have been fired by one (1) firearm. The four (4) 40 Smith and Wesson caliber missiles - items #2, #3, #4, and #5 were microscopically examined and were determined to have not been fired by the Beretta model pistol - item #1.
4DKZPB	I examined the bullets marked Item 1 to Item 5 and compared the individual and class characteristics markings transferred to them by firearms components during the firing process using a comparison microscope and found: - The bullets marked Item 2 to Item 5 were fired from the same firearm. - The bullets marked Item 1 were fired from a second firearm.
4HH9MR	A microscopic examination and comparison of the evidence described above revealed the following: deformed bullets (2, 3, 4, 5) are identified as having been discharged from the SAME gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Test fired bullets (1.1 - 1.3) and deformed bullets (2, 3, 4, 5) are ELIMINATED as having been discharged from the same gun based on the observed disagreement of individual characteristics.
4HZER9	Exhibit 1: These bullets were compared microscopically with each other and were identified as having been fired from a single firearm. Exhibits 2, 3, 4, and 5: These bullets are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka (CZ), Iberia Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher, and Taurus among others. They were compared microscopically with each other and were identified as having been fired from a single firearm; however, they were not fired from the same firearm as the bullets Exhibit 1.
4JWUXE	Tests #1, #1A, #1B - Pos(+) Identification to each other. Items #2 thru #5 - Pos(+) Identification to each other. #1, #1A, #1B vs #2 thru #5 - Neg(-) Elimination. Items #2 thru #5 were eliminated as having been discharged from the Beretta px4 Storm.
4K66W3	The projectiles in Items 2 through 5 bear class characteristics consistent with the projectiles in Item 1. However, no significant similarities in individual characteristics were observed.
4N73FH	The sized pistol (Beretta PX4 Storm, caliber .40 Smith & Wesson) has not fired the questioned bullets (ITEM 2, 3, 4 and 5). Questioned bullets are fired by the same pistol. This pistol has the same caliber and class characteristics that de sized pistol. The individual characteristics from

TABLE 2

WebCode	Conclusions
	recovered bullets (ITEMS 2 to 5), have significantly differences with three bullets fired using the recovered firearm (ITEM 1).
4NNV8F	None of the recovered questioned bullets (items 2-5) were fired from the same firearm (handgun) as the known bullets (item 1). The suspects handgun was not involved in the homicide at the jewellery store.
4QDHNA	The test fired copper jacketed projectiles from the Beretta pistol, specimen #1, were microscopically compared to the copper jacketed projectiles, specimens #2 through #5. It was determined that specimens #2 through #5 were fired from the same weapon; however, they were not fired from the Beretta pistol, specimen #1, due to differences in the individual striations. Further examination revealed that specimens #2 through #5 were consistent with .40 caliber class ammunition (which includes .40 S&W) and were fired from the barrel of a firearm that possessed six lands and grooves with a right twist.
4QF3KP	The evidence in items 1 through 5 was analyzed by physical and microscopic examination. The four (4) bullets in items 2, 3, 4, and 5 were determined to not have been fired from the same weapon as the three (3) known bullets in item 1. The four (4) bullets in items 2, 3, 4, and 5 were fired from one weapon. The four (4) bullets in items 2, 3, 4, and 5 were 40 caliber bullets which had been fired from the barrel of a weapon rifled with six (6) lands and grooves, right twist. Further analysis is pending submission of another weapon for additional comparison.
4UWKL8	The submitted bullets, Items #2-#5, were compared microscopically with each other and the submitted test fires, Item #1. There is agreement in all discernible class characteristics and sufficient disagreement in individual characteristics for elimination. These four bullets were not fired by the firearm that discharged the submitted tests. The four submitted bullets, Items #2-#5, have sufficient agreement in corresponding individual characteristics for identification. #2-#5 were discharged in the same firearm.
4YRA6Z	The bullets in Items 1, 2, 3, 4, and 5 were microscopically examined in conjunction with one another. Based on these comparative examinations and observed class and individual characteristics, it was determined that: A) The bullets in Items 2, 3, 4, and 5 had all been fired in the same firearm. B) The bullets from Item 1 bear the same class characteristics as Items 2, 3, 4, and 5. However, there are insufficient individual characteristics to link the bullets in Items 2, 3, 4, and 5 as having been fired in the same firearm as Item 1. The 6-Right rifling characteristics found on Items 2, 3, 4, and 5 are common to a variety of 40 S&W caliber firearms. Some of the most commonly encountered brands include: Beretta, Ceska Zbrojovka (CZ), Czechoslovakia, Heritage, Iberia Arms, KSN Industries, Republic Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher, Taurus, and possible others.
639PFD	The Item 1 bullets were eliminated as having been fired from the same firearm that fired the Item 2, 3, 4 and 5 bullets. The Item 2, 3, 4 and 5 bullets were identified, within the limits of practical certainty ¹ , as having been fired from the same firearm. Two (2) firearms are represented by the submitted bullets.
6DPEG4	I microscopically compared these bullets (Items 001-2 through 001-5) to each other and observed agreement in all discernable class characteristics and sufficient agreement in the individual characteristics to conclude that all four bullets were fired in a single nominal 40 caliber firearm. I microscopically compared all four bullets to a bullet test fired in the Beretta Px4 Storm pistol, Item 001-1, and I observed sufficient disagreement in the individual characteristics to conclude that these four bullets were not fired in the firearm that produced the test-fired bullets.
6DQA3U	The bullets in Items 2, 3, 4 and 5 were not discharged from the same barrel which discharged the bullets in Item 1 based on differences of class and individual characteristics. When inter-compared, the bullets in Items 2, 3, 4 and 5 were found upon microscopic comparison to have been discharged from the same unknown barrel. These identifications were based on an

TABLE 2

WebCode	Conclusions
6DR4LZ	<p>agreement of both class and individual characteristics.</p> <p>Comparison microscope examinations were conducted and it is the finding of this examiner that projectiles A through D (Items 2 through 5) were fired in the same .40 S&W firearm. These projectiles were not fired in the submitted .40 S&W Beretta pistol, model PX4 Storm (Item 1), based on differences in individual characteristics. Suspect weapons include .40 S&W Beretta, Ceska Zbrojovka, KSN Industries, SigArms, Smith & Wesson, Steyr-Mannlicher, and Taurus pistols; however, any suspect weapon should be submitted for examination.</p>
6G7Y2X	<p>The submitted specimens marked Item 2, 3, 4, and 5 were examined and identified as four (4) fired .40S&W/ 10mm Auto caliber jacketed bullets exhibiting six (6) land and groove impressions with a right twist. Items 2 through 5 were microscopically inter-compared and compared to Item 1 sample bullets. As a result of microscopic examination, it was concluded that Items 2 through 5 were identified as having been fired from the same unknown firearm. Items 2 through 5 were eliminated as having been fired from the same firearm that fired Item 1 sample bullets due to differences in individual characteristics. Firearms that produce similar rifling characteristics as those exhibited on Items 2 through 5 include, but are not limited to: .40 S&W caliber semi-automatic pistols marketed by: Beretta, CZ, Czechoslovakia, FN/Browning, Heritage, Iberia, KSN Industries, Sigarms, Smith & Wesson, Steyr-Mannlicher, Taurus; and 38-40 Winchester caliber rifles marketed by Winchester.</p>
6MVJ6D	<p>Items 2, 3, 4 and 5 had all been fired through the same barrel and had not been discharged by the Beretta pistol.</p>
6PDRZ7	<p>The forensic laboratory, of [Agency], section of physics (firearm laboratory) performed the investigations of the items (sent by CTS) and came to the following results: The forensic material consists of in total 7 bullets (9 mm) with following description: Item 1: Three bullets fired using the suspect's handgun (known). Items 2 – 5 Four bullets recovered at the crime scene (questioned). The fired bullets (item 2, 3, 4, 5) show no correlating traces to the test-fired bullets. In conclusion, the carried out investigations showed, that none of the bullets from the crime scene were fired from the seized firearm. The bullets from the crime scene (item 3, 4 und 5) show correlating traces to each other. In other words, these three bullets were fired from the same but unknown firearm. The bullet (item 2) don't show any matching traces to any of the other bullets, this mean that a second firearm were involved.</p>
6Q8FH3	<p>Before the examination the bullets which were fired from the barrel of the suspects firearm were marked V1 – V3 (item 1). The bullets recovered at the crime scene and by the medical examiner were marked accordingly T1 (item 2), T2 (item 3), T3 (item 4), T4 (item 5). Comparisons were conducted using the Leica FSC comparison microscope and the ballistic identification system "balscan". As a result of these examinations, the following conclusions were reached: The bullets bear appropriate marks that make them suitable for comparative analysis. Identification of the firearm used, based on these marks, appears to be possible. The bullets marked T1 – T4 all bear the same class characteristics as the bullets marked V1 – V3 (caliber .40, six lands and grooves with a right hand twist). Because of clear differences in the observed individual characteristics, the chance that the bullets T1 – T4 were fired from the suspects handgun is considered virtually non existent.</p>
6QA2F3	<p>The Items 2 through 5 fired bullets were fired from the same unknown firearm. These identifications are based on sufficient agreement of the combination of individual characteristics and all discernible class characteristics. The Items 2 through 5 fired bullets were not fired from the same firearm that produced the Item 1 test fires. These eliminations are based on sufficient differences in the patterns of individual characteristics.</p>
6QVRB9	<p>Item 1(A-C) were each fired from the same firearm. Items 2, 3, 4, and 5 were each eliminated as being fired from the same firearm which fired item 1(A-C). Items 2, 3, 4, and 5 were each fired from the same firearm.</p>

TABLE 2

WebCode	Conclusions
6U8L2E	1. The bullets described in the Item 1, are .40/10mm caliber, with right rifling(R-6)and were fired by the same firearm; were not fired by the firearm used to fired the bullets described in the Items 2, 3, 4 and 5. 2. The bullets described in the Items 2, 3, 4 and 5, are .40/10 mm caliber, with right rifling (R-6)and were fired by the same firearm.
6UB8V9	Beretta px4 Storm .40 caliber handgun serial number ????? did not fired bullets that inscribed item#2, item#3, item#4 and item#5 .
6VHD8A	Items #2, #3, #4 and #5 were microscopically examined and compared to the Item #1 test fired bullets. Based on significant differences within the patterns of individual characteristics, Items #2, #3, #4 and #5 were eliminated as having been fired from the same barrel as the Item #1 test fires. Items #2, #3, #4 and #5 were microscopically examined and compared. Based on the agreement of class characteristics and sufficient agreement of individual characteristics, Items #2, #3, #4 and #5 were identified as having been fired from the same barrel.
6YB98P	The three fired bullets (Exhibit 1) were microscopically compared to each other and to the fired bullets (Exhibits 2, 3, 4 and 5). Based on a disagreement of individual characteristics, Exhibits 2, 3, 4 and 5 were not fired from the same firearm as Exhibit 1. Based on an agreement of class characteristics and sufficient individual characteristics, Exhibits 2, 3, 4 and 5 were fired from the same firearm. The manufacturer of the firearm that could have fired Exhibits 2, 3, 4 and 5 includes, but is not limited to, 40 S&W caliber Beretta, Smith and Wesson, Taurus, SigArms and CZ pistols. This does not preclude the possibility of another make not listed being used.
72KXRK	RESULTS: The Items 2-5 bullets were fired in the same unknown firearm. They were not fired in the same firearm as the Item 1 bullets. The design features of the Items 2-5 are consistent with bullets loaded in 40 S&W caliber cartridges. These bullets display rifling characteristics similar to firearms by Beretta, CZ, Heritage, SIGArms, Smith & Wesson, Steyr, and Taurus among others.
74PPJX	Sufficient disagreements of potential subclass and/or individual characteristics confirmed the item 2, 3, 4, and 5 expended bullets were not fired from the same firearm that fired the item 1 expended bullets.
77JE6E	1- The bullets marked from E-1 to E-3, corresponding to item 1, are caliber .40/10mm, with striation to the right (R-6) and were fired by the same firearm. 2- The bullet marked from E-1 to E-3,corresponding to item 1, are caliber .40/ 10mm, with striation to the right (R-6) and were not fired by the firearm used to shoot the bullet marked E-4, corresponding to item 2, the bullet marked E-5, corresponding to item 3, the bullet marked E-6, corresponding to item 4 and the bullet marked E-7, corresponding to item 5. 3- The bullet marked E-4, corresponding to item 2, the bullet marked E-5, corresponding to item 3, the bullet marked E-6, corresponding to item 4 and the bullet marked E-7, corresponding to item 5, are caliber .40/10mm, with striation to the right (R-6) and were fired by the same firearm.
7DKJ3P	The bullets in Items 2, 3, 4, and 5 were microscopically examined in conjunction with Item 1 (known) bullets. Based on these comparative examinations it was determined that: A. The bullets in Items 2 through 5 bear the same class characteristics as the bullets in Item 1. B. The bullets in Items 2, 3, 4, and 5 bear no individual characteristics to link them to the bullets in Item 1. C. Individual characteristics were found on the bullets in Items 2, 3, 4, and 5 to link them as having been fired through the barrel of the same firearm.
7KJ9JU	Items 2-5 were identified as having been fired from the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 2-5 were eliminated as having been fired from the same firearm as Item 1 due to disagreement of individual characteristics. Items 2-5 are 40/10mm caliber class copper jacketed bullets fired from a firearm with a rifling system of six (6) lands and grooves with a right twist. Firearms with a similar rifling system include, but are not limited to, the

TABLE 2

WebCode	Conclusions
	following: Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson and Taurus brands 40 S&W semi-automatic pistols.
7LY82X	Visual and microscopic examination of the metal jacketed bullets (Items 2 through 5) revealed that they are consistent with 40 caliber bullets having six land and groove impressions with a right twist. Common firearms with the same general rifling characteristics as the metal jacketed bullets (Items 2 through 5) include, but are not limited to the following: Beretta, Ceska Zbrojovka, Heritage, KSN Industries, Sigarms, Smith & Wesson, and Taurus. All 40 caliber firearms encountered during the course of this investigation should be submitted to [Laboratory] for examination. Microscopic examination and comparison of the metal jacketed bullets (Items 2 through 5) revealed sufficient agreement of individual characteristics to determine that they were all fired through the same barrel. Microscopic examination and comparison of the metal jacketed bullets (Items 2 through 5) revealed they can be eliminated as having been fired through the same barrel that fired the metal jacketed bullets (Items 1, 1A, and 1B).
7M9976	The four bullets (Items 2, 3, 4 & 5) were not fired from the same firearm that produced the test fired bullets (Item 1). The four bullets (Items 2, 3, 4 & 5) were identified as having been fired from the same firearm. GRC information from the four bullets (Items 2, 3, 4 & 5) indicated they were fired from a short list of possible firearms. Contact this examiner for a copy of the suspect firearm list.
7NEY6	The Exhibit 1 test fired bullets were not fired from the same firearm as the Exhibits 2, 3, 4 and 5 bullets. The Exhibits 2, 3, 4 and 5 bullets are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta and Taurus among others. These bullets were compared microscopically with each other. They were identified as having been fired from a second firearm.
7WD9CX	The Exhibit 2-5 bullets were identified as having been fired from the same unknown firearm. They were not fired from the same firearm as the Exhibit 1 bullets. The Exhibit 2-5 bullets have design features consistent with those loaded in 40/10mm caliber cartridges and display rifling characteristics consistent with 40 S&W caliber pistols by Beretta, FN/Browning, Sigarms, Smith & Wesson and Taurus, among others.
7ZVL2R	1) Examinations showed Items 2, 3, 4 and 5 were not fired from the same firearm as Item 1. 2) Examinations showed Items 2, 3, 4 and 5 were discharged from the same unknown firearm.
823ED6	1) Exhibit 1 contains three .40 metal jacketed bullets which were visually examined and microscopically compared to each other. a) The Exhibit 1 bullets were fired from the same firearm. 2) Exhibits 2 (One .40 metal jacketed bullet), 3 (One .40 metal jacketed bullet), 4 (One .40 metal jacketed bullet), and 5 (One .40 metal jacketed bullet) were visually examined and microscopically compared to Exhibit 1 and each other. a) The Exhibits 2, 3, 4, and 5 bullets were not fired in the same firearm as the Exhibit 1 bullets. b) The Exhibits 2, 3, 4, and 5 bullets were fired in the same firearm and are consistent with being fired from a Beretta or Taurus .40 pistol. This is not an all inclusive list.
83E6D9	Submitted Items #2, 3, 4, and 5 are excluded from having been fired from the firearm which fired Item #1. Submitted Items #2, 3, 4, and 5 are determined to have been fired from a single firearm different from Item #1.
83W3VZ	Items 1(1) through 1(3) and 2 through 5 are seven nominal .40 (10mm) caliber, truncated cone, copper full metal jacketed bullets. The bullets were each fired through a barrel with six lands and grooves of conventional right twist rifling. Using a comparison microscope, Item 2 was compared to Items 3, 4, and 5. Corresponding class and microscopic agreement of individual characteristics sufficient for identifications were observed. Items 2, 3, 4, and 5 were fired by the same firearm. Using a comparison microscope, Items 2, 3, 4, and 5 were compared to Item 1 test fires. There was agreement of class characteristics; however, significant disagreement of individual characteristics was observed to conclude that Items 2, 3,

TABLE 2

WebCode	Conclusions
87RYY8	4, and 5 were not fired by the firearm responsible for the Item 1 test-fires (elimination). I examined the fired bullets ITEM 1-ITEM5 and compared the individual and class characteristics markings transferred to them by firearm components during the firing process using a comparison microscope and found: The bullets mentioned marked Item 2-5 were fired from the same firearm. The bullets mentioned marked Item 2-5 were not fired from the same firearm as the bullets marked Item 1.
8BMVLD	The questioned bullets marked by me as 59562/17 (4) -2, -3, -4, -5 were fired from one same firearm; however were not fired from one recovered firearm (known - Item 1).
8DFFXD	Items 2, 3, 4 and 5 were not fired from the same firearm as Item 1. Items 2, 3, 4, and 5 were fired from the same unknown firearm.
8KEVRR	Exhibits #2, #3, #4, and #5 were fired from the same firearm; however, they were not fired from the same firearm as Exhibits #1A, #1B, and #1C. Exhibit #2 is 40/10mm caliber class and displays rifling characteristics similar to firearms by Beretta, CZ, FN/Browning, Springfield, and Taurus, among others.
8KW746	The Items 2-5 fired bullets were microscopically examined and eliminated as having been fired from the Item 1 firearm due to disagreement of individual characteristics. The Items 2-5 fired bullets were microscopically examined and identified as having been fired from the same unknown firearm based upon agreement of the combination of individual characteristics and all discernible class characteristics.
8PCK3W	Comparison microscope examinations were conducted on the evidence listed above. The findings of this examiner are the following: 1. Exhibits 2 through 5 are .40 caliber class bullets normally loaded in .40 S&W cartridges. 2. Exhibits 2 through 5 were fired in one firearm and were excluded as having been fired from the same firearm which fired exhibit 1 (test fires) based on differences in individual characteristics. 3. Suspect weapons include .40 S&W Beretta Px4 Storm pistols; however, any firearm should be submitted to the laboratory for analysis.
8XMPD3	The four jacketed bullets (Items 2, 3, 4, and 5) were microscopically compared to bullets labeled to have been test fired from the Beretta PX4 Storm .40 caliber handgun (Item 1). Because of differences observed in individual characteristics, the four jacketed bullets (Items 2, 3, 4, and 5) were eliminated as having been fired from the Beretta PX4 Storm .40 caliber handgun (Item 1).
8YD9J9	Microscopic Comparison made between four Projectiles recovered from the scene, marked Item #2 thru Item #5, with POSITIVE Results. They were all four fired from the same (one) Firearm. Microscopic Comparison made between submitted three Test Shots from Beretta Px4 Storm (Item #1) and four recovered Projectiles from the scene (Item #2 thru Item #5) with Negative Results. The four recovered Projectiles were not fired from the above listed Firearm.
8Z2PPA	The four nominal 40 caliber bullets (items 2 through 5) were not fired in the same firearm as the bullets fired from the .40 caliber Beretta PX4 Storm pistol (Item 1). The comparison results between the four nominal 40 caliber bullets (items 2 through 5) were inconclusive; however, items 2 through 5 were most likely fired in the same firearm. Based on the class characteristics observed on items 2 through 5, a list of possible firearms was generated. (See Additional Comments)
92DLUE	3. On 2018-06-11 during the performance of my official duties I received a sealed evidence bag with number PA4002342053 from Case Administration of the Ballistics Section, containing the following item: 3.1 One (1) sealed white cardboard box, marked "2018 CTS Forensic Testing Program TEST NO. 18-526: FIREARM EXAMINATION Sample Pack: F1", containing the following items: 3.1.1 One (1) sealed jewel box marked "Test No. 18-526 Item 1", containing the following exhibits: 3.1.1.1 Three (3) .40 calibre test fired bullets, marked by me "T1" each. 3.1.2 One (1) sealed envelope marked "Test No. 18-526 Item 2", containing the following exhibit: 3.1.2.1 One (1) .40 calibre fired bullet, marked by me "211318/18 2".

