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FORENSIC TESTING PROGRAM

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Firearms Examination
Test No. 22-5261 Summary Report

Each sample set consisted of three known expended bullets test-fired from a suspect weapon (Item 1) and four questioned expended bullets (Items 2-5). Participants were requested to examine these items and report their findings. Data were returned from 342 participants and are compiled into the following tables:

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. Items 2, 3, 4, and 5 each consisted of one bullet recovered from the scene. Federal American Eagle 9mm Luger 124 grain Full Metal Jacket (FMJ) 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 Items 1 and 4 were fired in a Beretta Model 92FS (Serial Number BER461281). Items 2 and 5 were fired in a Beretta Model 92F (Serial Number D762267). Item 3 was fired in a Springfield XD-9 4.0 Model 2 (Serial Number GM954664).

ITEMS 1 and 4 (IDENTIFICATION): Multiple magazines were loaded with Federal American Eagle ammunition for firing with the Beretta Model 92FS handgun. 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) and "4" (one bullet) and then sealed into their respective boxes.

ITEM 2 and 5 (ELIMINATION): Multiple magazines were loaded with Federal American Eagle ammunition for firing with the Beretta Model 92F handgun. After the ammunition was expended, the bullets were collected. 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 "2" (one bullet), and "5" (one bullet) and then sealed into their respective boxes.

ITEM 3 (ELIMINATION): Multiple magazines were loaded with Federal American Eagle ammunition for firing with the Springfield XD-9 4.0 Model 2 handgun. After the ammunition was expended, the bullets were collected. 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 "3" (one bullet) then sealed into their respective boxes.

SAMPLE SET ASSEMBLY: For each sample set, Items 2 and 5 of the same elimination batch, an Item 3, along with Items 1 and 4 of the same association batch 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.

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 9mm Luger 124 grain Full Metal Jacket (FMJ) bullets (Items 2, 3, 4, and 5). Participants were requested to compare these with three known expended bullets (Item 1) that were fired in the suspect's weapon, a Beretta 92FS 9mm (Serial Number BER461281). For each sample set, the Item 4 bullet was fired in the same firearm as the Item 1 known bullets (Refer to Manufacturer's Information for preparation details).

In Table 1 Examination Results, 335 of the 342 responding participants (98%) identified Item 4 and either eliminated or were inconclusive for items 2, 3, and 5 as having been fired in the same gun that fired the Item 1 bullets. Four participants eliminated or were inconclusive for items 2, 3, 4, and 5 as having been fired in the same gun that fired the Item 1 bullets. One participant identified items 2, 3, 4, and 5 as having been fired in the same gun that fired the Item 1 bullets. One participant identified items 3 and 4 and were inconclusive for items 2 and 5 as having been fired in the same gun as the Item 1 bullets. The remaining participant did not render a conclusion for Item 3 and either eliminated or was inconclusive for items 2, 4, and 5 as having been fired in the same gun as the Item 1 bullets.

CTS is aware that many labs will not, as a matter of policy, report an elimination without access to the firearm or when class characteristics match. Thus, responses of "Inconclusive" are not indicated as outliers for Elimination items.

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
22QL9X	No	No	Yes	No	3H86HA	No	No	Yes	No
24FVDT	No	No	Yes	No	3QH9MN	No	No	Yes	No
24TKG6	No	No	Yes	No	3XNZWK	No	No	Yes	No
272GF3	No	No	Yes	No	42GHRC	No	No	Yes	No
29AL8J	No	No	Yes	No	42Z7A7	No	No	Yes	No
29NBP2	No	No	Yes	No	462DAB	No	No	Yes	No
2A2NUY	No	No	Yes	No	48QKWT	No	No	Yes	No
2AEKTB	No	No	Yes	No	492H74	No	No	Yes	No
2DH7PN	No	No	Yes	No	49JEMW	Inc	Inc	Yes	Inc
2HC3DF	No	No	Yes	No	4BMF9Z	No	No	Yes	No
2JTY4U	No	No	Yes	No	4E79N9	No	No	Yes	No
2N2RPC	No	No	Yes	No	4JET9Z	No	No	Yes	No
2ZYJLH	No	No	Yes	No	4QKGB2	No	Inc	Yes	No
33CMP6	No	No	Yes	No	4XWGL4	No	No	Yes	No
366JCE	No	No	Yes	No	4XWJ83	No	No	Yes	No
3F66HD	No	No	Yes	No	4YFCD7	No	No	Yes	No
3FPNP6	No	No	Yes	No	4ZP9ZV	No	No	Yes	No

Revised: September 15, 2022. Typographical error on elimination gun #3.