TABLE 2

WebCode	Conclusions
	<p>3.1.3 One (1) sealed envelope marked "Test No. 18-526 Item 3", containing the following exhibit: 3.1.3.1 One (1) .40 calibre fired bullet, marked by me "211318/18 3". 3.1.4 One (1) sealed envelope marked "Test No. 18-526 Item 4", containing the following exhibit: 3.1.4.1 One (1) .40 calibre fired bullet, marked by me "211318/18 4". 3.1.5 One (1) sealed envelope marked "Test No. 18-526 Item 5", containing the following exhibit: 3.1.5.1 One (1) .40 calibre fired bullet, marked by me "211318/18 5". 4. The intention and scope of this forensic examination comprise the following: 4.1 The examination and identification of fired bullets. 4.2 Microscopic individualization of fired bullets. 5. I examined the fired bullets mentioned in paragraphs 3.1.1.1, 3.1.2.1, 3.1.3.1, 3.1.4.1 and 3.1.5.1 and compared the individual and class characteristics markings on them using a comparison microscope and found: 5.1 The bullets mentioned in paragraphs 3.1.2.1, 3.1.3.1, 3.1.4.1 and 3.1.5.1 marked "211318/18" each and "2" to "5" respectively, were fired from the same firearm. 5.2 The bullets mentioned in paragraphs 3.1.2.1, 3.1.3.1, 3.1.4.1 and 3.1.5.1 marked "211318/18" each and "2" to "5" respectively, were not fired from the same firearm that fired the bullets mentioned in paragraph 3.1.1.1 marked "T1".</p>
9434Z7	<p>The examination of the recovered questioned bullets under a comparison microscope, allows to conclude that none of them (item 2,3,4 et 5) were fired from the seized Beretta Px4 Storm. The examination also showed that items 2,3,4 et 5 were all fired from a second firearm.</p>
99J2W9	<p>THERE ARE TWO GUNS. THE FIRST GUN IS THE RECOVERED GUN FROM THE SUSPECT. THE SECOND GUN IS WITH WHOM THEY HAVE BEEN SHOT THE ITEMS NUMBER 2, 3, 4 AND 5. THESE ITEMS DO NOT COINCIDE WITH RECOVERED WEAPON, BUT BETWEEN THEM YES, SO THERE ARE TWO GUNS.</p>
9AYACP	<p>see report [Attachment not provided by participant]</p>
9CXY3B	<p>1. The bullets marked E-1, E-2 and E-3, described in item 1, are .40/10mm caliber, with a right rifling twist (R-6) and were fired by the same firearm. 2. The bullets marked E-1, E-2 and E-3, described in item 1, are .40/10mm caliber, with a right rifling twist (R-6) and were not fired by the firearm used to fire the bullets marked E-4, described in item 2, E-5, described in item 3, E-6, described in item 4 and E-7, described in item 5. 3. The bullets marked E-4, described in item 2, E-5, described in item 3, E-6, described in item 4 and E-7, described in item 5, are .40/10mm caliber, with a right rifling twist (R-6) and were fired by the same firearm.</p>
9LLRE8	<p>[No Conclusions Reported.]</p>
9MUZAK	<p>The questioned bullets were fired by the same gun. Elimination is concluded, the questioned items were e fired by a diferent weapon than the seized from the vehicle.</p>
9P4UJR	<p>The below listed spent bullets were macroscopically and microscopically examined and compared with test bullets fired from the Beretta 40 caliber handgun, Item #1, Property #[Participant Code], Lab Evidence #001-A1. It is my opinion that these items were not fired from this firearm. The below listed spent bullets were further microscopically compared with each other. Numerous corresponding individual characteristics were observed. Therefore, it is my opinion that the below listed items were fired from the same firearm. Lab Evidence # Property # Item # Item Description 001-A2 [Participant Code] 2 Spent 40 caliber bullet 001-A3 [Participant Code] 3 Spent 40 caliber bullet 001-A4 [Participant Code] 4 Spent 40 caliber bullet 001-A5 [Participant Code] 5 Spent 40 caliber bullet. [Participant submitted data in a format that could not be reproduced in this report].</p>
9UGQAM	<p>The test bullets in Item 1 were microscopically examined in conjunction with the bullets in Items 2, 3, 4 and 5. Based on these comparative examinations, it was determined that: A. The bullets in Items 2, 3, 4 and 5 had been fired through the barrel of the same firearm. B. Items 2, 3, 4 and 5 bear the same class characteristics as the test bullets in Item 1. However, there</p>

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	are no similar individual characteristics on Items 2, 3, 4 and 5 to link them as having been fired through the same barrel as the test bullets in Item 1.
9W3JZV	The bullet (item 2) was identified as having been fired from the same firearm as the three bullets (items 3, 4, 5). Agreement of the characteristics is sufficient to determine that the four projectiles were fired from the same firearm. The test fired bullets (item 1) could not be conclusively identified or excluded as having been fired from the same firearm as the four bullets (items 2, 3, 4, 5). However, it is inconsistent the test fires (item #1) were fired in the same firearm as (items 2,3,4,5). There was agreement of all discernible class characteristics and disagreement of some individual characteristics, but the disagreement was insufficient for exclusion.
A6FT64	Items 2 through 5 bullets were fired by one firearm. These are consistent with bullets commonly found loaded in some 40 S&W and 10mm Auto caliber cartridges. Items 2 through 5 were not fired by the firearm that fired Item 1 test-fires. See the attachment for a list of possible firearm manufacturers/origins that may have fired these projectiles. Note that this list may not be all inclusive. [Attachment not provided by participant]
A7BGER	Test bullets #1 - #3, Item 1, were compared microscopically to items 2, 3, 4 and 5. The examinations determined Items 2, 3, 4 and 5 were fired from a different firearm than Item 1 due to a disagreement of Individual characteristics. Items 2, 3, 4 and 5 were compared microscopically to each other. The examination determined that Items 2, 3, 4 and 5 were fired from the same firearm due to sufficient agreement between striations.
AD36NA	The fired bullets marked as 2, 3, 4 and 5 were fired from the same firearm but not the firearm that fired the bullets (tests) marked as Item 1.
AFA72U	The Item 2, 3, 4, and 5 bullets were identified as having been fired from the same unknown firearm; they were not fired from the same firearm as represented by the Item 1 tests. The bullets (Item 1, 2, 3, 4, and 5) have design features consistent with those loaded in 40/10mm caliber class ammunition and display rifling characteristics similar to 40 S&W caliber firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, and Taurus, among others.
AJYLJ3	1. Examination of Exhibits 2, 3, 4 and 5 disclosed four .40 fired bullets, which were visually examined and microscopically compared to the three Exhibit 1 test standards from a Beretta px4 Storm .40 caliber pistol. a. Microscopic comparison disclosed that Exhibits 2, 3, 4 and 5 were all fired in the same firearm, however they were not fired in the same firearm as the Exhibit 1 test standards.
AK43QK	A microscopic examination and comparison of the above evidence revealed the following: Bullets (Items # 2, 3, 4, 5) are identified as having been discharged from the same firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Bullets (Items # 2, 3, 4, 5) and Test Fires (Items # 1.1, 1.2, 1.3) are eliminated as having been discharged from the same firearm based on the observed disagreement of individual characteristics.
AKL9VC	The bullets mentioned in 3.1 were not fired from the same firearm as bullets mentioned in 3.2.
AKU6NP	Items 2-5 were examined and found to be 40 caliber jacketed bullets that were fired from a firearm having six lands and grooves with a right twist. Items 2-5 were microscopically compared to the bullets submitted under Item 1. Items 2-5 were fired from the same firearm, but were not fired from the same firearm as the bullets submitted under Item 1. A list of possible firearms that could have fired Items 2-5 includes, but is not necessarily limited to those manufactured by Beretta, Ceska Zbrojovka, Czechoslovakia, Heritage, Iberia Arms, KSN Industries, Republic Arms, Sigarms, Smith & Wesson, Springfield Inc., Steyr-Mannlicher, and Taurus.
ALGUH3	I have microscopically compared rifling marks on the four bullets recovered from the victim and crime scene (Items 2 – 5) and have found sufficient agreement of class characteristics and

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	individual characteristics to conclude that all four were fired from the same gun as each other. I have also compared these rifling marks with the bullets test fired from the suspect pistol (Item 1) and have found significant differences in individual characteristics. I am satisfied that the crime bullets (Items 2 – 5) were not discharged from the suspect gun.
ANUDRY	Items 2, 3, 4, and 5 were examined and found to be fired 40 caliber class bullets with rifling characteristics of 6 conventional lands and grooves with a right twist. These items are suitable for comparison. Items 2, 3, 4, and 5 were identified as having been fired by the same firearm. Items 2, 3, 4, and 5 were eliminated as having been fired by Item 1 (firearm).
ARP3Z7	Items 2,3,4 and 5 are .40 caliber were fired from a same handgun but not fired from the Brezza px4 storm .40 caliber handgun which the Known bullets {Item 1} fired from
AT2VYE	It is concluded that the projectiles (bullets) of the items 2, 3, 4 and 5, are not uniprocedent (not concordant) with the projectiles (bullets) of the item 1, means that were not fired with the same firearm.
AVTP4W	Items 2, 3, 4 and 5 were fired in the same firearm, however they were not fired in the same firearm as the Item 1 test fires. Items 2 through 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Astra, Beretta, Ceska Zbrojovka, FN/Browning, Heckler & Kock, Heritage, KSN Industries, Republic Arms, Sigarms, Smith & Wesson, Springfield Inc., and Taurus.
AZGHNA	The bullets recovered from victim and crime scene have the same surface characteristics. The findings show that all of the recoverd bullets fired from one gun. The bullets fired from the suspect's gun have the different surface characteristics from the bullets recovered from victim and crime scene.
B2LHEA	Received bullets (Items 2 - 5) marked 211232/18 D-G were fired from the same firearm land and grooves marks correspond but were not fired from the same F/A with received firearm (known).
B9VKUB	Bullets (2 - 5) are identified as having been discharged from the same firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Test Fires (1.1 - 1.3) and bullets (2 - 5) are eliminated as having been discharged from the same firearm based on the observed disagreement of individual characteristics.
BBQPUA	The fired bullets marked (2) - (5) were fired from the same F/A (first F/A) but not from the F/A that fired the exhibits marked (1A), (1AA) & (1 AAA) (second F/A).
BE32BC	1. The three bullets (Item 01-01) are 40 caliber, weigh approximately 180 grains and were fired from a single firearm; presumably the Beretta pistol listed in the given scenario. 2. The bullets (Items 01-02 - 01-05) were neither identified nor eliminated as having been fired from the same Beretta pistol that fired the bullets (Item 01-01) due to the agreement of class characteristics, but lack of reproduced individual characteristics; the result is inconclusive. The bullets (Items 01-02 - 01-05) are 40 caliber, weigh approximately 180 grains and were identified as having been fired from a single unknown firearm having six lands and grooves inclined to the right.
BMP8XH	I microscopically compared Items 1A, 1B, and 1C (known bullets) to Items 2, 3, 4, and 5 (questioned bullets). I eliminated Items 2, 3, 4, and 5 as having been fired in the same firearm as Items 1A, 1B, and 1C based on significant disagreement of individual characteristics within all land impressions. I microscopically compared Items 2, 3, 4, and 5 (questioned bullets) to each other. I identified Items 2, 3, 4, and 5 as being fired in the same firearm based on sufficient agreement of individual characteristics within all land impressions. The list of manufacturers of firearms that may have fired Items 2, 3, 4, and 5 (questioned bullets) includes Beretta, Ceska, Zbrojovka, Czechoslovakia, FN/Browning, Heritage, KSN Industries, Sigarms, Smith & Wesson, Taurus, and Winchester. Sufficient agreement means the quantity

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	and quality of the agreement of toolmarks produced by the firearm exceed the agreement of toolmarks produced by different firearms, such that the likelihood another firearm could have produced these marks is so remote as to be considered practically impossible.
BQX7LX	The test fired bullets (Items 1A, 1B, 1C) from the Beretta px4 Storm, 40 S&W caliber pistol and the fired bullets (Items 2, 3, 4, and 5) were compared to each other. The test fired bullets were found to have similar class marks but significant differences in individual marks to the fired bullets (Items 2, 3, 4, and 5). In absence of alteration, the bullets (Items 2, 3, 4, and 5) were not fired by firearm Item 1. The bullets (Items 2, 3, 4, and 5) had a similar class of marks and were compared to each other and sufficient corresponding individual microscopic marks were found to conclude that they were fired by a single firearm.
BWEXKB	A microscopic examination and comparison of evidence described above revealed the following: Deformed bullets (2-5) are identified as having been discharged in the SAME gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Deformed bullets (2-5) are ELMINATED as having been discharged in the same gun as test fired bullets (1.1 - 1.3) based on observed disagreement of individual characteristics.
BXNYCB	Exhibits 2 (two) - 5 (five) fired from the same firearm but negative to tests.
BXPY6N	Item 1 was fired by an other weapon than items 2-5.
BXV339	Items 1, 2, 3, 4, and 5 were microscopically examined. Items 2, 3, 4, and 5 were identified as having been fired from one (1) firearm. Items 2, 3, 4, and 5 were eliminated as having been fired from the firearm represented by Item 1. Items 2 through 5 exhibit markings that may be suitable for identification with the firearm from which they were fired. Firearms that produce class characteristics like those present on Items 2 through 5 include the brands of firearms listed below. This is not all encompassing; it is possible another brand of firearm produced class characteristics like these and is not listed due to the content of the database searched. Beretta, CZ, Iberia Arms, SIG Arms, Smith & Wesson, Steyr and Taurus pistols chambered to fire caliber 40 Smith & Wesson cartridges. Beretta rifles chambered to fire caliber 40 Smith & Wesson cartridges
BYKH44	The four (4) bullets (Items 2-5) were NOT fired from the barrel of the same firearm as the three (3) test fired bullets from Item 1. The four (4) bullets listed as Items 2-5 have been identified as having been fired from the barrel of the same firearm.
C3J79H	The four (4) fired bullets in Item 2 through Item 5 were microscopically examined in conjunction with the test fired bullets in Item 1. Based on these comparative examinations, it was determined that the bullets in Items 2 through 5 had not been fired through the barrel of the recovered firearm in the condition in which it was received by the lab. The bullets in Items 2 through 5 were also microscopically examined in conjunction with one another. Based on these comparative examinations, it was determined that all four (4) of these bullets had been fired through the barrel of the same 40 caliber firearm. The rifling characteristics present on Items 2 through 5 are common to a number of 40 caliber weapons. Some of the more commonly encountered brands include: Beretta, CZ, Heritage, Iberia Arms, KSN Industries, Republic Arms, Sig Arms, S&W, Springfield Inc., Steyr-Mannlicher, Taurus and others. Any suspect firearm(s) recovered should be submitted to the lab for comparison with these Items.
C6MRBW	Items #2,3,4,5 were microscopically eliminated from having been fired in firearm #1. Items #2,3,4,5 were microscopically identified as having been fired in the same unknown 40 S&W or 10mm Auto caliber firearm.
C7YNF2	The Item 2, 3, 4 and 5 bullets are identified as having been fired in the same unknown firearm. The Item 2, 3, 4 and 5 bullets are eliminated from having been fired in the same

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	firearm that fired the Item 1 bullets.
C8FVRB	The four bullets (items 01-02 - 01-05) are 40/10 mm caliber. They were eliminated from having been fired from the Beretta pistol represented by the test fired bullets (item 01-01). The four bullets (items 01-02 – 01-05) were fired from a single unknown 40/10 mm caliber firearm. Commonly encountered firearms with rifling characteristics similar to those observed on the bullets include but are not limited to Beretta, Smith & Wesson, and Taurus. Any firearm suspected of involvement in this offense should be submitted for comparisons to the bullet.
CHY3WR	Item 1 - Three (3) .40 S&W caliber fired bullets (samples from Beretta pistol) (1). Item 2 - One (1) fired bullet (2). Item 3 - One (1) fired bullet (3). Item 4 - One (1) fired bullet (4). Item 5 - One (1) fired bullet (5). The submitted specimens marked Items 2, 3, 4, and 5 were examined and identified as four (4) fired .40 S&W/10mm Auto caliber bullets exhibiting six (6) land and groove impressions with a right twist. Items 2 through 5 were microscopically compared to Item 1 sample bullets. As a result of microscopic examination, it was concluded that Items 2, 3, 4, and 5 were identified as having been fired from the same firearm. Items 2, 3, 4, and 5 exhibit similar class characteristics as those exhibited on Item 1 but were eliminated as having been fired from Item 1 due to differences in individual characteristics. Firearms that produce similar rifling characteristics as those exhibited on Item 2, 3, 4, and 5 include, but are not limited to: .40 S&W caliber pistols manufactured by Beretta, Ceska Zbrojovka, Czechoslovakia, Heritage, Iberia Arms, KSN Industries, SIG Arms, Smith & Wesson, Steyr-Mannlicher, and Taurus; and .40 S&W caliber rifles manufactured by Beretta.
CLVXAY	The submitted bullets, Items #2-#5, were compared microscopically with each other and the submitted test fires, Item #1. There is agreement in all discernible class characteristics and sufficient disagreement in individual characteristics for elimination. These four bullets were not fired by the firearm that discharged the submitted tests. The four submitted bullets, Items #2-#5, have sufficient agreement in corresponding individual characteristics for identification. #2-#5 were discharged in the same firearm.
CPRK23	Items 2, 3, 4 and 5 were all fired through the same gun barrel. The three(3) Item 1 bullets were not fired through the same gun barrel as the Items 2, 3, 4 and 5 bullets.
D3D2ME	Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets from Item 1 were identified as having been fired from the same firearm. Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets, Items 2-5, were identified as having been fired from the same firearm. Based on significant disagreement of individual characteristics, the fired bullets from Item 1 could not have been fired from the same firearm as the fired bullets, Items 2-5.
D3WZMX	The fired bullets item 2, item 3, item 4, and item 5 are identified as having been fired from the same firearm. The fired bullets item 2, item 3, item 4, and item 5 are not identified or eliminated (Inconclusive) as having been fired from the submitted firearm. The individual characteristics do not display sufficient agreement. Item 2, item 3, item 4, and item 5 are consistent with being .40/10mm class fired metal jacketed bullets displaying 6 lands and grooves with a conventional right hand twist. These specifications are characteristic of firearms manufactured by several companies. Therefore, no suspected firearm should be overlooked.
D8LJL	Four fired bullets (Items 002, 003, 004, and 005) were identified as having been fired by the same unknown firearm. These items (Items 002, 003, 004, and 005) were microscopically compared to the bullets submitted as Item 001 (described as test-fires from a Beretta px4 Storm) and were eliminated from having been fired by the same firearm. Therefore, Items 002, 003, 004, and 005 were not fired by the same firearm as Item 001.
DBQANF	I microscopically compared Items 1 (A, B, C) to Items 2, 3, 4, and 5. Although Items 1 (A, B, C), 2, 3, 4, and 5 share the same class characteristics (general rifling characteristics), Items 2, 3, 4, and 5 can be eliminated from being fired in the same firearm as the bullets from Item 1 (A, B, C) due to significant disagreement of individual characteristics within the land and

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DCKRBB	<p>groove impressions. I microscopically compared Items 2, 3, 4, and 5 to each other. I identified Items 2, 3, 4, and 5 as being fired in a second firearm based on sufficient agreement of individual characteristics within the land impressions.</p> <p>Item 1-01: Three fired bullets (Item 1): The three fired bullets were identified as having been fired from the same firearm due to consistent and repeatable marks. This item was used for comparison purposes. Item 1-02: One fired bullet (Item 2): The fired bullet was identified as having been fired from the same firearm as three of the other fired bullets (1-03 - 1-05) submitted in this case due to consistent and repeatable marks. The fired bullet was not identified or eliminated as having been fired from the same firearm as the three bullets submitted as known test fires (1-01) due to agreement in available class characteristics but a lack of consistent and repeatable individual marks. Item 1-03: One fired bullet (Item 3): The fired bullet was identified as having been fired from the same firearm as three of the other fired bullets (1-02, 1-04, and 1-05) submitted in this case due to consistent and repeatable marks. The fired bullet was not identified or eliminated as having been fired from the same firearm as the three bullets submitted as known test fires (1-01) due to agreement in available class characteristics but a lack of consistent and repeatable individual marks. Item 1-04: One fired bullet (Item 4): The fired bullet was identified as having been fired from the same firearm as three of the other fired bullets (1-02, 1-03, and 1-05) submitted in this case due to consistent and repeatable marks. The fired bullet was not identified or eliminated as having been fired from the same firearm as the three bullets submitted as known test fires (1-01) due to agreement in available class characteristics but a lack of consistent and repeatable individual marks. Item 1-05: One fired bullet (Item 5): The fired bullet was identified as having been fired from the same firearm as three of the other fired bullets (1-02 - 1-04) submitted in this case due to consistent and repeatable marks. The fired bullet was not identified or eliminated as having been fired from the same firearm as the three bullets submitted as known test fires (1-01) due to agreement in available class characteristics but a lack of consistent and repeatable individual marks.</p>
DE6WGY	Because of differences in individual characteristics the items 2-5 bullets could not have been fired in the same firearm as the known bullets (item 1).
DF27TP	The Item 2, 3, 4, and 5 bullets were identified as having been fired from the same unknown firearm. They were not fired from the same firearm as Item 1. Items 2 through 5 have design features consistent with bullets loaded in 40/10mm caliber class ammunition and display rifling characteristics similar to firearms by Beretta, Sigarms, Smith & Wesson, and Taurus, among others.
DFNKC2	Item's 2,3,4 and 5 were eliminated from having been fired from the Item#1 firearm. Item's 2,3,4 and 5 were identified as having been fired from the same unknown firearm. Firearms that may have fired the above listed projectiles include Beretta and Smith and Wesson. The complete list of firearms can be found in the case file. This report contains the opinions and interpretations of the individual whose signature appears on the report. All identifications and eliminations are based on microscopic comparisons and the correspondence of individual characteristics.
DGKXYT	The Exhibit 2, 3, 4 and 5 bullets were fired from the same firearm as each other; however, they were not fired from the same firearm as the Exhibit 1 bullets. The Exhibit 2, 3, 4 and 5 bullets are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, Steyr-Mannlicher and Taurus, among others.
DKHGY7	Based on the agreement of all discernible class characteristics and sufficient agreement of individual characteristics (land impressions) it was determined that the items 2 through 5 bullets were fired from the same unknown firearm. Although there was agreement of all discernible class characteristics, there was significant disagreement of individual characteristics (land impressions) between the test-fired bullets from the Item 1 pistol and the Items 2 through 5

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	bullets. The Items 2 through 5 bullets were not fired from the Item 1 pistol.
DNZTMB	Items 2 through 5 have the same class characteristics that three bullets recovered from Beretta pistol, but no in individual characteristics. Items 2 through 5, were not fired from the Beretta pistol, PX4 Storm, caliber .40.
DPVGX	1. Exhibit 1 was visually examined and microscopically compared to Exhibits 2, 3, 4, and 5. Exhibits 2, 3, 4, and 5 were ELIMINATED as having been fired in the same firearm as Exhibit 1. 2. Exhibits 2, 3, 4, and 5 were visually examined and microscopically compared to each other. Exhibits 2, 3, 4, and 5 were IDENTIFIED as having been fired in the same firearm. Firearms that produce rifling characteristics similar to those displayed on Exhibits 2 through 5 include, but are not limited to, Beretta, Sigarms, Taurus, Ceska Zbrojovka (CZ), and KSN Industries.
DQMHT9	Three of the seven bullets (1A, 1B, 1C) were reported to have been test fired from a 40 Smith & Wesson caliber Beretta model Px4 Storm semiautomatic pistol. Three of the seven bullets (1A, 1B, 1C) were not fired from the same firearm as the remaining four bullets (2 - 5). Four of the seven bullets (2 - 5) were fired from the same firearm.
DTQ92A	The four (4) fired bullets, items 2, 3, 4 and 5, were identified as having been fired from one firearm, however, they were not fired from the recovered firearm, item 1. Items 2, 3, 4 and 5 are most consistent with bullets loaded in 40 S&W caliber cartridges. The manufacturers of firearms known to exhibit general rifling characteristics similar to these items include, but are not limited to the following: Beretta, Ceska Zbrojovka, Heritage, Iberia Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher and Taurus.
DY9LKG	The known bullets obtained from the Beretta PX4 STORM, Caliber .40 S&W pistol, do not present ballistic correlation with the questioned bullets marked as Items 2, 3, 4 and 5. The questioned bullets marked as Items 2, 3, 4 and 5, were fired by the same .40 S&W caliber firearm, but they were not fired by the firearm found in the suspect's vehicle.
E2Y86J	Item 1 is three (3) known fired .40 S&W caliber, copper-jacketed bullets, that were fired from a rifled barrel with six (6) lands and grooves, right twist. Items 2, 3, 4 and 5 are four (4) fired .40/10mm. class caliber, copper-jacketed bullets, that were identified as having been fired from the same firearm. These Items were eliminated as having been fired from the same firearm as the Item 1 bullets due to differences in sizes and marking of land and groove impressions.
E4RWVR	Projectiles A through D (Items 2 through 5) were not fired in the recovered .40 S&W Beretta pistol, model PX4 Storm, serial number unknown (Item 1), based on individual characteristics. Projectiles A through D (Items 2 through 5) were fired in a second .40 S&W firearm. The specific brand of the suspect weapon is unknown; however, any suspect weapon should be submitted for examination.
E6YDR3	Our laboratory does not report using terms such as "identification" or "inconclusive". Instead, we indicate the level of support that the observations provide for the proposition that the questioned bullet was fired in the firearm at the source of the control bullets as opposed to another, unknown firearm. In the present case, we reached the following conclusion: The observations provide moderate support for the view that the questioned bullets, Items 2, 3, 4 and 5, were all fired in one or more unknown firearms, rather than by the firearm at the source of the three control bullets (Item 1). By moderate support we mean that for each questioned bullet, the observations are about 60 times more probable if the bullets were fired in another unknown firearm, rather than if they were fired in the firearm used to fire the control bullets.
EE4AL8	Bullets (2, 3, 4, 5) are all identified as having been fired from the SAME firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Bullets (2, 3, 4, 5) are ELIMINATED as having been fired from the same firearm as test fire bullets (1.1, 1.2, 1.3) based on the observed disagreement of individual characteristics.

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EFZLPM	Items 2-5 were eliminated as having been fired from the same firearm as Item 1 due to disagreement of discernible individual characteristics. Items 2-5 were identified microscopically as having been fired from the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics.
EH2VBP	Items 2 - 5 were identified as having been fired from the same unknown firearm. They were not fired from the same firearm as Item 1. Items 2 - 5 are 40/10mm caliber class and display rifling characteristics similar to 40 S&W caliber firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, and Taurus, among others.
EHP3PM	Test bullets #1 through #3 (Item 1) were compared microscopically to Items 2, 3, 4 and 5. The examinations determined Items 2, 3, 4 and 5 were fired from a different firearm than Item 1 due to a disagreement of individual characteristics. Items 2, 3, 4 and 5 were compared microscopically to each other. The examinations determined that Items 2, 3, 4 and 5 were fired from the same firearm due to a sufficient agreement between striations.
ENTZ7E	Items #2, #3, #4, #5 were not fired from firearm #1 based on the disagreement of the individual characteristics. Items #2, #3, #4, #5 were all fired by one firearm (not #1) based on the agreement of class characteristics and patterns of sufficient corresponding individual characteristics.
EQ23JX	1. It was stated that the Exhibit 1 test fires were fired from a "Beretta PX4 Storm .40 caliber handgun." 2. Physical examination of Exhibits 2, 3, 4 and 5 revealed they are consistent with .40 caliber class projectiles normally loaded in a .40 S&W cartridge. 3. Microscopic comparison revealed Exhibits 2, 3, 4, and 5 were fired from the same firearm. 4. Microscopic comparison revealed Exhibits 2, 3, 4, and 5 were not fired from the same firearm as the Exhibit 1 test fires. 5. The following is an investigative lead only and not intended to exclude all other makes of firearms. Based on the class characteristics of Exhibits 2, 3, 4 and 5, the possible firearm could be a .40 S&W Beretta, H & K, or Taurus pistol.
ERFL6G	see report [Attachment not provided by participant]
ETUX78	The bullets Items 2, 3, 4 and 5 were microscopically identified as having been fired from the same firearm, but a different firearm than the firearm that fired Item(s) 1. The bullets Items 2, 3, 4 and 5 were determined to be of 40/10mm caliber displaying rifling characteristics of six lands and grooves, right twist. Manufactures of firearms with similar rifling characteristics include, but are not limited to Beretta, CZ, Sigarms, Smith and Wesson, Steyr-Mannlicher and Taurus.
EVQV4C	Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets from Item 1 were identified as having been fired from the same firearm. Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets, Items 2-5, were identified as having been fired from the same firearm. Based on significant disagreement of individual characteristics, the fired bullets from Item 1 could not have been fired from the same firearm as the fired bullets, Items 2-5.
EVUBKJ	The items #2-5 projectiles were all fired from the same unknown firearm; however, they were not fired from the same firearm as the item #1 tests.
EY9VJR	The Item 2-5 fired bullets were microscopically compared to the Item 1 test fired bullets with the following results: Items 2-5 were eliminated from having been fired from the same firearm as the Item 1 fired bullets. Items 2-5 were identified as having been fired from the same unknown firearm.
EYDARM	The four bullets in "Item 2" to "Item 5" were not fired from the firearm that fired the three bullets in "Item 1".
F6ANTE	A microscopic examination and comparison of the evidence described above revealed the following: Deformed bullets (2-5) are identified as having been fired from the same gun based on the observed agreement of their class characteristics and the sufficient agreement of their

TABLE 2

WebCode	Conclusions
	individual characteristics. Deformed bullets (2-5) are eliminated as having been fired from the same gun as test fires (1.1-1.3) based on the observed disagreement of their individual characteristics.
F6FMHH	see report [Attachment not provided by participant]
FB3TLH	A. Items 2, 3, 4 and 5 were fired from the same firearm. These bullets are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, and Taurus, among others. B. Items 2, 3, 4 and 5 were not fired from the firearm that fired Item 1.
FBEE6R	1.- Bullets 2, 3, 4 and 5 are caliber 40 S&W, and were fired by the same firearm. 2.- Bullets 2, 3, 4 and 5 weren't fired by the same firearm as known bullets from item 1, T-1, T-2 and T-3.
FDPEAY	Item #1 were three fired bullets consistent with being 40 caliber copper jacketed bullets fired from a firearm barrel rifled with six lands and grooves, right twist. Item #1 bullets were submitted as known test fires from a recovered firearm reported to be a 40 caliber pistol, Beretta, model PX4 Storm, serial number not provided. Items #2-5 were bullets fired from a firearm barrel rifled with six lands and grooves, right twist. The weight and diameter of the bullets were consistent with being within the 40 family caliber of bullets. Items #2-5 were not fired from the same firearm barrel as Item #1 bullets (known test fires). However, Items #2-5 were microscopically inter-compared and identified as having been fired from the same unknown firearm barrel. If a suspect firearm is developed in the future, Items #2-5 bullets may be re-submitted along with the suspect firearm for comparison purposes.
FEDVF2	The fired bullets (items 2, 3, 4, and 5) were eliminated as having been fired from the same firearm that fired item 1 (said to be a Beretta PX4 Storm pistol). I noted agreement of all discernable class characteristics between the fired bullets (items 2, 3, 4, and 5). I also noted excellent agreement of the microscopic markings in the land impressions that would be of sufficient quality and quantity to identify these four bullets as having been fired from the same firearm, assuming the markings are individual in nature, and not from subclass carryover. Subclass carryover may occur in some manufacturing processes, such as firearm barrel manufacturing. These processes have the potential to produce multiple units with carryover of fine detail from the tooling to the manufactured items. Without the firearm to evaluate, I was unable to eliminate the possibility of subclass markings on the bullets. Therefore, it is possible that the submitted bullets (items 2, 3, 4, and 5) were fired from the same firearm, or in a limited number of firearms manufactured using the same tooling at or near the same time. If a firearm is submitted, I can revisit this examination.
FGA7V3	The test fired bullets produced in the Beretta PX4 handgun (Item 1) were microscopically compared to the four spent bullets located from the victim (Item 2) and scene (Items 3-5), comparing both class and individual characteristics. While there was correspondence of the observed class characteristics, there were significant differences observed in the individual characteristics between Item 1 and Items 2 to 5. Due to these differences, I formed the opinion that Items 2 to 5 cannot have been discharged from the Beretta PX4 handgun.
FGRYR7	Items 2 through 5, each a caliber 40/10 class full metal jacketed bullet, were examined microscopically and found to have been fired from a firearm having a barrel rifled with six (6) lands and grooves inclined to the right. Items 2 through 5 were identified as having been fired from the same firearm. Items 2 through 5 were eliminated as having been fired from the same firearm as Item 1, due to sufficient differences in individual characteristics. Firearms that produce general rifling class characteristics like those present on Items 2 through 5 include pistols, chambered to fire 40 S&W cartridges, with the brand names listed below. Beretta, Sigarms, Taurus. This list is not all encompassing; it is possible another brand of firearm produced these class characteristics and is not listed due to the content of the database

TABLE 2

WebCode	Conclusions
	searched.
FHXQ9K	The Item 2 through Item 5 bullets were identified as having been fired from the same unknown firearm. They were not fired from the same firearm that fired the Item 1 bullets. The Item 2 through Item 5 bullets have design features consistent with those loaded in 40/10mm caliber class cartridges and display rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka, SigArms, Smith & Wesson, and Taurus, among others.
FM83Y7	3. On 2018-06-21 during the performance of my official duties I received a sealed evidence bag with number PA4002342054 from Case Administration of the Ballistics Section, containing the following tests and exhibits: 3.1 Three (3) .40 calibre fired test bullets marked by me "211328/18" each and "1A" to "1C" respectively. 3.2 Four (4) .40 calibre fired bullets marked by me "211328/18" each and "2" to "5" respectively. 4. The intention and scope of this forensic examination comprises the following: 4.1 The examination and identification of fired bullets. 4.2 Microscopic individualization of fired bullets. 5. I examined the fired bullets mentioned in paragraphs 3.1 and 3.2 and compared the individual and class characteristics markings, transferred to them by firearm components during the firing process using a comparison microscope and found: 5.1 The bullets mentioned in paragraph 3.2 were fired from the same firearm, but they were not fired from the firearm that fired the bullets mentioned in paragraph 3.1. 6. The conclusions arrived at were based on facts, established by means of an examination and process which require a knowledge and skill in Forensic Ballistics.
FPHQQJ	Items 2, 3, 4, and 5 were fired from the same firearm. They were not fired from the firearm represented by Items 1A, 1B, and 1C. Items 2, 3, 4, and 5 are 40/10mm caliber class bullets and display rifling characteristics similar to firearms by Beretta, SigArms, Smith & Wesson, and Taurus, among others.
FQFXFQ	Items 2 through 5 were fired in the same firearm, however they were not fired in the same firearm as the item 1 test fires. Items 2 through 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, CZ, Czechoslovakia, Heritage, Iberia, KSN Industries, Republic Arms, Sigarms, Smith and Wesson, Steyr and Taurus.
FQWZXX	The bullets Item 2, Item 3, Item 4 and Item 5 were not fired from the recovered firearm.
FRLF4Z	The bullets item 2 to 5 were fired in a second firearm.
FT7CNZ	Results and Conclusions: Items 1A, 1B, 1C, 2, 3, 4 and 5 are 40 caliber class bullets based upon the diameter. Opinion and Interpretation: Items 1A, 1B, 1C, 2, 3, 4 and 5 are consistent with bullets loaded in .40 S&W and 10mm Auto caliber cartridges based upon the weight/style. Items 2, 3, 4, and 5, the questioned bullets exhibit characteristics found in (but not limited to) the following firearms: Beretta, Ceska ZBrojovka, SIGARMS, Smith & Wesson and Taurus .40 S&W caliber firearms. Methodology – Comparison Microscopy: Items 1A, 1B and 1C, the bullets identified to be test fires from Beretta pistol, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics. Items 2, 3, 4 and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics. Items 2, 3, 4 and 5, the bullets, were not fired through the barrel of the same firearm as Items 1A, 1B and 1C, the bullets identified to be test fires from Beretta pistol, based upon different individual microscopic characteristics.
G4W97Z	The questioned bullets (2-5) were eliminated as having been fired in the same firearm as the known bullets (1).
G9QDRG	The Exhibit #2, #3, #4, and #5 bullets were fired from the same firearm. They were not fired from the same firearm as the Exhibit #1 bullets. They are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, SigArms, Smith & Wesson, and Taurus,

TABLE 2

WebCode	Conclusions
	among others.
GAXK3W	1. On 2018-06-07 during the performance of my official duties I received a sealed evidence bag with number PA4002342056 from Case Administration of the Ballistics Section, containing the following exhibits: 1.1 Three (3) .40 calibre fired bullets marked by me "211261/18 1". 1.2 Four (4) .40 calibre fired bullets marked by me "211261/18" each and "2", "3", "4" and "5" respectively. 2. I examined the fired bullets mentioned in paragraphs 1.1 and 1.2 and compared the individual and class characteristics markings on them using a comparison microscope and found: 2.1 The bullets mentioned in paragraph 1.2 were fired from the same firearm. 2.2 The bullets mentioned in paragraph 1.2 were not fired from the firearm that discharge the bullets mentioned in paragraph 1.1.
GH2LK4	Laboratory Items 001.B (Item 2), 001.C (Item 3), 001.D (Item 4) and 001.E (Item 5) four fired 40 caliber copper jacketed bullets are identified as being fired by the same firearm. Laboratory Items 001.B (Item 2), 001.C (Item 3), 001.D (Item 4) and 001.E (Item 5) four fired 40 caliber copper jacketed bullets are inconclusive as being fired by the same firearm as the Laboratory Item 001.A (Item 1) test fires from the recovered Beretta px4 Storm 40 caliber handgun. An inconclusive finding resulted from agreement of all discernible class characteristics, and some disagreement of individual characteristics, but insufficient for an elimination.
GK4DLP	Item 2(QB-1), item 3 (QB-2), item 4 (QB-3) and item 5 (QB-4) bear marks consistent with having been fired from the same firearm, firearm unknown. Item 1 (K-1) cannot be identified or eliminated as having fired item 2 (QB-1) through item 5 (QB-4), inconclusive.
GMBTX3	1. The bullet projectiles marked from E-1 to E-3, corresponding to item 1 are caliber .40/10mm, with striation to the right (R-6) and were fired by the same firearm. 2. Bullet marked from E-1 to E-3, corresponding to item 1, are caliber .40/10mm, with striation to the right (R-6) and were not fired by the firearm used to fire the bullet marked E-4, corresponding to the item 2, the bullet marked E-5, corresponding to the item 3, the bullet marked E-6, corresponding to the item 4 and the bullet marked E-7, described in item 5. 3. The bullet marked E-4, corresponding to item 2, is caliber .40/10mm with striation to the right (R-6) and was fired by the firearm used to fire the bullet marked E-5, corresponding to item 3, the bullet marked E-6, corresponding to item 4 and the bullet marked E-7, corresponding to item 5.
GPLGMT	Items 2, 3, 4 and 5 were all microscopically identified as having been fired in the same unknown firearm, a different firearm than the one that generated the three test fires of Item 1.
GU7T8N	MICROSCOPIC COMPARISON EXAMINATION OF EVIDENCE BULLET ITEMS #'S 2 THROUGH 5 WITH TEST FIRED BULLETS ITEM #1 FROM K1 BERETTA PX4 STORM PISTOL REVEALED SUFFICIENT AGREEMENT OF INDIVIDUAL CHARACTERISTICS EXISTS TO IDENTIFY ITEMS #'S 2 THROUGH 5 AS HAVING BEEN FIRED WITH THE SAME UNKNOWN FIREARM. DUE TO DIFFERENCES IN INDIVIDUAL MICROSCOPIC MARKINGS PRESENT, ITEMS #'S 2 THROUGH 5 WERE NOT FIRED WITH K1 BERETTA PISTOL. SHOULD ANY OTHER SUSPECT FIREARM BE RECOVERED, SUBMIT SAME IN REFERENCE. "Sufficient agreement" exists between two toolmarks means that the agreement is of a quantity and quality that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility. Sufficient agreement is related to the significant duplication of random toolmarks as evidence by a pattern or combination of patterns of surface contours.
GUCXVD	Item A1-1: The Item A1-1 .40 caliber fired bullets are consistent in class characteristics with the items A1-2, A1-3, A1-4 and A1-5 .40 caliber fired bullets. Item A1-2: The Item A1-2 .40 caliber fired bullet is consistent in class characteristics with the items A1-1, A1-3, A1-4 and A1-5 .40 caliber fired bullets. Item A1-3: The Item A1-3 .40 caliber fired bullet is consistent in class characteristics with the items A1-1, A1-2, A1-4 and A1-5 .40 caliber fired bullets. Item A1-4: The Item A1-4 .40 caliber fired bullet is consistent in class characteristics with the items A1-1, A1-2, A1-3 and A1-5 .40 caliber fired bullets. Item A1-5: The Item A1-5 .40 caliber

TABLE 2

WebCode	Conclusions
	fired bullet is consistent in class characteristics with the items A1-1, A1-2, A1-3 and A1-4 .40 caliber fired bullets. Item A1-1 was compared to items A1-2, A1-3, A1-4 and A1-5. Due to differences in individual characteristics, the Item A1-1 bullets were eliminated as having been fired from the same firearm as the Items A1-2, A1-3, A1-4 and A1-5 bullets.
GYABYQ	The Exhibit 2, 3, 4 and 5 bullets were fired from the same firearm. They were not fired from the same firearm as the Exhibit 1 bullets. They are 40/10mm caliber class bullets and display rifling characteristics similar to firearms by numerous manufacturers.
GYHU27	3. On 2018-06-07 during the performance of my official duties I received a sealed evidence bag with number PA4002342055 from Case Administration of the Ballistics Section, containing the following exhibit: 3.1 One (1) sealed cardboard box marked "Test No. 18-526: FIREARMS EXAMINATION", containing the following: 3.1.1 One (1) small white box marked "Test No. 18-526 Item 1", containing the following exhibit: 3.1.1.1 Three (3) .40/ 10mm calibre test fired bullets marked by me "211280/18" each and "TB1A", "TB1B" and "TB1C" respectively. 3.1.2 One (1) small white box marked "Test No. 18-526 Item 2", containing the following exhibit: 3.1.2.1 One (1) .40/ 10mm calibre fired bullet marked by me "211280/18 2". 3.1.3 One (1) small white box marked "Test No. 18-526 Item 3", containing the following exhibit: 3.1.3.1 One (1) .40/ 10mm calibre fired bullet marked by me "211280/18 3". 3.1.4 One (1) small white box marked "Test No. 18-526 Item 4", containing the following exhibit: 3.1.4.1 One (1) .40/ 10mm calibre fired bullet marked by me "211280/18 4". 3.1.5 One (1) small white box marked "Test No. 18-526 Item 5", containing the following exhibit: 3.1.5.1 One (1) .40/ 10mm calibre fired bullet marked by me "211280/18 5". 4. The intention and scope of this forensic examination comprise of the following: 4.1 The examination and identification of fired bullets. 4.2 Microscopic individualization of fired bullets. 5. I examined the fired bullets mentioned in paragraphs 3.1.1.1, 3.1.2.1, 3.1.3.1, 3.1.4.1 and 3.1.5.1 and compared the individual and class characteristics markings transferred to them by firearm components during the firing process using a comparison microscope and found: 5.1 The bullets mentioned in paragraphs 3.1.2.1, 3.1.3.1, 3.1.4.1 and 3.1.5.1 were fired from the same firearm but not from the firearm that discharged the bullets mentioned in paragraph 3.1.1.1.
GYPWBD	Exhibits 1 through 5 consist of seven (7) .40-caliber class, copper jacketed bullets fired from a barrel rifled with six (6) lands and grooves with a right twist. Microscopic comparisons were conducted between these items, with the following results: Based on agreement of all discernible class characteristics and sufficient correspondence of individual characteristics, the Exhibit 1A through 1C bullets were identified as having been fired from the same firearm. Based on agreement of all discernible class characteristics and sufficient correspondence of individual characteristics, the Exhibit 2 through 5 bullets were identified as having been fired from the same firearm. However, based on extreme differences in individual characteristics, Exhibits 2 through 5 were eliminated as having been fired from the same firearm as the Exhibit 1 bullets.
H47WKW	ITEMS 2 TO 5 WERE FIRED FROM THE SAME FIREARM. ITEMS 2 TO 5 WERE NOT FIRED FROM THE SAME FIREARM AS ITEM 1.
H8ACMU	RESULTS OF EXAMINATION: QB2-QB5 (Items 2-5) were examined and determined to be four (4) fired, .40 caliber, full metal jacketed (copper) bullets with 6R conventional rifling characteristics. QB2-QB5 were microscopically inter-compared. It is my opinion that QB2-QB5 were fired by the same firearm. See photos for areas of comparison. QB2-QB5 were microscopically compared to TF1-TF3 (Item 1). It is my opinion that QB2-QB5 are eliminated as having been fired by the firearm which fired TF1-TF3.
H9L69V	3. On 2018-06- 06 during the performance of my official duties I received a sealed evidence bag with number PA4002342052 from Case Administration of the Ballistics Section, containing the following exhibits : 3.1 Three (3) test fired .40 calibre bullets marked

TABLE 2

WebCode	Conclusions
HDH3NE	<p>"211255/18" each and "1A", "1B" and "1C" respectively. 3.2 Four (4) .40 calibre fired bullets marked "211255/18" each and "2", "3", "4" and "5" respectively. 4. The intention and scope of this forensic examination comprise of the following: 4.1 The examination and identification of fired bullets. 4.2 Microscopic individualization of fired bullets. 5. I examined the fired bullets mentioned in paragraphs 3.1 and 3.2 compared the individual and class characteristics markings on them using a comparison microscope and found: 5.1 The bullets mentioned in paragraph 3.2 marked "211255/18" each and "2", "3", "4" and "5" respectively were fired from the same firearm. 5.2 The bullets mentioned in paragraph 5.1 were not fired from the same firearm that discharged the bullets mentioned in paragraph 3.1. Exhibits #2, #3, #4, and #5 were fired from the same firearm. These exhibits are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, Sigarms, Smith & Wesson, and Taurus, among others. Exhibits #2, #3, #4, and #5 were not fired from the Exhibit #1 pistol.</p>
HGEQ4L	<p>The known bullets Item 1 and the questioned bullets Item 2, 3, 4 and 5 have different individual characteristics, so it is undoubtedly proved, that the bullets Item 2, 3, 4 and 5 were not fired in the same firearm as the known bullets Item 1. The questioned bullets Item 2, 3, 4 and 5 have with each other matching individual characteristics, so it is undoubtedly proved, that these bullets were fired in the same firearm.</p>
HGJWRB	<p>The following findings reflect the professional opinion of the examiner authoring this report. Examination of Item #1 revealed three (3) fired 40 caliber full metal jacket bullets reportedly test fired through the barrel of the suspect Beretta model Px4 Storm semi-automatic pistol. Examination of the four (4) fired full metal jacket bullets revealed they are 40 caliber and fired through a firearm barrel rifled with six (6) lands and grooves with a right hand twist. Microscopic examination Items #2 thru #5 revealed they were fired through the same firearm barrel; however, Items #2 thru #5 were not fired through the barrel of the suspect Beretta semi-automatic pistol.</p>
HLPTY6	<p>3. On 2018-06-26 during the performance of my official duties I received a sealed evidence bag with number PA4002342058 from Case Administration of the Ballistics Section, containing the following items: 3.1 One (1) jewel box marked "Item 1" containing the following exhibits: 3.1.1 Three (3) .40 calibre fired bullets marked by me "211291/18" each and "T1A", "T1B" and "T1C" respectively. 3.2 One (1) jewel box marked "Item 2" containing the following exhibit: 3.2.1 One (1) .40 calibre fired bullet marked by me "211291/18 2". 3.3 One (1) jewel box marked "Item 3" containing the following exhibit: 3.3.1 One (1) .40 calibre fired bullet marked by me "211291/18 3". 3.4 One (1) jewel box marked "Item 4" containing the following exhibit: 3.4.1 One (1) .40 calibre fired bullet marked by me "211291/18 4". 3.5 One (1) jewel box marked "Item 5" containing the following exhibit: 3.5.1 One (1) .40 calibre fired bullet marked by me "211291/18 5". 4. The intention and scope of this forensic examination comprise of the following: 4.1 The examination and identification of fired bullets. 4.2 Microscopic individualization of fired bullets. 5. I examined the fired bullets mentioned in paragraphs 3.1.1, 3.2.1, 3.3.1, 3.4.1 and 3.5.1 and compared the individual and class characteristics markings on them using a comparison microscope and found: 5.1 The bullets mentioned in paragraphs 3.2.1, 3.3.1, 3.4.1 and 3.5.1 were fired from the same (1st) firearm. 5.2 The bullets mentioned in paragraph 3.1.1 were not fired from the firearm that discharged the bullets mentioned in paragraph 3.1.1.</p>
HMNQTY	<p>[No Conclusions Reported].</p>
HNUC8X	<p>In my opinion a microscopical comparison of firing marks on the test fired bullets (Item 1) against the recovered items 2, 3, 4, & 5 has shown that there is agreement of class characteristic markings with sufficient disagreement of fine individual markings to conclusively determine that the bullets in items 2, 3, 4 & 5 were not fired from the recovered weapon (Item</p>

TABLE 2

WebCode	Conclusions
HQ474X	<p>1). However a microscopical comparison of firing marks on items 2, 3, 4 & 5 has shown that there is sufficient agreement of class and individual characteristic markings to conclusively determine that they were all fired from the same weapon.</p> <p>I examined the fired tests bullets (Item 1) and the fired exhibit bullets (Items 2-5) and compared the individual and class characteristic markings transferred to them by firearm components during the firing process, using a comparison microscope and found: The exhibit bullets (Items 2-5) were fired from the same firearm. (First firearm) The test bullets (Item 1) were not fired from the same firearm, than the exhibit bullets (Items 2-5). (Second firearm)</p>
HZBYGY	Item 2, 3, 4, 5 bullets were different from the firearm used to fire item 1 bullets.
HZWHDJ	Items 2-5 were fired in the same firearm (identification). This conclusion was verified by Firearms Examiner (name). Items 2-5 could not be identified or eliminated as having been fired in the same firearm as Item 1 (inconclusive). This conclusion was verified by Firearms Examiner (name). For additional clarification regarding conclusion statements, please contact the Firearms Section or go to [website].
J3YNMX	Item # 2,3,4 and 5 were not fired from the same firearm as item # 1 Item 3 2,3,4 and 5 were fired from the same firearm with similar class characterization to Berreta PX4 storm 40 S/W caliber
J4AKXU	The bullets Exhibits 2, 3, 4 and 5 were compared microscopically with each other. They were identified as having been fired from a single firearm. They were NOT fired from the same firearm as the bullets Exhibit 1 (known-test fires). The bullets Exhibits 2, 3, 4 and 5 are 40/10mm caliber class and display rifling characteristics similar to 40 S&W caliber firearms by Beretta, CZ, SigArms, Smith & Wesson and Taurus among others. Therefore, any suspect firearm should be considered for submission to this laboratory for examination.
J968T4	Item 1 contains three (3) caliber 40 class full-metal jacketed bullets that were examined microscopically and identified as having been fired from the same firearm. Items 2, 3, 4, and 5, each a caliber 40 class full-metal jacketed bullet, were examined microscopically and identified as having been fired from the same firearm. Items 2, 3, 4, and 5 were eliminated as having been fired from the same firearm as the Item 1 bullets due to differences in individual characteristics. Firearms that produce general class characteristics like those present on Items 2, 3, 4, and 5 include firearms chambered to fire caliber 40 Smith & Wesson cartridges with the brand names listed below. This list is not all-encompassing; it is possible another brand of firearm produced these class characteristics and is not listed due to the content of the databases searched. Beretta, CZ, Sigarms/SIG Sauer, and Taurus
JAEGGU	Using the Bayesian approach in casework we view our findings under two hypotheses. In this test we used the following hypotheses: H1: The questioned bullet was fired through the barrel of the submitted firearm. H2: The questioned bullet was fired through the barrel of another firearm of the same caliber and with the same class characteristics as the submitted firearm. The likelihood ratio (LR) of the findings is expressed in the following verbal scale: Approximately equally probable (LR = 1-2). Slightly more probable (LR = 2-10). More probable (LR = 10-100). Much more probable (LR = 100-10,000). Very much more probable (LR = 10,000-1,000,000). Extremely more probable (LR = >1,000,000). Conclusions: Item 2: The findings are extremely more probable when H2 is true than when H1 is true. Item 3: The findings are extremely more probable when H2 is true than when H1 is true. Item 4: The findings are extremely more probable when H2 is true than when H1 is true. Item 5: The findings are extremely more probable when H2 is true than when H1 is true.
JC2A4W	In my opinion, a microscopical comparison of firing marks has shown there is agreement of class characteristic markings, but significant disagreement of individual characteristic markings, therefore the bullets, item 2, item 3, item 4 & item 5 were not fired from the recovered Beretta px4 Storm firearm.

TABLE 2

WebCode	Conclusions
JMM38E	1. Examinations showed Items 2, 3, 4, and 5 were not discharged from the same firearm as Item 1. 2. Examinations showed Items 2, 3, 4, and 5 were discharged from the same unknown firearm.
JPCJ8E	See attached report [Attachment not provided by participant]
JU2ZKZ	The questioned bullets marked as BP2 (Item 2), BP3(Item 3), BP4 (Item 4) and BP5(Item 5), were fired by the same firearm. The questioned bullets marked as BP2, BP3, BP4 and BP5 were not fired by the Beretta, PX4 STORM .40 caliber firearm that fired the known bullets.
JYYKMN	The fired bullets, Items 001-2 through 001-5, were fired by a single firearm but they were not fired by the same firearm that was reportedly used to produce the test fired bullets, Items 001-1A through 001-1C.
K7ZY76	Items 2, 3, 4 and 5 were all eliminated as having been fired in the same firearm that was used to create Item 1 based on significant disagreement of individual characteristics. Items 2, 3, 4 and 5 were all identified as having been fired in the same unknown firearm based on sufficient agreement of class and individual characteristics.
KDZGLG	Test bullets #1 through #3 (Item 1) were compared microscopically to Items 2, 3, 4 and 5. The examinations determined Items 2, 3, 4 and 5 were fired from a different firearm than Item 1 due to a disagreement of individual characteristics. Items 2, 3, 4 and 5 were compared microscopically to each other. The examinations determined that Items 2, 3, 4 and 5 were fired from the same firearm due to a sufficient agreement between striations.
KEKG8Q	Items 2 through 5 (fired bullets) are not identified or eliminated (inconclusive) as having been fired from the same firearm as Item 1 (test shots reportedly from a .40 S&W caliber, Beretta, model PX4 Storm, semiautomatic pistol). The individual characteristics present do not display agreement. However, the characteristics present suggest that they were fired from different firearms. Submission of those firearms is necessary for further examination. Toolmarks observed on Items 2 through 5 (fired bullets) are identified as having been produced by a common source. However, due to potential subclass Items 2 through 5 are inconclusive as having been fired from the same firearm. The characteristics observed potentially lack sufficient individuality for identification to a single firearm. The submission of the suspected firearm is necessary for further examination. Items 2 through 5 (fired bullets) are consistent with being .40/10mm caliber class fired metal jacketed bullets displaying conventional rifling specifications of six lands and grooves with a right twist.
KGBHDE	Exhibits #1a, #1b, and #1c were fired from the same firearm. The bullets are 40/10mm caliber class. Exhibit #1c displays rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, Springfield Inc., and Taurus, among others. Exhibits #2, #3, #4 and #5 were fired from the same firearm; however, these exhibits were not fired from the same firearm as Exhibits #1a, #1b, and #1c. The bullets are 40/10mm caliber class. Exhibit #2 displays rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, Springfield Inc., and Taurus, among others.
KGWA9J	Microscopic examination of the test fired bullets in Item #1 in conjunction with the bullets in Item #2 through Item #5 revealed the following: A) Item #2 through Item #5 bear the same class characteristics as Item #1; however, no individual characteristics were found to link Item #2 through #5 as having been fired in the same firearm as the bullets in Item #1. B) Item #2 through Item #5 were all fired in the same unknown firearm. Rifling characteristics present on these Items are commonly found on firearms manufactured by Beretta, CZ, Heritage, Sigarms, Smith and Wesson, Taurus and others. Any suspect firearm should be submitted for comparison.
KHNA7V	Items 2, 3, 4, and 5 were microscopically examined and compared. Based on observed agreement of class characteristics and sufficient agreement of individual characteristics, the bullets were identified as having been fired from the same firearm. Items 2, 3, 4, 5, and the

TABLE 2

WebCode	Conclusions
	test fired bullets from the Beretta semiautomatic pistol (Item 1) were microscopically examined and compared. Based on observed disagreement of individual characteristics, the bullets were eliminated as having been fired from the Beretta semiautomatic pistol. Items 2, 3, 4, and 5 have physical and design characteristics consistent with being .40/10mm caliber. Common 40 S&W semiautomatic pistols that could have fired them include the following: Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, Taurus. NOTE: The above listed firearms do not constitute a complete listing of makes and/or models of firearms that could have possibly fired the listed bullets, nor should the complete list be considered all-inclusive. A complete listing of the search results will be provided upon request.
KK963V	The test fired bullets (Item 1) and the fired bullets (Items 2-5) were microscopically examined and compared. There is observed agreement of their class characteristics. However, there is insufficient agreement or disagreement of their individual characteristics to either identify or eliminate the bullets (Items 2-5) as having been fired from the same firearm as the test fired bullets (Item 1).
KKMK8W	None of the bullets recovered at the scene, items 3, 4 and 5, nor the bullet recovered from the victim, item 2 was fired from the suspect firearm, the Beretta PX4 Storm 40 caliber pistol. Items 2, 3, 4, and 5 were fired in the same firearm; however they were not fired in the recovered Beretta PX4 Storm 40 caliber pistol used to make the test fires, item 1.
KL3TKQ	Items 2 through 5 (fired metal jacketed bullets) are identified as having been fired from the same firearm. Items 2 through 5 (fired metal jacketed bullets) are not identified or eliminated (inconclusive) as having been fired from Item 1 (Beretta handgun). The individual characteristics present do not display agreement; however, differences suggest these bullets were fired from a different firearm. Submission of that firearm is necessary for further examination. Items 2 through 5 are consistent with being .40/10mm caliber class fired metal jacketed bullets displaying conventional rifling specifications of six lands and grooves with a right twist.
KL6HPN	The fired bullets of item #'s 2,3,4 and 5 were microscopically eliminated as having been fired from the siezed Beretta firearm due to significant differences in gross marks and individual characteristics. These four bullets were microscopically identified as having been fired from the same unknown firearm. The fired bullets of item #'s 2,3,4 and 5 are consistent in diameter, weight, and bullet design with .40 caliber bullets loaded into 40 S&W caliber and 10mm Auto caliber cartridges.
KQYHXH	The bullets of Item 1 (three bullets said to have been fired from a recovered pistol) were fired from a different firearm than Items 2, 3, 4 and 5 (four bullets). Items 2 through 5 were fired from the same firearm.
KRPKQY	The questioned bullets including the one recovered from the victim's body, marked as BP2, BP3, BP4 and BP5 were fired by the same .40 caliber firearm, but they do not present ballistic correlation with the known bullets obtained from the Beretta, model PX4 STORM caliber .40 pistol, because they do not have the same microscopic individual characteristics.
L6D9AP	1. Examination of Exhibits 2 through 5 disclosed them to be four fired .40 caliber full metal jacketed bullets displaying six land and groove impressions with a right twist. Exhibits 2 through 5 were microscopically compared to Exhibit 1, test fired bullets from the recovered firearm. a. As a result of microscopic comparison, it was concluded that Exhibits 2 through 5 were eliminated as having been fired from the same firearm as Exhibit 1 due to differences in individual characteristics. b. Exhibits 2 through 5 were identified as having been fired from the same firearm.
L74B6R	The bullets in items 001-02 through 001-05 were examined in conjunction with the test fired bullets in item 001-01. Based on these microscopic comparisons the following was determined: Based on the agreement of class and individual characteristics, the bullets in items 001-02 through 001-05 were identified as having been fired in the same unknown firearm.

TABLE 2

WebCode	Conclusions
	The bullets in items 001-02 through 001-05 were inconclusive as having been fired in the same firearm as the bullets in item 001-01. Agreement of class characteristics was observed; however, there was insufficient agreement or disagreement of individual characteristics for identification or elimination.
L78NWU	The items 2, 3, 4 and 5 fired bullet specimens were fired from the same firearm, but not the same firearm as the item 1 fired bullet specimens. The general rifling characteristics of the items 2, 3, 4 and 5 fired bullet specimens are consistent with firearms marketed by Beretta, CZ, Iberia Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher, Taurus and others.
L83ER2	Items 2-5 were identified as having been fired from the same firearm as each other. However, based on differences in individual characteristics, they are eliminated from having been fired from the firearm that fired Item 1. The identifications and eliminations were confirmed by another firearms examiner.
L864WX	Item 5 was not fired from the same firearm as Item 1a (test). Items 2, 3, 4, and 5 were all microscopically identified as having been fired from the same unknown firearm. Items 2, 3, 4, and 5 were determined to be of 40 / 10mm caliber, displaying rifling characteristics of six lands and grooves, right twist. Manufacturers of firearms with similar rifling characteristics include, but are not limited to Beretta, Ceska Zbrojovka, Czechoslovakia, Heritage, Iberia Arms, KSN Arms, Republic Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher, and Taurus.
LAMFK2	Ballistic comparison between projectiles (Items 2, 3, 4 and 5) with reference sample projectiles of the Beretta Px4 Storm caliber .40 gun result: there is not uniprocedent.
LCF8YT	Items 2, 3, 4 and 5 were fired in the same firearm, however they were not fired in the same firearm that fired the item 1 test fires. Items 2, 3, 4 and 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, Taurus, Sigarms and Smith & Wesson.
LCR27T	I examined the fired bullets marked Item 1 to Item 5 and compared the individual and class characteristics markings transferred to them by firearm components during the firing process using a comparison microscope and found that they were fired in different firearms as follows: The bullets marked Item 1 were fired from the same firearm. The bullets marked item 2 to item 5 were fired from a second firearm.
LFXBPB	Exhibits #2,3,4 and 5 were fired from the same unknown firearm. They were not fired from Exhibit #1. Exhibits #2,3,4 and 5 are 40/10mm caliber class. They display rifling characteristics similar to firearms by Beretta, Heritage, Sigarms, Smith and Wesson, among others.
LJVR4Q	On examination and comparison, I found that the characteristic marks between the three bullets fired using the recovered firearm (Item 1) and the bullet recovered from victim (Item 2), the first bullet recovered from drywall at the scene (Item 3), the second bullet recovered from drywall at the scene (Item 4), the bullet recovered from wall partition at the scene (Item 5) for a negative correlation. Hence, I am of opinion that, different firearm fired the bullet between Item 1 and Item 2, Item 3, Item 4, Item 5.
LK3AWU	The Items 2-5 fired large caliber bullets and test fires (Item 1) from the recovered firearm were examined and microscopically compared to each other with the following results: Items 2-5 were identified as having been fired from the same unknown large caliber firearm. Items 2-5 were eliminated as having been fired from the firearm used to create the Item 1 test fires based on disagreement of individual characteristics. The Items 2-5 bullets are most consistent with bullets commonly loaded in 10mm Auto or 40 S&W caliber cartridges. Some possible firearms that exhibit the same class characteristics as observed on Items 2-5 include, but are not limited to, those marketed by: Beretta, CZ, SigArms, Smith & Wesson and Taurus. However, any suspect firearm should be submitted for comparison.
LLYMJM	Items #01.01 through #01.05- The four (4) questioned bullets were originally components of

TABLE 2

WebCode	Conclusions
	.40 caliber cartridges that had been fired in a barrel with six lands and grooves of conventional style rifling with a right hand twist. Microscopic examination and comparison of the submitted known expended bullets with the questioned expended bullets revealed the following: The four (4) questioned expended bullets, items #01.02 through #01.05 revealed sufficient agreement of individual characteristics to conclude that they had been fired from the same weapon. These four (4) questioned expended bullets revealed sufficient disagreement of individual characteristics to conclude that they had not been fired from the known weapon that fired Item #01.01; but rather a second unknown weapon.
LMV292	Microscopic examination and comparison of the fired bullets Items 2, 3, 4 and 5 reveals corresponding general rifling characteristics, cut rifling, six (6) lands and six (6) grooves with a right hand twist along with corresponding individual barrel engraved striations with significant duplication of patterns establishing that all four (4) fired bullets were fired by the same unknown 40 caliber/ 10 mm caliber firearm. Microscopic examination and comparison of the test fired bullets Item 1 to the fired bullets Items 2, 3, 4 and 5 reveals dissimilar individual barrel engraved striations establishing that the four (4) fired bullets were not fired from the same firearm that fired Item 1.
LNDZFW	I conducted a comparative microscopic examination between the three bullets in Item 1 and each of the four bullets marked as Items 2, 3, 4 and 5. This revealed the following: The barrel that was responsible for discharging Item 1, was not used to discharge any of the four bullets Items 2, 3, 4 and 5. The four bullets in Items 2, 3, 4 and 5 were all discharged through the same barrel.
LP2EZZ	The Item 1 through 5 bullets, each a caliber 40 class bullet, were examined microscopically. The Item 1 bullets were identified as having been fired from the same firearm. Items 2 through 5 were identified as having been fired from the same firearm. Due to sufficient differences in individual characteristics, Items 2 through 5 were eliminated as having been fired from the same firearm as the Item 1 bullets. Firearms that produce general class characteristics like those present on Items 2 through 5 include firearms, chambered to fire caliber 40 S&W cartridges, with the brand names listed below: Beretta, CZ, Iberia Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher, and Taurus. This list is not all-encompassing. It is possible another brand of firearm produced these class characteristics and is not listed due to the content of the database searched.
LR3K3Z	The fired bullets marked as 519709/17 (3) A2-A5 were fired from the same firearm. The test fired bullets marked as 709 TB1-TB3 were not fired from the same firearm that fired the exhibits 519709/17 (3) A2-A5.
LRTKBY	1. The bullets described in item 1, are .40/10mm with right rifling (R-6) and were fired by the same firearm. 2. The bullets described in item 1, are .40/10mm with right rifling (R-6) and were not fired by the firearm used to fire the bullets described in items 2, 3, 4 and 5. 3. The bullets described in items 2, 3, 4 and 5, are .40/10mm with right rifling (R-6) and were fired by the same firearm.
LXHZ2R	All the questioned bullets(Items2-5) were fired from the same firearm, but not fired from the recovered firearm(known).
LZHG2T	Item 1 was excluded has having fired Item 2, Item 3, Item 4 and Item 5. Item 2, Item 3, Item 4 and Item 5 were all fired from the same firearm.
LZMH7E	Items 2-5 were identified as having been fired from the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 2-5 were eliminated as having been fired from the same unknown firearm as the test fires reportedly from Item 1 due to disagreement of individual characteristics.
M3N9ME	Items 2-5 were not fired in the same firearm as Item 1 (elimination). This conclusion was verified by Firearms Examiner_____. Items 2-5 were fired in the same firearm (identification). This conclusion was verified by Firearms Examiner_____.

TABLE 2

WebCode	Conclusions
M6BRK6	After microscopic comparison, it was determined that Items #2, 3, 4 and 5 were not fired from the Beretta, Model PX4 Storm, caliber 40 S&W semiautomatic pistol. The exclusion was based on differences of individual characteristics of the land impression marks. After microscopic comparison, it was determined that Items #2, 3, 4 and 5 were fired from the same firearm based on sufficient agreement of class and individual characteristics of the land impression marks. (Firearm #2)
MCACTT	Items 2 through 5 were fired in the same firearm, however they were not fired in the same firearm as the item 1 test fires. Items 2 through 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, Ceska Zbrojovka, Czechoslovakia, Iberia Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher and Taurus.
MHFZBZ	The submitted fired bullets (Items 2 through 5) were fired from the same unknown firearm. The submitted fired bullets (Items 2 through 5) were eliminated as having been fired from the Beretta (Item 1). The submitted fired bullets (Items 2 through 5) were consistent with .40 caliber class and was fired from a firearm with six lands and grooves with a right twist. Some possible firearms would include, but not be limited to, the following: Beretta, Smith & Wesson, Taurus, Sig Arms, and Steyr-Mannlicher.
MK4J8R	Examination and microscopic comparison of the submitted fired bullets (Items 3-5) with submitted test fired bullets (Item 1) revealed insufficient detail to either eliminate or identify the submitted bullets (Items 3-5) as having been fired through the same barrel as the test bullets (Item 1). The results are therefore inconclusive. Examination and microscopic inter-comparison of the submitted fired bullets (Items 3-5) revealed sufficient microscopic detail to conclude that the submitted bullets (Items 3-5) were all fired through the same barrel.
MPH2P9	A microscopic examination and comparison of the evidence described above revealed the following: BULLETS (2-5) are identified as having been discharged from the same firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. BULLETS (2-5) and TEST FIRES (1.1-1.3) are eliminated as having been discharged from the firearm described above based on the observed disagreement of individual characteristics.
MTU6B6	Items# 2, 3, 4, and 5 were NOT discharged from Item# 1 based on differences in individual characteristics. After microscopic comparison, it was determined that Items# 2, 3, 4 and 5 were fired from the same firearm based on agreement of class and sufficient agreement of individual characteristics of the land impression marks.
MUNPAW	I examined the fired bullets received and compared the individual and class characteristics markings transferred during the firing process using a comparison microscope and found: (i) The bullets marked item 2 to item 5 were fired from the same firearm. (ii) The bullets marked item 1 were not fired from the same firearm as those marked item 2 to item 5.
N37C27	As a result of my comparisons, I formed the following opinions: The exhibit fired bullets (Items 2 - 5) were not discharged from the submitted .40S&W calibre, Beretta, PX4 Storm, semi-automatic pistol. However, the exhibit fired bullets (Items 2 - 5) had all been discharged from the same unknown firearm.
N97XME	Items 2-5 were fired in the same firearm (identification). This conclusion was verified by Firearms Examiner XXXXXXXX. Items 2-5 could not be identified or eliminated as having been fired in the same firearm as Item 1 (inconclusive). This conclusion was verified by Firearms Examiner XXXXXXXX. Items 2-5 are consistent with the 40 caliber family, which includes 40 S&W and 10mm Auto. In the event that Items 2-5 were fired in a 40 S&W or 10mm Auto firearm, then in addition to the firearm that fired Item 1, they could have been fired in a firearm of the following caliber and manufacture: 40 S&W, BERETTA, CESKA ZBROJOVKA, FN/BROWNING, SIGARMS, SMITH & WESSON. 10mm Auto: There are currently no matching entries in this laboratory's database. Manufacturers lists are investigative tools and

TABLE 2

WebCode	Conclusions
NEX66M	<p>are not intended to be all-inclusive. Any suspect firearms should be submitted for comparison. The submitted bullets, Items #2-#5, were compared microscopically with each other and the submitted test fires, Item #1. There is agreement in all discernible class characteristics and sufficient disagreement in individual characteristics for elimination. These four bullets were not fired by the firearm that discharged the submitted tests. The four submitted bullets, Items #2-#5, have sufficient agreement in corresponding individual characteristics for identification. #2-#5 were discharged in the same firearm.</p>
NHDKR9	<p>Microscopic examination of the test fired bullets, item 1 showed that there were reproducible matching marks present. These marks were not present on items 2 to 5. Therefore the firearm which was used to produce the test fires item 1 did not fire the recovered bullets, items 2-5. Examination of items 2-5 showed that there were reproducible matching marks present which indicated that they were all fired in a different single firearm.</p>
NLNMLQ	<p>I examined the fired bullets marked Item 1 to Item 5 and compared the individual and class characteristics markings transferred to them by firearm components during the firing process using a comparison microscope and found: The bullets marked Item 2 to Item 5 were fired from the same firearm. The bullets marked Item 2 to Item 5 were not fired from the same firearm as the test bullets marked Item 1.</p>
NR4AG9	<p>see report [Attachment not provided by participant]</p>
NRGQEU	<p>Based on correspondence in the available microscopic details and the assumptions listed below, Items 2 thru 5 were fired from a single firearm. The test fired bullets (Items 1A thru 1C) were fired from a second firearm. 1. I am assuming that since I do not have access to the firearm(s) involved with this incident they have been thoroughly evaluated for subclass and deemed to not have subclass contribution. 2. The test fired bullets were evaluated and deemed to be good representations of the barrel(s) marking signature.</p>
NWAYR2	<p>Items 2, 3, 4 and 5 were identified as having been fired from the same unknown firearm. They were not fired from the firearm represented by the Item 1 tests.</p>
NXH7ZW	<p>The fired bullets marked 211327/08 B2-B5 (Item 2 to Item 5) were fired from the same firearm but were not fired from the same firearm as known bullets marked 327 TB1-TB3 (Item 1).</p>
NXNE3H	<p>I microscopically evaluated Items 2, 3, 4, and 5 and the test fired bullets from suspect's firearm, a Beretta PX4 Storm .40 S&W caliber handgun. Items 2, 3, 4, and 5 were eliminated as having been fired in the suspect's firearm based on sufficient disagreement of the individual characteristics in the rifling marks. Items 2, 3, 4, and 5 were identified as having been fired in the same firearm based on sufficient agreement of individual characteristics in the rifling marks.</p>
P27QPQ	<p>Bullet Analysis: Items 2, 3, 4, and 5 are 40 caliber class bullets based upon the diameter. Opinion/Interpretation: Items 2, 3, 4, and 5 are consistent with bullets loaded in .40 S&W and 10mm Auto caliber cartridges based upon the weight and style. These bullets exhibit characteristics found in (but not limited to) the following firearms: .40 S&W caliber firearms- Beretta, Ceska Zbrojovka, Heritage, Sigarms, Smith & Wesson, Steyr-Mannlicher, and Taurus. Methodology - Comparison Microscopy: Items 2, 3, 4, and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics. Items 2, 3, 4, and 5, the bullets, were not fired through the barrel of Item 1, the Beretta pistol, based upon different individual microscopic characteristics.</p>
P2ZQEP	<p>It was determined that the projectiles recovered from the victim and scene (Items 2,3,4,5) were all fired in the same firearm. These projectiles shared similar class characteristics with the projectiles fired in the recovered firearm but insufficient microscopic characteristics to determine whether or not they were fired in the same firearm.</p>

TABLE 2

WebCode	Conclusions
P3UEVY	The questioned bullets identified with the items 2, 3, 4 and 5 were shot in the same firearm, but different from the firearm that fired the bullets known from the item 1.
PADMEP	The recovered questioned bullets Items 2,3,4 and 5 have not been fired in the same firearm as the known bullets Item 1. Bullets Items 2,3,4 and 5 have been fired in the same firearm.
PAFCJM	Item 2 through Item 5 (bullets) were microscopically compared to each other and were identified as having been fired from the same unknown firearm due to the correspondence of all discernible class characteristics. Item 2 through Item 5 (bullets) were microscopically compared to Item 1 (test fired bullets) and were eliminated as having been fired from the same firearm as Item 1 (test fired bullets) due to the disagreement of individual characteristics.
PBAZ3H	The findings support very strongly the hypothesis that Item 2 to 5 were fired by the same firearm, while none of the mentioned bullets were fired in the seized firearm.
PBQ6KF	Items 2, 3, 4, and 5 were fired in the same firearm, however they were not fired in the same firearm as the item 1 test fires. Items 2, 3, 4, and 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, CZ, Czechoslovakia, Heritage, Iberia Arms, KSN Industries, Republic Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher, and Taurus.
PF2383	Items 2 through 5 (bullets) were eliminated as having been fired through the same firearm as item 1 (test fired bullets). There are sufficient individual markings present to identify items 2 through 5 (bullets) as having been fired through the same firearm.
PLLEUH	Results of Examinations: Item 2 through Item 5 are .40 S&W caliber (10mm) bullets that were identified as having been fired from the same barrel that is rifled with six grooves, right twist. Due to a lack of sufficient corresponding microscopic marks of value, no conclusion could be reached as to whether the Item 2 through Item 5 bullets were fired from the same barrel as the Item 1 test fired bullets. A check of the Laboratory's General Rifling Characteristics (GRC) database produced a list of pistols with GRCs like those present on the Item 2 through Item 5 bullets that includes pistols marketed by Beretta, CZ, Heritage, Sigarms, Smith & Wesson and Taurus and rifle carbines marketed by Beretta.
PW324J	Items 1 through 5 are .40 caliber/10mm full metal jacketed bullets that were fired from a barrel rifled with six lands and grooves, right twist. The Item 2 through Item 5 bullets were identified as having been fired from the same barrel. Due to a lack of sufficient corresponding microscopic marks of value, it could not be determined whether the Item 2 through 5 bullets were fired from the same barrel as the Item 1 bullets.
PX4VZW	Results: The Item 1 bullets, each a caliber 40 Class full metal jacketed bullet, were examined microscopically and identified as having been fired from one (1) firearm. Items 2, 3, 4 and 5, each a caliber 40 Class full metal jacketed bullet, were examined microscopically and identified as having been fired from one (1) firearm. Firearms that produce general class characteristics like those present on these bullets include pistols chambered to fire caliber 40 S&W cartridges with the brand names listed below. This list is not all encompassing; it is possible another brand of firearm produced these class characteristics and is not listed due to the content of the databases searched. Beretta, Ceska Zbrojovka (CZ), SIGARMS (SIG Sauer), and Taurus. Due to sufficient differences in individual characteristics Items 2, 3, 4 and 5 were eliminated as having been fired from the firearm that fired the Item 1 bullets.
PZUYQH	Items 2 through 5 were eliminated to Item 1 based on the disagreement of individual characteristics. Items 2 through 5 were identified as having been fired from the same unknown firearm based on agreement of individual and class characteristics.
Q4KURN	3. On 2018-06-11 during the performance of my official duties I received a sealed evidence bag with number PA4002354579 from Case Administration of the Ballistics Section containing the following: 3.1 Three (3) test fired .40 calibre bullets which I marked TB each and 1 to 3 individually (Item 1). 3.2 Four (4) fired .40 calibre bullets which I marked "211235/18" each

TABLE 2

WebCode	Conclusions
	and "2" to "5" individually (Item 2 to 5). 4. The intention and scope of this forensic examination comprises of the following: 4.1 The examination and identification of fired bullets. 4.2 Microscopic individualization of fired bullets. 5. I examined the bullets mentioned in paragraphs 3.1 and 3.2 and compared the individual and class characteristics markings on them using a comparison microscope and found: 5.1 The bullets mentioned in paragraph 3.2 were fired from the same firearm but they were not fired from the firearm that fired the tests mentioned in paragraph 3.1.
Q86MXP	All the items(#1,#2,#3,#4,#5) were microscopically compared to each other. Based on these comparative examinations and observed class and individual characteristics, it was determined that : Item #2,#3,#4,#5 can be eliminated as having been fired by the recovered pistol. and Item #2,#3,#4,#5 had all been fired in the same unknown firearm.
Q8AYN7	Examinations showed that Items 2,3,4, and 5 were not discharged from the same firearm as Item 1. Examinations showed that Items 2,3,4, and 5 were discharged from the same unknown firearm.
Q8Q9HT	I conducted an examination using a comparison microscope and compared the test fired bullets of Item 1 with each of those from exhibit items 2, 3, 4 & 5. There are significant and discernible differences in individual characteristics between the known and each of the questioned exhibits and therefore Items 2, 3, 4 & 5 are eliminated as having been fired in the same firearm used to produce Item 1. An examination of Items 2, 3, 4 & 5 to each other resulted in them being identified as having been fired in the same, yet to be identified / examined, .40S&W calibre firearm.
Q9ZBEY	As a product of the comparison of the projectiles gathered in boxes marked as items 2, 3, 4 and 5, reason for study, in relation to the samples collected (Item 1) obtained from the firearm Beretta px4 Storm caliber handgun .40, is established that they do not present uniprocedencia, that is to say, the projectiles 2, 3, 4 and 5 were not fired by the firearm in mention.
QAUXVA	The characteristic marks on the recovered bullets Item 2, Item 3, Item 4 and Item 5 did not match with the characteristic marks on the all three bullets fired using the recovered firearm. Hence I am of the opinion that all of the recovered bullets Item 2, Item 3, Item 4 and Item 5 were not fired by the Beretta px4 Storm .40 caliber handgun.
QBQKET	I made an examination of the three test fired cartridge cases using a comparison microscope. This type of examination allows two objects to be viewed simultaneously so that microscopic marks left behind on the fired bullet during discharge can be compared and assessed. This was done to determine which marks on the test fired bullets replicates. I then performed a similar comparison between these test fired bullets and the question fired bullets, Item 2 to Item 5. As a result of this examination I formed the following opinion: Items 2 to 5 were all four discharged from the same firearm barrel, being a different firearm barrel fitted to the exhibit firearm (Item 1).
QJKP8U	Item 2 - Item 5 were not fired from the same firearm as the Item 1A, 1B, and 1C test fires. Item 2 - Item 5 were microscopically identified as having been fired from the same unknown firearm. The items were determined to be of 40/10mm caliber displaying rifling characteristics of 6 lands and grooves, right twist. Manufacturers of firearms with similar rifling characteristics include, but are not limited to: Beretta, Ceska Zbrojovka, Czechoslovakia, Heritage, Iberia Arms, KSN Industries, Sigarms, Smith & Wesson, Steyr-Mannlicher, and Taurus.
QK8DFM	Items 2-5 are characteristic of .40 S&W caliber fired bullets. They display class rifling specifications of 6 lands and grooves with a right twist and contain sufficient individual characteristics for comparison. Items 2-5 were identified as having been fired in the same firearm. Items 2-5 were eliminated from having been fired in Item 1 due to a difference in individual characteristics.
QKUQ2E	MICROSCOPIC COMPARISON EXAMINATIONS OF THE BULLETS Q1B THROUGH Q4B (ITEMS 2 THROUGH 5) AND TEST FIRED BULLETS FROM THE BERETTA PX4 .40 S&W PISTOL

TABLE 2

WebCode	Conclusions
	<p>K1 (ITEM 1) HAVE REVEALED THE FOLLOWING: SUFFICIENT AGREEMENT OF INDIVIDUAL CHARACTERISTICS EXISTS TO IDENTIFY Q1B THROUGH Q4B (ITEMS 2 THROUGH 5) AS HAVING BEEN FIRED WITH THE SAME UNKNOWN FIREARM. Q1B THROUGH Q4B (ITEMS 2 THROUGH 5) CAN BE ELIMINATED AS HAVING BEEN FIRED WITH THE BERETTA PX4 STORM .40 S&W PISTOL K1 (ITEM 1) DUE TO DIFFERENCES IN INDIVIDUAL MARKINGS ON THE LAND AND GROOVE IMPRESSIONS. Sufficient agreement is related to the significant duplication of random toolmarks as evidence by a pattern or combination of patterns of surface contours. "Sufficient agreement" exists between two toolmarks means that the agreement is of a quantity and quality that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility.</p>
QNU7AP	<p>Items 2 through 5 were fired in the same firearm; however, they were not fired in the same firearm as the item 1 test fires. Items 2 through 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, Sigarms, Smith & Wesson and Taurus.</p>
QP3AZ8	<p>The Item #2, #3, #4, and #5 bullets were fired from the same unknown firearm. They are 40/10mm caliber class. Item #2 displays rifling characteristics similar to firearms by Beretta, Heritage, Iberia Arms, Sigarms, Smith & Wesson, and Taurus, among others. Items #2, #3, #4, and #5 were not fired from the same firearm that fired the Item #1A,1B, and #1C bullets.</p>
QW68ZX	<p>After microscopic comparison of the test fires from the Beretta pistol and the fired bullets (Items 2, 3, 4 & 5) it was determined that none of the fired bullets were fired from the Beretta pistol.</p>
QWX47T	<p>Items 2-5 are 40 caliber class bullets based on the diameter. These items are consistent with being loaded in 40 S&W or 10mm Auto caliber cartridges based on the weight, style, and size. Items 2-5 were fired in the same unknown firearm based on corresponding discernible class and individual characteristics (identification). Items 2-5 were not fired in Item 1 based on different individual characteristics (elimination).</p>
RAAP67	<p>Examinations showed that Item 2, Item 3, Item 4 and Item 5 were not discharged from the same firearm as Item 1.</p>
RH8B8E	<p>MICROSCOPIC COMPARISONS OF Q1B THROUGH Q4B (ITEMS 2 THROUGH 5) WITH TEST FIRED BULLETS (ITEM 1) FROM K1 RUGER PISTOL REVEAL THAT SUFFICIENT AGREEMENT EXISTS TO IDENTIFY Q1B THROUGH Q4B (ITEMS 2 THROUGH 5) AS HAVING BEEN FIRED WITH THE SAME UNKNOWN FIREARM, BUT NOT K1 RUGER PISTOL DUE TO DIFFERENCES IN INDIVIDUAL MICROSCOPIC MARKINGS PRESENT. SHOULD ANOTHER SUSPECT FIREARM BE RECOVERED PLEASE SUBMIT IT IN REFERENCE TO THE ABOVE CASE NUMBER.</p>
RR9ULM	<p>The firearm that fired the item 1 bullets is eliminated as having fired the item 2, 3, 4 and 5 bullets. The item 2, 3, 4 and 5 bullets are identified as having been fired in the same unknown firearm.</p>
RRRQZ8	<p>Items 2-5 were eliminated as having been fired from the same firearm that fired the test fire bullets, Item 1, due to disagreement of individual characteristics. Items 2-5 were identified microscopically as having been fired from the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics.</p>
RT3H6H	<p>Examination of Items 2 through 5 revealed them to be a .40/10mm caliber full metal jacketed flat nose bullets that have been fired from a firearm rifled with six lands and grooves with right twist. Based on the agreement of class characteristics, the four fired bullets, Items 2, 3, 4, and 5, were microscopically compared to the submitted test exemplars Item 1. These bullets were eliminated due to the significant disagreement of individual characteristics. These bullets were not fired by the barrel of the recovered Beretta pistol. Based on the agreement of class characteristics, the four fired bullets, Items 2, 3, 4, and 5, were microscopically inter-compared to each other. The four bullets were identified on individual characteristics as having been fired</p>

TABLE 2

WebCode	Conclusions
	from the barrel of one unknown firearm. The significance of these identifications is made to the practical, not absolute, exclusion of all other firearms. Any firearms recovered during the course of the investigation that are chambered for 40 S&W or 10mm Auto caliber ammunition should be submitted along with Items 2-5 for comparison purposes.
RVYF3N	Exhibit bullets marked Item 2 to Item 5 were fired from the same firearm. Exhibit bullets marked Item 2 to Item 5 were not fired from the same firearm as the test fired bullets marked Item 1.
RWMD29	Differences of individual characteristics confirmed the Items 2 - 5 questioned bullets had not been fired from the same firearm as the Item 1 test standard bullets. Sufficient agreements of class and individual characteristics confirmed the Items 2 - 5 questioned bullets had been fired from the same firearm.
RZHA6F	Item 1 consists of three .40 caliber copper full metal jacketed bullets reportedly test fired from a Beretta pistol, Model Px4 Storm rifled with six grooves, right twist. Items 2, 3, 4, and 5 are .40 caliber/10mm copper full metal jacketed bullets that were identified as having been from the same barrel rifled with six grooves, right twist. Due to a lack of sufficient corresponding microscopic marks of value, no conclusion could be reached as to whether the Item 2 through Item 5 bullets were fired from the same barrel as the Item 1 bullets. A check of the Laboratory's General Rifling Characteristics (GRC) database produced a list of firearms with GRCs like those present on the Item 2 through Item 5 bullets that includes pistols marketed by Beretta, SigArms & Taurus and a rifle carbine marketed by Beretta.
T4WDJP	None of the submitted questioned bullets were fired from the same firearm as the submitted test-fires. All four of the submitted questioned bullets were fired from the same unknown firearm, assuming there is no subclass influence.
T4YYDJ	The bullets Exhibits 2, 3, 4, and 5 were compared microscopically with each other and to the tests in Exhibit 1. They were identified as having been fired from a single firearm. However, they were NOT fired from the recovered firearm which produced the Exhibit 1 tests. The bullets Exhibits 2, 3, 4, and 5 are 40/10mm caliber class and display rifling characteristics similar to 40 S&W caliber firearms by Beretta and Ceska Zbrojovka (CZ) among others.
TKM6UP	The exhibit items listed as items 2, 3, 4 & 5 were eliminated as having been fired in the exhibit Beretta Px4 Storm 40 calibre handgun. The exhibit items listed as items 2, 3, 4 & 5 were identified within the limits of practical certainty as having been fired in the same firearm.
TLCP89	The Item 2 – 5 bullets were identified as having been fired from the same unknown firearm. The Item 2 – 5 bullets are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, CZ, Iberia Arms, SIGArms, Smith & Wesson, and Taurus, among others. The Item 2 – 5 bullets were not fired from the pistol represented by the Item 1 test fired bullets.
TMAZ4C	All seven bullets are .40 caliber full metal jacketed bullets weighing approximately 180 grains and have six (6) right rifling impressions. Item #1A, 1B, and 1C were microscopically compared to Items #2, 3, 4, and 5 and found to have different individual characteristics in their land impressions. Item #2, 3, 4, and 5 can be excluded as being fired in the same firearm as Items #1A, 1B, and 1C. Item #2 was microscopically compared to Items #3, #4 and #5 and sufficient agreement of individual characteristics was observed in the land impressions to conclude that all four bullets were fired from the same unknown firearm.
TQK2XU	3. On 2018-06-07 during the performance of my official duties I received a sealed evidence bag with number PA4002342057 from Case Administration of the Ballistics Section, containing the following items: 3.1 Item 1 containing the following exhibits: 3.1.1 Three (3) .40 calibre fired bullets marked by me "211306/18" each and item "1" respectively. 3.2 Item 2 containing the following exhibit: 3.2.1 One (1) .40 calibre fired bullet marked by me "211306/18 2". 3.3 Item 3 containing the following exhibit: 3.3.1 One (1) .40 calibre fired bullet marked by me "211306/18 3". 3.4 Item 4 containing the following exhibit: 3.4.1 One (1) .40 calibre fired bullet marked by me "211306/18 4". 3.5 Item 5 containing the following exhibit: 3.5.1 One (1) .40 calibre fired bullet marked by me "211306/18 5". 4. The intention

TABLE 2

WebCode	Conclusions
	and scope of this forensic examination comprises of the following: 4.1 The examination and identification of fired bullets. 4.2 Microscopic individualization of fired bullets. 5. I examined the fired bullets mentioned in paragraphs 3.1.1 to 3.5.1 and compared the individual and class characteristics markings on them using a comparison microscope and found that they were fired from different firearms as follows: 5.1 The bullets mentioned in paragraphs 3.2.1, 3.3.1, 3.4.1 and 3.5.1 were fired from a first (1st) firearm. 5.2 The bullets mentioned in paragraphs 3.1.1 were fired from a second (2nd) firearm.
TTFQBN	I examined item 1, the three test-fired bullets from the Beretta pistol, and found the individual marks to be reproducible and sufficient for identification. I microscopically compared items 2 through 5, four fired bullets, to a test-fired bullet. I found sufficient disagreement in the individual marks, including striations in the land impressions. I concluded that items 2 through 5 were not fired in the same firearm as the test-fired bullets (item 1). I microscopically compared items 2 through 5 to each other and found sufficient agreement for identification in the individual marks, including striations in the land impressions. I concluded that the same, unknown firearm fired items 2 through 5.
U2MJJH	The bullets in Item 1 were visually inspected. The bullets Items 2, 3, 4, and 5 are 40/10mm caliber class and display rifling characteristics similar to 40 S&W caliber firearms by Beretta, Sigarms, and Taurus among others. They were compared microscopically with each other and to the bullets in Item 1. The bullets Items 2, 3, 4, and 5 were identified as having been fired from the same firearm; however, they were not fired from the same firearm as the bullets in Item 1.
U93GYP	The Bullets .40 caliber marked as items 2, 3, 4 and 5 do not match the bullets marked as item 1.
UGWJ3L	The four fired bullets were all fired through the barrel of the same self-loading pistol. The four fired bullets were not fired from the Beretta PX4 Storm self-loading pistol.
UJLY9N	Items 2, 3, 4, and 5 were identified to a common source. While identification-quality correspondence exists between the items, subclass potential could not be eliminated because no firearm was available for examination. The common source is most likely a single firearm; however, the common source may be the same tooling used to manufacture a limited number of firearms. Item 1 bullets were compared to the item 2 bullet (and items 3, 4, and 5 by proxy). While the firearm-related class characteristics were the same, disagreement of individualizing detail was observed between the item 1 bullets and the item 2 bullet. The Beretta pistol is unlikely to have been the source for the items 2, 3, 4, and 5 bullets; however, the disagreement of individualizing characteristics alone is insufficient for elimination of the Beretta pistol as the source of the items 2, 3, 4, and 5 bullets.
UMJDVD	Results of Examinations: Item 1 includes three .40 caliber test-fired jacketed bullets reportedly from a .40 S&W caliber Beretta pistol, Model PX4 Storm. Items 2 through 5 are .40 caliber/10mm jacketed bullets that were fired from a barrel rifled with six grooves, right twist, such as the barrel from which Item 1 was fired. The Item 2, 3, 4, and 5 bullets were identified as having been fired from the same barrel, but due to a lack of sufficient corresponding microscopic marks of value, no conclusion could be reached as to whether the Item 2 through 5 bullets were fired from the same barrel as the Item 1 bullets. A check of the Laboratory's General Rifling Characteristics (GRC) database produced a list of pistols with GRCs like those present on Items 2 through 5 that includes pistols marketed by Beretta, CZ, Sigarms, and Taurus.
UQ3GTB	MICROSCOPIC COMPARISON OF EVIDENCE BULLET SPECIMENS ITEM 2 THROUGH ITEM 5 AND TEST FIRED BULLETS FROM ITEM 1 BERETTA PX4 STORM PISTOL REVEALS SUFFICIENT AGREEMENT OF INDIVIDUAL CHARACTERISTICS EXISTS TO IDENTIFY THE FOLLOWING: ITEM 2 THROUGH ITEM 5 WERE FIRED WITH THE SAME UNKNOWN FIREARM. ITEM 2 THROUGH ITEM 5 WERE NOT FIRED WITH ITEM 1 DUE TO

TABLE 2

WebCode	Conclusions
UVEHMT	<p>DIFFERENCES IN INDIVIDUAL MICROSCOPIC MARKINGS. SHOULD ANY ADDITIONAL FIREARMS BE RECOVERED, SUBMIT, AND REFER TO ABOVE CC#.</p> <p>3. On 2018-06-11 during the performance of my official duties I received a sealed evidence bag with number PA4002342051 from Case Administration of the Ballistics Section, containing the following: 3.1 One (1) white box written ITEM 1 containing the following exhibits: 3.1.1 Three (3) .40 calibre fired bullet tests marked by me "211269/18" each and "1A", "1B" and "1C" respectively. 3.2 One (1) white box written ITEM 2 containing the following exhibit: 3.2.1 One (1) .40 calibre fired bullet marked by me "211269/18 2". 3.3 One (1) white box written ITEM 3 containing the following exhibit: 3.3.1 One (1) .40 calibre fired bullet marked by me "211269/18 3". 3.4 One (1) white box written ITEM 4 containing the following exhibit: 3.4.1 One (1) .40 calibre fired bullet marked by me "211269/18 4". 3.5 One (1) white box written ITEM 5 containing the following exhibit: 3.5.1 One (1) .40 calibre fired bullet marked by me "211269/18 5". 5. The intention and scope of this forensic examination comprises the following: 5.1 The examination and identification of bullets. 5.2 Microscopic individualization of fired bullets. 6. I examined the fired bullets mentioned in paragraphs 3.1.1, 3.2.1, 3.3.1, 3.4.1 and 3.5.1 and compared the individual and class characteristics markings transferred to them by firearm components during the firing process using a comparison microscope and found: 6.1 The bullets mentioned in paragraphs 3.2.1, 3.3.1, 3.4.1 and 3.5.1 were fired from the same firearm. 6.2 The bullets mentioned in paragraph 6.1 were not fired from the same firearm that discharged the tests mentioned in paragraph 3.1.1.</p>
UWDDU4	<p>The bullets were examined and microscopically inter-compared with the following results: The four bullets (Lab Items 2-5) were identified as having been fired from a single firearm. These bullets were eliminated as having been fired from the same firearm that fired the test fired bullets (Lab Item 1).</p>
UWDJ9D	<p>I observed agreement of all discernable class characteristics and sufficient agreement of individual characteristics to conclude that Items 001-2 through 001-5 were fired through a single firearm. I then compared Item 001-2 to a test fired bullet from the Beretta brand pistol and observed disagreement of individual characteristics in the land impressions. Therefore, Items 001-2 through 001-5 were not fired through the Beretta brand pistol.</p>
UWQ9YH	<p>1. Examinations showed Items 2, 3, 4 and 5 were not discharged within Item 1, the Beretta PX4 Storm, caliber: .40 S&W, due to differences in individual characteristics. 2. Examinations showed Items 2, 3, 4 and 5 were discharged within the same unknown firearm.</p>
UYG6RJ	<p>The bullets (Item #1-2 through #1-5) have similar class rifling characteristics and areas of matching individual characteristics; they were identified as having been fired through the same barrel. They were eliminated as having been fired through the same barrel as Item #1-1 (test bullets from Beretta px4 Storm pistol).</p>
UYJXM7	<p>The below listed spent bullets were macroscopically and microscopically examined and compared with test bullets fired from the Beretta Px4 Storm 40 caliber pistol, Property# [Participant Code], Lab Evidence# 001-A1. It is my opinion that these items were not fired from this firearm. These spent bullets were further microscopically examined and compared with each other. Numerous corresponding individual characteristics were observed. Therefore, it is my opinion that the below listed spent bullets were fired from the same firearm. This firearm has a barrel with 6 lands and grooves with a right twist. Lab Evidence# Property# Item# Item Description 001-A2 [Participant Code] 2 Spent 40 caliber bullet 001-A3 [Participant Code] 3 Spent 40 caliber bullet 001-A4 [Participant Code] 4 Spent 40 caliber bullet 001-A5 [Participant Code] 5 Spent 40 caliber bullet. [Participant submitted data in a format that could not be reproduced in this report].</p>
V49WE7	<p>Items 2 through 5 were identified as having been fired from the same unknown firearm. They were not fired from the same firearm as Item 1. Items 2 through 5 are 40/10mm caliber class</p>

TABLE 2

WebCode	Conclusions
	and display rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, and Taurus, among others.
VADL6Q	The four (4) fired bullets, items 1.2, 1.3, 1.4, and 1.5, were consistent in all observable class characteristics (caliber and rifling) as the Beretta, item 1.1. While there is some disagreement of microscopic markings, the markings present are insufficient for an elimination. The results are inconclusive. The four (4) fired bullets, items 1.2, 1.3, 1.4, and 1.5, were each identified as having been fired in the same firearm.
VBR44Q	Items 2, 3, 4, and 5: These bullets were compared to a test-fired bullet from Item 1. Microscopic comparison of these bullets revealed that they have similar class of rifling, but significant disagreement in individual marks. These bullets were not fired in the Beretta firearm. Item 2 was compared to Items 3, 4, and 5. Microscopic comparison of these bullets revealed that they have the same class of rifling and sufficient corresponding individual marks to conclude that they were discharged in the same unknown firearm.
VC6REP	The Item1 bullets were fired from one firearm. The Item2-5 bullets were fired from another firearm.
VJPFKT	The Items 01-01 bullets were unable to be identified or eliminated as having been fired from the same firearm as the Items 01-02 to 01-05 bullets due to a lack of reproducible marks. The Items 01-02 to 01-05 bullets were identified as having been fired from the same unknown firearm.
VKQZTK	Item 2, Item 3, Item 4, and Item 5 bullets were fired from the same unknown firearm. They were not fired from Item 1 pistol.
VMX2VJ	ITEM 2 TO 5 WERE FIRED FROM THE FIRST FIREARM. ITEM 1 A TO C WERE FIRED FROM THE SECOND FIREARM
VQHXQP	1- The bullets marked E-1, E-2 and E-3, corresponding to the item 1, are .40/10mm caliber, with a right rifling twist (R-6) and were fired by the same firearm. 2- The bullet marked E-4, corresponding to the item 2, the bullet marked E-5, corresponding to the item 3, the bullet marked E-6, corresponding to the item 4 and the bullet marked E-7, corresponding to the item 5, are .40/10mm caliber, with a right rifling twist (R-6) and were fired by the same firearm. 3- The bullets marked E-1, E-2 and E-3, corresponding to the item 1, are .40/10mm caliber, with a right rifling twist (R-6) and were not fired by the firearm used to fired the bullet marked E-4, corresponding to the item 2, the bullet marked E-5, corresponding to the item 3, the bullet marked E-6, corresponding to the item 4 and the bullet marked E-7, corresponding to the item 5.
VTVMYT	Items #2, 3, 4 and 5 (four ~ .40 caliber FMJ projectiles) were examined and microscopically compared on 05/31/2018. Based on agreement of all discernable class characteristics and sufficient agreement of individual characteristics, Items #2, 3, 4 and 5 (four ~ .40 caliber FMJ projectiles) were positively identified as having been fired in the same firearm. No firearm has been submitted as of June 1, 2018. Based on significant disagreement of individual characteristics, Items #2, 3, 4 and 5 (four ~ .40 caliber FMJ projectiles) were eliminated as having been fired from Item 1 (Beretta pistol).
VTZBYQ	Item 2 - Item 5 (exhibits) are positive to eachother but negative to tests 1A-1C.
VUET6H	Four bullets from item 2,3,4 and 5 are fired from one gun, but they are not fired from known gun from which are fired bullets in Item 1. The gun which has fired four bullets in item 2-5 could be the same model such as known gun.
VUYFR7	Items 2, 3, 4, and 5 were not fired in the same firearm as Item 1 (elimination). This conclusion was verified by Firearms Examiner (name). Items 2, 3, 4, and 5 were fired in the same firearm (identification). This conclusion was verified by Firearms Examiner (name).
VYD3G6	Items 2, 3, 4 and 5 were all fired from the same firearm based on matching class and individual characteristics, including matching striae within the land impressions. Items 2, 3, 4

TABLE 2

WebCode	Conclusions
	and 5 were not fired from the same firearm as Item 1 based on similar class but significant disagreement of individual characteristics within the land impressions, including disagreement of individual characteristics within the groove impressions.
W399DL	A. The bullets described in Item 1, are .40/10mm caliber, with right rifling (R-6) and were fired by the same firearm. B. The bullets described in Items 2, 3, 4 and 5, are .40/10mm caliber, with right rifling (R-6) and were fired by the same firearm. They were not fired by the same firearm the shot the bullets described in the Item 1.
W3CKBQ	Items 2-5 (fired bullets) were microscopically compared to each other. Based on agreement of the class characteristics and sufficient agreement of the individual characteristics, it was determined that they were fired from the same unknown firearm. This renders a finding of identification as to Items 2-5 being fired from the same unknown firearm. Item 1 (3 test fired bullets) was microscopically compared to Items 2-5. Based on agreement of the class characteristics but insufficient agreement of the individual characteristics, it was determined that they were not fired from the same firearm. This renders a finding of elimination as to Items 2-5 being fired from the same firearm that test fired Item 1, which was the Beretta PX4 Storm 40 caliber pistol.
W4AVJZ	see report [Attachment not provided by participant]
WAVT9M	Items 2 through 5 were compared to each other and these bullets have the same class of rifling and sufficient corresponding individual marks to conclude that they were fired in a single firearm. Item 1 was compared to item 2 and found same class marks but significant differences in individual marks. In the absence of alteration, items 2 through 5 were not fired in the same firearm as item 1. The class of rifling marks present on items 2 through 5 are common to numerous manufacturers and types of firearms. A complete list can be provided upon request.
WDC4WR	There were two firearms in this case. Item 2, 3, 4 and 5 were fired from a second, another firearm.
WHJNQP	The bullets mentioned in 3.1 (Item 1) were fired from the same firearm. The bullets mentioned in 3.2 (Items 2 to 5) were not fired from the firearm mentioned in 6.1 (Item 1), but were fired from a second firearm.
WLJZLP	Item 2; 3; 4 & 5 are positive to each other. They were fired in one firearm. Item 1 is negative to Items 2; 3; 4 & 5.
WLQY2L	The Item 2 through 5 bullets were eliminated as having been fired from the pistol that generated the Item 1 test fires. The Item 2 through 5 bullets were identified, within the limits of practical certainty ¹ , as having been fired from the same pistol.
WMZ9UH	Bullet Analysis: Items 2, 3, 4 and 5 are 40 caliber class bullets based upon the diameter. Opinion/Interpretation: Items 2, 3, 4 and 5 are consistent with bullets loaded in .40 S&W/10mm AUTO caliber cartridges based upon the weight and style. These bullets exhibit characteristics found in (but not limited to) the following firearms: Beretta, Ceska Zbrojovka, Czechoslovakia, Sig Arms, Smith & Wesson, Steyr-Mannlicher and Taurus .40 S&W caliber firearms. Methodology - Comparison Microscopy: Items 2, 3, 4 and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual characteristics. Comparisons between Items 2, 3, 4 and 5, the bullets, and Items 1A, 1B and 1C, the bullets, were inconclusive due to insufficient individual microscopic characteristics.
WP7HWN	1. The bullets marked from E-1 to E-3, corresponding to Item 1, are .40/10mm, with right rifling (R-6) and were fired by the same firearm. 2. The bullet marked E-4, corresponding to Item 2, the bullet marked E-5, corresponding Item 3, the bullet marked E-6, corresponding Item 4 and the bullet marked E-7, corresponding Item 5, are .40/10mm, with right rifling (R-6) and were fired by the same firearm. 3. The bullets marked from E-1 to E-3, corresponding to Item 1, were not fired by the firearm used to fired, the bullet marked E-4, corresponding to Item 2, the bullet marked E-5, corresponding to Item 3, the bullet marked E-6, corresponding

TABLE 2

WebCode	Conclusions
	to Item 4 and the bullet marked E-7, corresponding to Item 5.
WRU6GN	The four bullets (Exhibits 1-2, 1-3, 1-4, 1-5) were microscopically identified as having been fired from the same firearm; however, they were not fired from the firearm represented in the Exhibit 1-1 test fires. The bullets were determined to be of 40 S&W / 10mm caliber displaying rifling characteristics of 6 lands and grooves, right twist. Manufacturers of firearms displaying similar rifling characteristics include, but are not limited to Beretta, CZ, Heritage, Republic Arms, SigArms, Smith and Wesson, Steyr-Mannlicher, and Taurus.
WRXMG9	1) Projectiles A through D (Items 2 through 5) were fired in one .40 S&W firearm. Suspect weapons include various .40 S&W pistols; however, any suspect weapon should be submitted to the laboratory for analysis. 2) Projectiles A through D (Items 2 through 5) were not fired in the submitted .40 S&W Beretta pistol, model PX4 Storm, based on differences in individual characteristics.
WUXR42	Items #2, #3, #4, and #5 were fired from the same firearm; however, they were not fired from the same firearm as Item #1. These items are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, CZ, Sigarms, Smith & Wesson, and Taurus, among others.
WW4CUL	3- test bullets marked 1-1 1-2 & 1-3 Pos (+) (red dot). Not from test firearm: 2 vs tests neg (-) elimination, 3 vs tests neg (-) elimination, 4 vs tests neg (-) elimination, 5 vs tests neg (-) elimination. Same Firearm (blue dot reference): 2 vs 3 pos (+) identification, 3 vs 4 pos (+) identification, 4 vs 5 pos (+) identification.
WZG7FK	The fired bullets, items 2-5, could not be identified or excluded from having been fired from the same gun as the known bullets, item 1.
X3PH99	Items 2 through 5 were fired in the same firearm, however they were not fired in the same firearm as the item 1 test fires. Items 2 through 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, Ceska Zbrojovka, Sigarms, Smith and Wesson, and Taurus.
X8KJ2A	The three test fired bullets from Item 1, were microscopically examined and compared with the four recovered fired bullets, Items 2, 3, 4 and 5. There is observed agreement of their class characteristics. However, based on the observed disagreement of individual characteristics, Items 2, 3, 4 and 5 were not identified as having been fired in the same firearm as the test fired cartridge cases, Item 1.
XCF2QM	Items 1 through 5 were microscopically examined and analyzed. Items 2 through 5, each a caliber 40 S&W/10mm Auto full metal jacketed bullet, were identified as having been fired from the same firearm having a barrel rifled with six (6) lands and grooves inclined to the right. Firearms that produce general rifling class characteristics like those present on Items 2 through 5 include Beretta, Ceska Zbrojovka, Sigarms, and Taurus brand pistols chambered to fire caliber 40 S&W cartridges. This list is not all encompassing; it is possible another brand of firearm produced these class characteristics and is not listed due to the content of the database searched. Items 2 through 5 were eliminated as having been fired from the same firearm as the Item 1 bullets due to sufficient differences in individual characteristics.
XCVGRH	1) Questioned bullets recovered from the scene (marked as items 2 - 5) were fired in the same firearm. 2) Questioned bullets (items 2 - 5) weren't fired in Beretta px 4 Storm .40 caliber as known pistol.
XE76H9	I microscopically compared the test fires (Item 1) from the suspect's Beretta PX4 Storm .40 S&W caliber pistol to the fired bullets collected from the victim (Item 2) and the scene (Items 3, 4, and 5). The fired bullets from the victim and the scene have been eliminated as having been fired from the suspect's Beretta PX4 Storm pistol based on sufficient disagreement of the individual characteristics in the rifling marks. After a microscopic comparison, I was able to identify Items 2, 3, 4, and 5 as having been fired from the same firearm based on sufficient

TABLE 2

WebCode	Conclusions
	agreement of the individual characteristics in the rifling marks.
XFBYUK	Items 2, 3, 4, and 5 were identified as having been fired from the same unknown firearm. Additionally, Items 2, 3, 4, and 5 were eliminated as having been fired from the Item 1 pistol based on differing characteristics.
XJC8YV	The evidence in items 1 through 5 was analyzed by physical and microscopic examination. The four (4) bullets in items 2, 3, 4, and 5 were determined not to have been fired from the weapon that fired the three (3) known bullets in item 1. The four (4) bullets in items 2, 3, 4, and 5 were fired from one weapon. The four (4) bullets in items 2, 3, 4, and 5 were 40 caliber bullets which were fired from the barrel of a weapon rifled with six (6) lands and grooves, right twist. Further analysis is pending submission of another weapon for additional comparison.
XJPTGJ	Items 2 through 5 were fired in the same firearm but not the same firearm as Item 1.
XMBLKY	The Exhibit #2, #3, #4 and #5 bullets were microscopically compared to each other and to the Exhibit #T1, #T2 and #T3 test fired bullets. Exhibits #2, #3, #4 and #5 were fired from the same unknown firearm; however, they were not fired from the same firearm as the Exhibit #T1, #T2 and #T3 test fired bullets. The Exhibit #2 through #5 bullets are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, Czechoslovakia and Sigarms, among others.
XNRLW2	Item 1.1 consists of three fired bullets stated to have been fired by a Beretta brand, model PX4 Storm, .40 caliber pistol. Items 1.2, 1.3, 1.4 and 1.5 consist of four fired .40 caliber bullets having six land and groove impressions with a right twist. They were microscopically compared to the bullets from Item 1.1 and to each other. Items 1.2, 1.3, 1.4 and 1.5 were identified as having been fired by the same firearm. They can be eliminated as having been fired by the firearm that fired the bullets from Item 1.1. Common firearms with the same general rifling characteristics as Items 1.2, 1.3, 1.4 and 1.5 include 40 Smith & Wesson firearms marketed by Beretta, Ceska Zbrojovka, Heritage, Iberia, KSN Industries, Republic Arms, SigArms, Smith & Wesson, Springfield Styer-Mannlicher and Taurus. This is not meant to be an all-inclusive list; therefore, all 40 Smith & Wesson firearms encountered during the course of the investigation should be submitted for comparative examination.
XNTGF8	Items 2 through 5 were fired in the same firearm. Suspect weapons are unknown at this time; However, any suspect weapon should be submitted for examination. Items 2 through 5 were not fired in the submitted .40S&W Beretta pistol, model PX4 Storm.
XQ9Z8N	Identification: Based on the agreement of discernible class characteristics and sufficient matching individual detail, the fired bullets B-2(Item 2), B-3(Item 3), B-4(Item 4), and B-5(Item 5) were identified as having been fired from the same firearm. Elimination: Based on the significant disagreement of class and/or individual characteristics, the fired bullets B-2(Item 2), B-3(Item 3), B-4(Item 4), and B-5(Item 5) were eliminated as having been fired from the same firearm as the fired bullets in Item 1.
XXY2ZN	Items 002 through 005 were microscopically compared to the test-fired bullets submitted in Item 001 reportedly from a Beretta PX4 Storm handgun using a comparison microscope. Based on these comparisons, it is the opinion of this examiner that all four bullets (items 002 through 005) were not fired in that gun. Elimination was based on significant differences of individual characteristics seen in multiple land impressions. Items 002 through 005 were microscopically compared to each other using a comparison microscope and in the opinion of this examiner, all four bullets were fired in the same firearm.
XY7HZF	Items N 2,3,4 and 5 were fired from one and the same firearm the following bullets where not fired from the same firearm as the bullets represented in Item N1.
XZVW76	Items 2, 3, 4, and 5 were identified as having been fired from the same unknown firearm. They were not fired from the same firearm as Item 1. Items 2, 3, 4, and 5 have design features consistent with bullets loaded in 40/10mm caliber class cartridges and display rifling

TABLE 2

WebCode	Conclusions
	characteristics similar to firearms by Beretta, Heritage, Sigarms, Smith & Wesson, and Taurus, among others.
XZYN3R	The analysis of the elements are the following: The bullets of the items from 2 to 5 didn't were fired in the same firearm as the known bullets (item 1) from the weapon Beretta px4 Storm .40 caliber handgun. The bullets of the items from 2 to 5 are .40 caliber and were identified as having been fired from the same firearm.
Y2CBK7	The test fired bullets in Item 1 and the bullets in Items 2, 3, 4, and 5 were all microscopically examined in conjunction with one another. Based on these comparative examinations, the following was determined: a. Items 2, 3, 4, and 5 were all fired through the barrel of the same firearm. b. Items 2, 3, 4, and 5 bear the same class characteristics as the test fired bullets in Item 1. However, there are no individual characteristics to link Items 2, 3, 4, and 5 to the test fired bullets in Item 1. The general rifling characteristics present on Items 2, 3, 4, and 5 are common to many different firearms made by a large variety of firearms manufacturers. Any suspect firearms should be submitted for comparison.
Y2P4UE	A MICROSCOPIC EXAMINATION WAS PERFORMED ON THE BULLETS SUBMITTED, FROM THE FIRING DETAIL PRESENT CONSISTING OF GENERAL RIFLING FORM AND FINE DETAIL WITHIN THE FOLLOWING WAS CONCLUDED: THE BULLETS 2,3,4 AND 5 RECOVERED FROM THE CRIME HAD ALL BEEN FIRED FROM THE SAME WEAPON, BUT NOT THE SAME WEAPON AS THE TEST FIRED BULLETS 1 ,WHICH WERE FIRED FROM THE RECOVERED WEAPON.
Y3ZXQE	Exhibits 2 through 5 were not fired from the same firearm that fired the Exhibit 1 known test fires.
Y4ZUCV	Exhibit 1(A through C) consists of three (3) .40 caliber class copper jacketed bullets, fired from a barrel rifled with six (6) lands and grooves, right twist. Exhibit 1(A through C) were reportedly fired from a Beretta, .40 S&W caliber handgun, model PX4 Storm. Exhibits 2 through 5 consist of four (4) fired, .40 caliber class, copper jacketed bullets which were fired from a barrel rifled with six (6) lands and grooves, right twist, that contain microscopic marks of value for comparison. Exhibits 2 through 5 were microscopically compared to Exhibit 1(A through C), with the following results noted: It was determined there is agreement of all discernible class characteristics and sufficient agreement of individual characteristics to identify Exhibits 2 through 5 as having been fired from the same firearm. Due to sufficient disagreement of individual characteristics, Exhibits 2 through 5 were eliminated as having been fired from the firearm that fired Exhibit 1(A through C). Firearms which produce similar rifling impressions like those on Exhibits 2 through 5 include, but are not limited to, semi-automatic pistols by Ceska Zbrojovka (CZ), Czechoslovakia, Iberia Arms, Sigarms, Smith & Wesson and Steyr-Mannlicher; and semi-automatic rifles/carbines by Beretta.
Y74MBV	A microscopic examination and comparison of the evidence described above revealed the following: Deformed Bullets (2, 3, 4, 5) are identified as having been fired from the SAME firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Deformed Bullets (2, 3, 4, 5) and Test Fires (1.1, 1.2, 1.3) are eliminated as having been fired from the ABOVE firearm based on the observed disagreement of individual] characteristics.
Y7H9KX	The Exhibit #2 through #5 bullets were fired from the same firearm; however, they were not fired from the same firearm as the Exhibit #1 bullets. The Exhibit #3 bullet is 40/10mm caliber class and displays rifling characteristics similar to firearms by Beretta, Sigarms and Taurus, among others.
YCT8AA	Items 2, 3, 4 and 5 were identified as having been fired by the same firearm. Items 2,3,4 and 5 could not have been fired by the firearm that fired Item 1 based on differences in class characteristics. A list of firearms that could have fired Items 2, 3, 4 and 5 would include BERETTA, SIGARMS, SMITH & WESSON, TAURUS and any other firearm having similar

TABLE 2

WebCode	Conclusions
YDMPGD	<p>caliber and rifling characteristics.</p> <p>Items 2, 3, 4, and 5 are identified as having been fired from the same firearm. The submitted fired bullet (Items 2, 3, 4 and 5) are not identified or eliminated (Inconclusive) as having been fired from the submitted test shots (Items 1-A, 1-B and 1-C) from seized firearm. The individual characteristics present do not display agreement. Items 2, 3, 4, and 5 are consistent with being a .40/10mm caliber class fired metal jacketed bullet displaying conventional rifling specifications of 6 lands and grooves with a right twist. These specifications are characteristic of several firearm manufacturers. No suspected firearm should be overlooked.</p>
YK8474	<p>Items 2-5 were fired in the same firearm (identification) This conclusion was verified by Firearms Examiner (name). Items 2-5 were not fired in the same firearm as Item 1 (elimination). This conclusion was verified by Firearms Examiner (name). For additional clarification regarding conclusion statements, please contact the Firearms Section or go to [website]. Items 2-5 are consistent with the 40 caliber family, which includes 40 S&W and 10mm Auto. In the event that Items 2-5 were fired in a 40 S&W or 10mm Auto firearm, then they could have been fired in a firearm of the following caliber and manufacture: 40 S&W: (Manufacturers List). 10mm Auto: (Manufacturers List). Manufacturers lists are investigative tools and are not intended to be all-inclusive. Any suspect firearms should be submitted for comparison.</p>
YL2RNY	<p>The bullets in Submissions 1b (Item 2), 1c (Item 3), 1d (Item 4), and 1e (Item 5) were microscopically compared to each other and found to have sufficient individual characteristics to conclude an identification. Therefore, the bullets in Submissions 1b - 1e were fired from the same firearm. The test fired bullets in Submission 1a (Item 1) were microscopically compared to the fired bullets in Submissions 1b - 1e and found to have sufficient disagreement in individual characteristics to conclude an exclusion. Therefore, the bullets in Submissions 1b - 1e were not fired from the firearm that fired the bullets in Submission 1a.</p>
YLXC8R	<p>Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets from Item 1 were identified as having been fired from the same firearm. Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets, Items 2-5, were identified as having been fired from the same firearm. Based on significant disagreement of individual characteristics, the fired bullets from Item 1 could not have been fired from the same firearm as Items 2-5.</p>
YTFH4Y	<p>Exhibits #2, #3, #4, and #5 were fired from the same firearm. Exhibits #2, #3, #4, and #5 were not fired from the same firearm as Exhibits #1A, #1B, and #1C. Exhibits #2, #3, #4, and #5 are 40/10mm class bullets. Exhibits #2, #3, #4 and #5 display rifling characteristics similar to firearms by Beretta, Czechoslovakia, Heritage, Iberia Arms, KSN Industries, Smith & Wesson, and Taurus, among others.</p>
YVMZ3V	<p>The three test fired bullets (Item 1) and the four individually packaged bullets (Items 2, 3, 4, 5) were microscopically compared to one another with the following results: The bullets in Items 2, 3, 4, and 5 display similar general rifling characteristics to the test fired bullets in Item 1, but lack any matching individual identifying detail, indicating that Items 2, 3, 4, and 5 were fired from a different weapon than Item 1. A further inter-comparison of Items 2, 3, 4, and 5 identified them as having been fired from the same unknown weapon based on an agreement in all discernible class characteristics and sufficient agreement in matching identifying characteristics.</p>
YZFRKP	<p>Items 2, 3, 4, and 5 were fired from the same firearm; however, Items 2, 3, 4, and 5 were not fired from the same firearm as Items 1A-C. Items 2, 3, 4, and 5 are consistent with .40 caliber class and were fired from a firearm having six lands and grooves inclined to the right. A list of possible firearm manufacturers would include, but not be limited to, the following: Beretta, Ceska Zbrojovka, Czechoslovakian, Heritage, Iberia Arms, KSN Industries, Sig Arms, Smith & Wesson, Steyr-Mannlicher, and Taurus.</p>

TABLE 2

WebCode	Conclusions
Z77FYV	ITEMS 2 thru 5 not fired in the same weapon as the known bullets, however, all four (ITEMS 2 thru 5) fired from the same unknown weapon
Z968EL	Microscopic examination and comparison of the fired bullets Items 2, 3, 4 and 5 reveals corresponding general rifling characteristics, cut rifling with six (6) lands and six (6) grooves with a right hand twist along with corresponding individual barrel engraved striations with significant duplication of patterns establishing that all four (4) fired bullets were fired by the same unknown 40 caliber/ 10 mm caliber firearm. Microscopic examination and comparison of the test fired bullets Item 1 to the fired bullets Items 2, 3, 4 and 5 reveals dissimilar individual barrel engraved striations establishing that the four (4) fired bullets were not fired from the same firearm that fired Item 1.
ZC8W9F	Bullet Analysis: Items 2, 3, 4, and 5 are 40 caliber class bullets based upon the diameter. Opinion/Interpretation: Items 2, 3, 4, and 5 are consistent with bullets loaded in .40 S&W and 10mm Auto caliber cartridges based upon the weight and style. These bullets exhibits characteristics found in (but not limited to) the following firearms: .40 S&W caliber firearms manufactured for Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson, and Taurus. Methodology – Comparison Microscopy: Items 2, 3, 4, and 5, the bullets, were not fired through the barrel of Item 1, the Beretta pistol, based upon different individual microscopic characteristics. Items 2, 3, 4 and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics.
ZDCR9K	[No Conclusions Reported.]
ZF6BKK	From the microcomparison study performed between known bullets marked as ITEM 1 against the questioned bullets marked as ITEM 2, ITEM 3, ITEM 4 and ITEM 5 There is not sufficient agreement, therefore, they were fired from a different weapon.
ZNW2WE	ITEMS 2-5 WERE FIRED FROM THE SAME FIREARM. ITEMS 2-5 AND ITEM 1 WERE NOT FIRED FROM THE SAME FIREARM.
ZTHF6M	The bullets (Items 2 through 5) were fired in the same firearm but not the Beretta pistol.
ZYPBF	Bullet Analysis: Items 2, 3, 4 and 5 are 40 caliber class bullets based upon the diameter. Opinion/Interpretation: Items 2, 3, 4 and 5 are consistent with bullets loaded in 40 S&W/10mm Auto caliber cartridges based upon the weight and style. These bullets exhibit characteristics found in (but not limited to) the following firearms: Beretta, SigArms, Smith & Wesson and Taurus .40 S&W caliber firearms. Methodology – Comparison Microscopy: Items 2, 3, 4 and 5, the bullets, were not fired through the same barrel as Items 1A, 1B and 1C based upon different individual microscopic characteristics. Items 2, 3, 4 and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics.
ZZ7DCU	Elimination. The bullets identified as item 2,3,4,5 were not fired by the handgun: Beretta, model PX4 STORM, .40 caliber. Because there is not enough agreement in comparison with unique marks about item 1 (know).
ZZ9CGN	The questioned bullets, identified on Item 2, Item 3, Item 4 and Item 5, were part of the same .40 caliber cartridges; which were not fired with the suspicious weapon, Beretta Px4 Storm .40 caliber handgun.

Additional Comments

TABLE 3

WebCode	Additional Comments
22K9ND	All of the projectiles had similar rifling characteristics but the microscopic markings of the test fires (Item 1) were insufficient to determine if the weapon that fired the projectiles in Item 1 was the same weapon used to fire the projectiles in Items 2 through 5.
249XP7	The projectiles in Items 2,3,4 and 5 were fired in the same gun based on agreement observed in individual characteristics.
2KFU96	Items 2 through 5 are consistent with bullets from ammunition designated 40 S&W. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, Ceska Zbrojovka, Czechoslovakia, Heritage, Iberia Arms, Republic Arms, Sigarms, Smith & Wesson, Steyr-Mannlicher, and Taurus.
4K66W3	The projectiles in Items 2 through 5 were fired in the same gun, based on agreement observed in individual characteristics.
4NNV8F	The recovered questioned bullets (items 2-5) are identified as having a common origin in that all four bullets are identified as fired from the same barrel. This includes the bullet involved in the homicide (item 2).
4YRA6Z	The bullets in Item 1 have the same class characteristics as the bullets in Items 2, 3, 4, and 5. The individual characteristics found on Items 2, 3, 4, and 5 were all consistent; however these individual characteristics were not found on the bullets in Item 1. These differences are insufficient for excluding Items 2, 3, 4, and 5 from Item 1.
639PFD	LIMITATIONS: 1 Practical Certainty: Since it is not possible to collect and examine samples of all firearms, it is not possible to make an identification with absolute certainty. However all scientific research and testing to date and the continuous inability to disprove the principles of toolmark analysis have demonstrated that firearms produce unique, identifiable characteristics which allow examiners to reliably make identifications. Firearms/Toolmark Identification is an empirical science that relies on objective observations and a subjective interpretation of microscopic marks of value. NOTES: This report contains interpretations and opinions based on scientific data. Technical assistance has been provided to the writer of this report, in accordance with the policies and procedures of the [Laboratory], in the examination and analysis of items discussed in this report. Some samples may have been altered or consumed during testing or may deteriorate with time. To obtain information about sample availability for re-testing or additional testing please contact the writer of this report. CONTRIBUTION: Attribution of items to an individual or location is based on information provided to the [Laboratory]. The Item 1 bullets are attributed as having been test fired from a .40 S&W calibre Beretta Model PX4 Storm semi-automatic pistol seized by Police.
6Q8FH3	Based upon the observed similarities of individual characteristics (striated Marks), the bullets marked T1 – T4 were positively identified as being matched to each other. They were all fired from a second gun.
6UB8V9	Bullets that inscribed item#2, item#3, item#4 and item#5 were fired from the same barrel (but different from the suspect gun barrel).
74PPJX	CTS should consider including a silicone cast of the bore of the suspect firearm to allow firearm examiners to evaluate for potential subclass characteristics in the bore of the suspect firearm.

TABLE 3

WebCode	Additional Comments
7LY82X	Items 2 through 5 were fired through the same barrel, but were not fired through the barrel of the recovered Beretta PX4 Storm. Items 2 through 5 are eliminated from Items 1, 1A, and 1B.
8KEVRR	Questions regarding this report should be addressed to: [email address].
8XMPD3	The four jacketed bullets (Items 2, 3, 4, and 5) were determined to be characteristic of .40 S&W / 10mm Auto caliber full metal jacket style bullets. They were fired from a firearm rifled with six grooves, right hand twist. Firearms that share these rifling characteristics include, but are not limited to those manufactured under the brand names Beretta, Taurus, Sigarms, Smith & Wesson, Ceska Zbrojovka, Heritage, Iberia Arms, KSN Industries, and Steyr-Mannlicher. The four jacketed bullets (Items 2, 3, 4, and 5) were microscopically compared to each other. Based on sufficient corresponding individual barrel markings observed, these four jacketed bullets were identified as having been fired from the same firearm. Any suspect firearm should be submitted for comparison.
8YD9J9	This examiner noted that class characteristics are in agreement and some agreement of Sub-Class Characteristics was observed. However, there is sufficient disagreement of Individual Identifying Characteristics to support an elimination. Respectfully Submitted,
8Z2PPA	The four nominal 40 caliber bullets (items 2 through 5) were compared microscopically to the bullets fired from the .40 caliber Beretta PX4 Storm pistol (Item 1). Eliminations were made between items 2 through 5 and the bullets fired from the .40 caliber Beretta PX4 Storm pistol (Item 1) based on multiple differences observed in possible subclass and individual characteristics observed in the rifling marks. The four nominal 40 caliber bullets (items 2 through 5) were microscopically compared to each other with inconclusive results. Items 2 through 5 share class and possible individual characteristics with each other; however, without examination of the firearm, subclass carryover cannot be eliminated. Items 2 through 5 were most likely fired in the same firearm; however, it is possible they were fired from a similar firearm with a barrel that was manufactured with the same tool at the same approximate state of wear. Based on the class characteristics observed on items 2 through 5 (nominal 40 caliber, six lands and grooves, right twist, land and groove impression widths), they may have been fired from one of the following 40 S&W pistols: Astra Beretta Ceska Zbrojovka Czechoslovakia FN/Browning Heckler & Koch Ruger Sigarms Smith & Wesson Springfield Inc. Taurus. The above list of firearms was generated using the "FBI General Rifling Characteristics 2016 Database" and is not intended to be all-inclusive.
B2LHEA	Received bullets (Items 2-5) and received firearm (known) bullets the have the same class marks but different individual characteristics.
BBQPUA	Two (2) separate F/As was used.
BE32BC	The bullets (Items 01-02 - 01-05) were neither identified nor eliminated as having been fired from the same Beretta pistol that fired the bullets (Item 01-01) due to the agreement of class characteristics, but lack of reproduced individual characteristics; the result is inconclusive.
BXPY6N	Items 2 to 5 were fired by the same weapon.
C8FVRB	The following explanation is because this examiner infrequently eliminates based on individual characteristics: The evidence bullets (items 1-2 – 1-5) exhibit a high degree of reproducibility of patterns of striations. The test fired bullets also have a high degree of reproducibility between them. Due to the significant differences of individual patterns and topographical marks between the two groups, the bullets are eliminated from having been fired from the pistol represented by the test fired bullets.

TABLE 3

WebCode	Additional Comments
D3WZMX	The individual characteristics do not display sufficient agreement, (Inconclusive).
DCKRBB	The four fired bullets (1-02 - 1-05) were most consistent with .40 caliber class and were fired from a firearm having six conventionally rifled lands and grooves with a right twist. A list of possible firearms from which the bullets could have been fired would include, but should not be limited to: .40 S&W caliber firearms marketed by Beretta, Iberia Arms, Sig Arms, and Smith & Wesson.
DGKXYT	Questions regarding this report should be addressed to: [email address].
EYDARM	The four bullets in "Item 2" to "Item 5" were fired from the same firearm.
FBEE6R	3.- Bullets 2, 3, 4 and 5 have class characteristics of six lands and grooves impressions with twist to the right, some firearms that fire bullets of similar class characteristics, are manufactured by: Taurus, Sigarms, Cezka, KSN and Beretta. Note: Do not use this list to eliminate any firearm suspected of similar caliber and class characteristics, since this is not exclusive and there could be firearms of other brands, not listed, that could have fired them.
FGA7V3	Items 2 to 5 were intercompared and all were identified as having been discharged from the same firearm.
GH2LK4	Item 2, Item 3, Item 4, Item 5 - An inconclusive finding resulted from agreement of all discernible class characteristics, and some disagreement of individual characteristics, but insufficient for an elimination.
GK4DLP	Our SOP's require an inconclusive finding if the class characteristics are consistent even if there are no matching individual characteristics. The comparison is highly unlikely.
HZBYGY	Item 2, 3, 4, 5 bullets were fired from the same firearm.
HZWHDJ	Some disagreement was observed between Items 2-5 and Item 1, but not enough disagreement for an elimination conclusion. It might have been helpful if another set of test fires was provided.
JAEGGU	Similarities have been observed between the marks in the Items 2, 3, 4, and 5. This observation lead to an additional examination between the marks in Item 2, 3, 4 and 5. The findings of this examination were viewed under the following two hypotheses: H3: The bullets were fired through the barrel of the same firearm. H4: The bullets were fired through different barrels of the same caliber and with the same class characteristics. The findings of the additional examination are extremely more probable when H3 is true than when H4 is true.
KEKG8Q	Inconclusive result between Items 2 through 5 to Item 1 is based on agreement of class characteristics and disagreement of individual characteristics. Items 2 through 5 display identifiable toolmarks. However, the inconclusive results are based on agreement of class characteristics and agreement of potential subclass characteristics. The results for Items 2 through 5 would be reported as identifications if subclass potential was eliminated through inspection of the gun barrel.
KK963V	There is agreement of all discernible class characteristics with agreement and disagreement of individual characteristics due to an absence, insufficiency, or lack of reproducibility.
KL3TKQ	Items 2 through 5 were found inconclusive as having been fired from the known firearm because they had the same class characteristics as the known bullets and our standard

TABLE 3

WebCode	Additional Comments
	operating procedure does not allow for elimination on individual characteristics.
L6D9AP	1. Firearms that produce rifling characteristics similar to those exhibited on Exhibits 2 through 5 include, but are not limited to, .40 Smith & Wesson caliber firearms marketed by Beretta, Sig Arms, Smith & Wesson, and Taurus.
MK4J8R	The submitted bullets (Items 3-5) exhibited agreement of all discernible class characteristics and disagreement of individual characteristics in comparison to the submitted test bullets (Item 1), but insufficient for an elimination.
N97XME	Items 2-5 exhibit similarities and differences in the markings in the land impressions. Many of the differences were gross in nature. Without the firearm to examine, the source of gross markings could not be determined. The similarities noted were too great to render a conclusion of elimination, and the the differences noted were too great to render a conclusion of identification. The similarities noted were at the shoulders of the land impressions, and seemed to extend the length of the bullet. These could be subclass carry over. Again, without the firearm to examine, I cannot determine the source of the markings or if they are subclass or individual in nature. I am leaning towards eliminating Items 2-5 from Item 1. If I had the firearm and could test fire it with multiple brands/types of ammunition, that could help establish more consistency of the markings and I might be more comfortable eliminating Items 2-5 from Item 1.
NRGQEU	All of the bullets exhibit striae that run the length (or nearly) of the land impression (engagement to base) which raises the possibility of subclass. All of the bullets marked extremely poorly (especially the test fires - 1A thru 1C) with very fine striae that are only observable under higher magnifications. Under our normal casework approach (assuming I had possession of the firearm) I would have fired more test fires with different ammunition to see if improved markings could be achieved and I would have cast the barrel for subclass evaluation.
NWAYR2	The Item 2, 3, 4 and 5 bullets are 40/10mm caliber class and display rifling characteristics similar to firearms by Beretta, Ceska Zbrojovka, Sigarms, Smith & Wesson and Taurus, among others.
NXH7ZW	(1) Item 2 to Item 5) Positive - groove and land microscopic marks correspond. (2) (Item 1) negative with recovered bullet - different characteristics.
NXNE3H	The identifications this case are made to the practical, not absolute, exclusion of all other firearms. This is because it is not possible to examine all firearms in the world, a prerequisite for absolute certainty. The conclusion that sufficient agreement for identification exists between two firearm-produced toolmarks means that the likelihood another firearm could have made the questioned mark is so remote as to be considered a practical impossibility.
PLLEUH	Methods: Bullet Examination: Two bullets, either two evidence items or one evidence item and one bullet test fired in the Laboratory, undergo two stages of comparison. First, the bullets are examined to determine and compare their class characteristics. The class characteristics of fired bullets include diameter, number of land and groove impressions, direction of twist, and the widths of the land and groove impressions. If the class characteristics of the two bullets are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the striated marks present on two bullets to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Exclusion (Elimination): If two bullets have different class characteristics, an Exclusion opinion is rendered. Exclusion opinions based on general differences are not required to be verified. However, an exclusion opinion based on a

TABLE 3

WebCode	Additional Comments
	<p>minor difference in a measured class characteristic cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 2) Identification: If the following conditions are met during the comparison of microscopic marks, an opinion of Identification is rendered: a) The degree of similarity is greater than the Examiner has ever observed in previous evaluations of bullets known to have been fired from different barrels. b) The degree of similarity is equivalent to that normally observed in bullets known to have been fired from the same barrel. When these conditions are met the likelihood another tool (firearm) could have produced the same mark is so remote as to be considered a practical impossibility. An Identification opinion cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 3) Inconclusive (No Conclusion): If the conditions required for an Exclusion or Identification are not observed, an opinion of Inconclusive is rendered. A failure to meet the conditions for an Exclusion or Identification could be the result of limited microscopic marks of value, a lack of any observed microscopic similarity, or microscopic similarity that is present but too limited to meet the criteria for Identification. GRC: The appropriate GRC measurements are entered in the database, which then returns a list of all firearms in the database with compatible GRCs. Limitations: Bullet Examination: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to random changes in barrels such as wear, corrosion and lead accumulation, bullets fired from the same barrel are sometimes not identifiable as such. Additionally, some barrel manufacturing methods routinely produce barrels that leave limited microscopic marks of value on fired bullets. Damaged, corroded or fragmented bullets may be of little or no value for comparison purposes. GRC: The GRC database contains information obtained from firearms at the Laboratory and from voluntary submissions of test-fired specimens from law enforcement agencies around the world. It is not a comprehensive list of all firearms, and contains no information about the numbers of each type of firearm present in the general population. The firearms listed in the report are typically those considered to be more common and are included at the discretion of the examiner authoring the report.</p>
PW324J	By laboratory policy, exclusions are only permissible when class characteristics are different.
QAUXVA	The characteristic marks on the recovered bullets Item 2, Item 3, Item 4 and Item 5 were matched to each other. Hence I am of the opinion that all of the recovered bullets Item 2, Item 3, Item 4 and Item 5 were fired by the same firearm.
QW68ZX	After further microscopic examination of the fired bullets it was determined that they were all fired in the same unknown weapon capable of chambering and firing .40S&W / 10mm ammunition.
QWX47T	GRC not included for Items 2-5 due to CTS FA PT.
RHHB8E	SUFFICIENT AGREEMENT: Sufficient agreement is related to the significant duplication of random toolmarks as evidence by a pattern or combination of patterns of surface contours. "Sufficient agreement" exists between two toolmarks means that the agreement is of a quantity and quality that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility.
RZHA6F	Methods: Bullet Examination: Two bullets, either two evidence items or one evidence item and one bullet test fired in the Laboratory, undergo two stages of comparison. First, the bullets are examined to determine and compare their class characteristics. The class characteristics of fired bullets include diameter, number of land and groove impressions, direction of twist, and

TABLE 3

WebCode	Additional Comments
	<p>the widths of the land and groove impressions. If the class characteristics of the two bullets are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the striated marks present on two bullets to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Exclusion (Elimination): If two bullets have different class characteristics, an Exclusion opinion is rendered. Exclusion opinions based on general differences are not required to be verified. However, an exclusion opinion based on a minor difference in a measured class characteristic cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 2) Identification: If the following conditions are met during the comparison of microscopic marks, an opinion of Identification is rendered: a) The degree of similarity is greater than the Examiner has ever observed in previous evaluations of bullets known to have been fired from different barrels. b) The degree of similarity is equivalent to that normally observed in bullets known to have been fired from the same barrel. When these conditions are met the likelihood another tool (firearm) could have produced the same mark is so remote as to be considered a practical impossibility. An Identification opinion cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 3) Inconclusive (No Conclusion): If the conditions required for an Exclusion or Identification are not observed, an opinion of Inconclusive is rendered. A failure to meet the conditions for an Exclusion or Identification could be the result of limited microscopic marks of value, a lack of any observed microscopic similarity, or microscopic similarity that is present but too limited to meet the criteria for Identification. GRC: The appropriate GRC measurements are entered in the database, which then returns a list of all firearms in the database with compatible GRCs. Limitations: Bullet Examination: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to random changes in barrels such as wear, corrosion and lead accumulation, bullets fired from the same barrel are sometimes not identifiable as such. Additionally, some barrel manufacturing methods routinely produce barrels that leave limited microscopic marks of value on fired bullets. Damaged, corroded or fragmented bullets may be of little or no value for comparison purposes. GRC: The GRC database contains information obtained from firearms at the FBI Laboratory and from voluntary submissions of test-fired specimens from law enforcement agencies around the world. It is not a comprehensive list of all firearms, and contains no information about the numbers of each type of firearm present in the general population. The firearms listed in the report are typically those considered to be more common and are included at the discretion of the examiner authoring the report.</p>
T4WDJP	<p>I microscopically compared the questioned bullets, Items 2 through 5, to the submitted test-fired bullets, Item 1. I found the size of the rifling impressions to agree. However, I found sufficient disagreement in the striations within the land impressions to conclude that none of the questioned bullets were fired from the same firearm as the test-fired bullets. I microscopically compared the submitted questioned bullets to one another and found the size of the rifling impressions to agree. I found significant agreement of the striations within the land impressions; however, without examining the bore of the firearm used to fire them, I could not rule out the possibility that this agreement is due to potential subclass influence. Therefore, the questioned bullets could have been fired from the same unknown firearm or multiple firearms having barrels that were manufactured by the same tools in the same approximate state of wear.</p>
TTFQBN	<p>The identification of the bullets is made to the practical, not absolute, exclusion of all other firearms. This is because it is not possible to examine all firearms in the world, a prerequisite</p>

TABLE 3

WebCode	Additional Comments
	for absolute certainty. The conclusion that sufficient agreement for identification exists between two firearm-produced toolmarks means that the likelihood another firearm could have made the questioned mark is so remote as to be considered a practical impossibility.
U93GYP	According to the result of the microcomparison between the bullets marked as items 2, 3, 4 and 5, they have sufficient agreement between them.
UJLY9N	Based on the class characteristics alone, the items 2, 3, 4, and 5 bullets could have been fired from the Beretta pistol used to generate the item 1 bullets. With no pistol to examine, the possibility that the pistol's barrel had been modified sufficiently to alter the individualizing characteristics could not be ruled out.
UMJDVD	<p>Methods: Bullet Examination: Two bullets, either two evidence items or one evidence item and one bullet test fired in the Laboratory, undergo two stages of comparison. First, the bullets are examined to determine and compare their class characteristics. The class characteristics of fired bullets include diameter, number of land and groove impressions, direction of twist, and the widths of the land and groove impressions. If the class characteristics of the two bullets are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the striated marks present on two bullets to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Exclusion (Elimination): If two bullets have different class characteristics, an Exclusion opinion is rendered. Exclusion opinions based on general differences are not required to be verified. However, an exclusion opinion based on a minor difference in a measured class characteristic cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 2) Identification: If the following conditions are met during the comparison of microscopic marks, an opinion of Identification is rendered: a) The degree of similarity is greater than the Examiner has ever observed in previous evaluations of bullets known to have been fired from different barrels. b) The degree of similarity is equivalent to that normally observed in bullets known to have been fired from the same barrel. When these conditions are met the likelihood another tool (firearm) could have produced the same mark is so remote as to be considered a practical impossibility. An Identification opinion cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 3) Inconclusive (No Conclusion): If the conditions required for an Exclusion or Identification are not observed, an opinion of Inconclusive is rendered. A failure to meet the conditions for an Exclusion or Identification could be the result of limited microscopic marks of value, a lack of any observed microscopic similarity, or microscopic similarity that is present but too limited to meet the criteria for Identification. GRC: The appropriate GRC measurements are entered in the database, which then returns a list of all firearms in the database with compatible GRCs. Limitations: Bullet Examination: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to random changes in barrels such as wear, corrosion and lead accumulation, bullets fired from the same barrel are sometimes not identifiable as such. Additionally, some barrel manufacturing methods routinely produce barrels that leave limited microscopic marks of value on fired bullets. Damaged, corroded or fragmented bullets may be of little or no value for comparison purposes. GRC: The GRC database contains information obtained from firearms at the Laboratory and from voluntary submissions of test-fired specimens from law enforcement agencies around the world. It is not a comprehensive list of all firearms, and contains no information about the numbers of each type of firearm present in the general population. The firearms listed in the report are typically those considered to be more common and are included at the discretion of the examiner authoring the report.</p>

TABLE 3

WebCode	Additional Comments
UQ3GTB	SUFFICIENT AGREEMENT: Sufficient agreement exists between two toolmarks means that the agreement is of a quantity and quality that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility. Sufficient agreement is related to the significant duplication of random toolmarks as evidence by a pattern or combination of patterns of surface contours.
UWDDU4	The four bullets were consistent with nominal .40 caliber, to include .40 S&W. Firearms manufactured with rifling characteristics similar to those present on these bullets include, but may not be limited to, Beretta, CZ, FN/Browning, Sigarms, Smith & Wesson and Taurus .40 S&W caliber firearms.
VADL6Q	Lab policy does not allow for eliminations based on individual characteristics.
VJPFKT	Reproducible differences in patterns of individual characteristics were noted between the Item 01-01 bullets and the Items 01-02 to 01-05 bullets, but these differences were insufficient for elimination.
VMX2VJ	TESTS ARE NEGATIVE TO THE EXHIBS
VTVMYT	The general rifling characteristics of Items #2, 3, 4 and 5 (four ~ .40 caliber FMJ projectiles) are consistent with the following .40 caliber pistols: Beretta CX4 Storm, Ceska Zbrojovka CZ100, Taurus PT140 and a Smith & Wesson 4006; however, this listing is not all inconclusive.
WLQY2L	1 Practical Certainty: Since it is not possible to collect and examine samples of all firearms, it is not possible to make an identification with absolute certainty. However all scientific research and testing to date and the continuous inability to disprove the principles of toolmark analysis have demonstrated that firearms produce unique, identifiable characteristics which allow examiners to reliably make identifications. Firearms/Toolmark Identification is an empirical science that relies on objective observations and a subjective interpretation of microscopic marks of value.
WMZ9UH	Comparisons between Items 2, 3, 4 and 5 (evidence bullets) were inconclusive to the bullets identified to have been test fired through the barrel of a Beretta firearm (test fires). There was agreement of all discernible class characteristics between the evidence bullets and the test fires. However, there was not enough agreement of individual characteristics to ID them to the test fires, nor was there enough disagreement to eliminate them from being fired in the same firearm as the test fires.
WZG7FK	Both groups shared similar class characteristics but did not share any significant amounts of individual characteristics. This examiner does not make exclusions based on differing individual characteristics.
XE76H9	The identifications in this case are made to the practical, not absolute, exclusion of all other firearms. This is because it is not possible to examine all firearms in the world, a prerequisite for absolute certainty. The conclusion that sufficient agreement for identification exists between two firearm-produced toolmarks means that the likelihood another firearm could have made the questioned mark is so remote as to be considered a practical impossibility.
XY7HZF	The microscope " LEICA FSC" have been used for the examination.
XZYN3R	The bullets of the items from 2 to 5 are .40 caliber and were identified as having been fired from the same firearm.

TABLE 3

WebCode	Additional Comments
Y2P4UE	ONLY ONE WEAPON WAS UTILISED DURING THIS INCIDENT AND NOT THE ONE RECOVERED BY THE POLICE. IT IS LIKELY HOWEVER, THAT THE QUESTIONED FIREARM, IS OF THE SAME MAKE AS THE ONE RECOVERED.
Y3ZXQE	Exhibits 2 through 5 projectiles were fired in the same unknown firearm.
ZF6BKK	From the microcomparison between questioned bullets marked as ITEM 2, ITEM 3, ITEM 4 and ITEM 5, it is concluded that There is sufficient agreement, so it is considered that the four problem bullets were fired by the same firearm.
ZYKPBF	This CTS was difficult but not because the quality of evidence, but rather the lack of firearm or barrel in the actual examiners hands. The submission of the test fires only and not the actual gun or even a barrel to cast creates a "leap of faith" moment for the examiner. I want the firearm, I want to create more test fires, I would like to shoot bullets of different material. I would still come to the same conclusion, but I would know I did everything I'm able to do.
ZZ7DCU	Identification. The bullets identified as item 2, 3, 4, 5 corresponds to the .40 caliber, there is enough agreement with their class and unique marks, that they were fired by the same unknown firearm. I inform you that the forensic unit sends results in Spanish.

-End of Report-
(Appendix may follow)

Appendix: Data Sheet

Collaborative Testing Services ~ Forensic Testing Program Test No. 18-526: Firearms Examination

DATA MUST BE RECEIVED BY July 23, 2018 TO BE INCLUDED IN THE REPORT

Participant Code:

WebCode:

Accreditation Release Statement

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and A2LA. Please select one of the following statements to ensure your data is handled appropriately.

- This participant's data is intended for submission to ASCLD/LAB, ANAB, and/or A2LA. (Accreditation Release section on the last page must be completed and submitted.)
- This participant's data is **NOT** intended for submission to ASCLD/LAB, ANAB, and/or A2LA.

Scenario:

Police are investigating a homicide that occurred at a jewelry store. The victim was shot once and the bullet was recovered by the medical examiner. Investigators also recovered three bullets from the scene, two from the drywall and one from a wall partition. A suspect was apprehended later that day and a handgun was seized from his vehicle. The firearm is a Beretta px4 Storm .40 caliber handgun. Three rounds of Federal American Eagle® .40 S&W 180 grain FMJ ammunition (which were consistent with the bullets recovered from the victim and scene) were test fired from the recovered firearm and the bullets collected. Investigators are asking you to compare the recovered bullets from the victim and scene with those test fired in the recovered firearm and report your findings.

Please note the following:

- Each Item is in a labeled jewel box, it is suggested that when the items are removed from their labeled boxes, they be marked according to your laboratory procedure. However, in case the items are separated from their boxes before labeling has occurred, each item has been inscribed with its item number.
- The bullet stated to have been recovered from the victim was never exposed to biological material.

Items Submitted (Sample Pack F1):

Item 1: Three bullets fired using the recovered firearm (known).

Item 2: Bullet recovered from victim (questioned).

Item 3: First bullet recovered from drywall at the scene (questioned).

Item 4: Second bullet recovered from drywall at the scene (questioned).

Item 5: Bullet recovered from wall partition at the scene (questioned).

1.) Were any of the recovered questioned bullets (Items 2-5) fired in the same firearm as the known bullets (Item 1)?

Item 2	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Inconclusive*	<input type="checkbox"/>
Item 3	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Inconclusive*	<input type="checkbox"/>
Item 4	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Inconclusive*	<input type="checkbox"/>
Item 5	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Inconclusive*	<input type="checkbox"/>

*Should an item(s) be marked "Inconclusive", please document the reason in the Additional Comments section of this data sheet.

Please return all pages of this data sheet.

Page 1 of 3

Participant Code:

WebCode:

2.) What would be the wording of the Conclusions in your report?

3.) Additional Comments

<p>Return Instructions: Data must be received via online data entry, fax (please include a cover sheet), or mail by <i>July 23, 2018</i> to be included in the report. Emailed data sheets are not accepted.</p>	<p>Participant Code:</p>
<p>QUESTIONS? TEL: +1-571-434-1925 (8 am - 4:30 pm EST) EMAIL: forensics@cts-interlab.com www.ctsforensics.com</p>	<p>ONLINE DATA ENTRY: www.cts-portal.com FAX: +1-571-434-1937 MAIL: Collaborative Testing Services, Inc. P.O. Box 650820 Sterling, VA 20165-0820 USA</p>

Please return all pages of this data sheet.

Collaborative Testing Services ~ Forensic Testing Program

RELEASE OF DATA TO ACCREDITATION BODIES

The following Accreditation Releases will apply only to:

Participant Code:

WebCode:

for Test No. **18-526: Firearms Examination**

This release page must be completed and received by **July 23, 2018** to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

Have the laboratory's designated individual complete the following steps **only if your laboratory is accredited in this testing/calibration discipline** by one or more of the following Accreditation Bodies.

Step 1: Provide the applicable Accreditation Certificate Number(s) for your laboratory

ANAB Certificate No. _____

(Include ASCLD/LAB Certificate here)

A2LA Certificate No. _____

Step 2: Complete the Laboratory Identifying Information in its entirety

Signature and Title _____

Laboratory Name _____

Location (City/State) _____

Accreditation Release

Return Instructions

Please submit the completed Accreditation Release at the same time as your full data sheet. See Data Sheet Return Instructions on the previous page.

*Questions? Contact us 8 am-4:30 pm EST
Telephone: +1-571-434-1925
email: forensics@cts-interlab.com*

Please return all pages of this data sheet.

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