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
62XZ4W	No	No	Yes	No	7H2WZZ	No	No	Yes	No
683HUW	No	No	Yes	No	7HKHWX	No	No	Yes	No
6A98TZ	Inc	No	Yes	Inc	7JNHMW	No	Inc	Yes	No
6FWRXZ	Inc	No	Yes	Inc	7K3VEY	No	No	Yes	No
6G9J4A	Inc	Inc	Yes	Inc	7QTCP6	No	No	Yes	No
6JDEGK	No	No	Yes	No	7XE3DK	No	No	Yes	No
6N4PHX	No	No	Yes	No	83NNRW	No	No	Yes	No
6N79KD	No	No	Yes	No	88QXTX	No	No	Yes	No
6RQ3HE	No	No	Yes	No	89PZVU	Inc	Inc	Yes	Inc
6T7KGD	No	No	Yes	No	8AKHWV	No	No	Yes	No
6Y7Y6Z	No	No	Yes	No	8CRZT7	No	No	Yes	No
6YQH8L	No	No	Yes	No	8EWNBG	No	No	Yes	No
7383U2	No	Inc	Inc	No	8HWY3A	No	No	Yes	No
73BMLB	No	No	Yes	No	8KJDQK	No	No	Yes	No
767MB7	No	No	Yes	No	8PAWXV	No	No	Yes	No
77L3MM	No	No	Yes	No	8QMHJ4	No	No	Yes	No
78ETW8	No	Inc	Yes	No	8R4EB4	No	No	Yes	No
7A3CVJ	No	No	Yes	No	8UAY2N	No	No	Yes	No
7FE2MV	No	No	Yes	No	8VGCHQ	No	No	Yes	No

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TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
8WCUKR	No	No	Yes	No	ATP3J9	No	No	Yes	No
8X9DK8	No	No	Yes	No	AYT2Y6	Inc	No	Yes	Inc
9B8KUU	No	No	Yes	No	BBLNTU	Inc	No	Yes	Inc
9CFZ2Z	No	No	Yes	No	BCWM2U	Inc	Yes	Yes	Inc
9ERJF6	No	Inc	Yes	No	BD8JB6	No	No	Yes	No
9NGCJN	No	No	Yes	No	BDQC2G	No	No	Yes	No
9QKUZ6	No	Inc	Yes	No	BPKUMP	Inc	Inc	Yes	Inc
9YFV8W	No	No	Yes	No	BRR7CQ	No	No	Yes	No
A2DZ32	No	No	Yes	No	BTGFER	No	No	Yes	No
A7WZE2	No	No	Yes	No	BW6RJC	No	No	Yes	No
A9GUB2	No	Inc	Yes	No	C42292	No	No	Yes	No
AB69XQ	No	No	Yes	No	C4JV8Q	No	No	Yes	No
ACHVBY	No	No	Yes	No	C4WNMQ	No	Inc	Yes	No
AGVJ8N	No	No	Yes	No	C738LL	No	No	Yes	No
AHQYL8	No	No	Yes	No	C7PFWB	No	No	Yes	No
ALQCZJ	No	No	Yes	No	C9QLAW	No	Inc	Yes	No
AM4YHX	No	No	Yes	No	CAL4AC	No	No	Yes	No
AMXPLR	No	No	Yes	No	CCP473	No	No	Yes	No
ANPXLU	No	No	Yes	No	CDNZY8	No	No	Yes	No

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WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
CL3TB3	No	No	Yes	No	E3F8JB	No	No	Yes	No
CLJZH7	No	No	Yes	No	E7EMTK	No	No	Yes	No
CN8GN8	No	No	Yes	No	E88HA2	No	No	Yes	No
CTJJFU	No	No	Yes	No	E98E46	Yes	Yes	Yes	Yes
CV8Y66	No	No	Yes	No	EEBDH2	No	No	Yes	No
D3JE8X	No	No	Yes	No	EGWCLX	No	No	Yes	No
D4DXD7	No	No	Yes	No	EJ67NP	Inc	Inc	Yes	Inc
D4E2K3	No	No	Yes	No	EKJL2Q	No	No	Yes	No
D4TGX4	No	No	Yes	No	EWBFAD	No	No	Yes	No
D7JMC9	No	No	Yes	No	EYBTNQ	No	No	Yes	No
D8BQYN	Inc	No	Yes	Inc	F3U63M	No	No	Yes	No
D8DBV4	No	No	Yes	No	F4NLLB	No	No	Yes	No
DAN7K3	No	No	Yes	No	F6K4MC	No	No	Yes	No
DFB46J	No	No	Yes	No	FAEZ9W	No	No	Yes	No
DG343U	No	No	Yes	No	FFX9RM	No	No	Yes	No
DHD42A	No	No	Yes	No	FJYCHN	No	Inc	Yes	No
DLCDCC	No	No	Yes	No	FP73KU	Inc	No	Yes	Inc
DV27LM	No	No	Yes	No	FQZQ4P	No	No	Yes	No
DYXE7W	No	No	Yes	No	FUJTWG	No	No	Yes	No

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TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
G4M9FU	No	No	Yes	No	HUTMM2	No	No	Yes	No
GBGHJX	No	No	Yes	No	HWF2BB	No	Inc	Yes	No
GJWYFD	No	No	Yes	No	HZF8W9	No	Inc	Yes	No
GL6ABW	No	No	Yes	No	JFNNEU	No	No	Yes	No
GNDD8T	No	Inc	Yes	No	JJNUTZ	No	No	Yes	No
GQX84T	No	No	No	No	JKGMTP	No	No	Yes	No
GUFLBZ	No	No	Yes	No	JM8PYD	No	No	Yes	No
GUT8TN	No	No	Yes	No	JWXEDT	No	No	Yes	No
GVBZ3L	No	No	Yes	No	JY2AWW	No	No	Yes	No
GWMTR8	No	No	Yes	No	JY6MNY	No	No	Yes	No
H44MLH	No	No	Yes	No	K4BMDU	No	No	Yes	No
H6WH77	No	No	Yes	No	K4UP64	No	No	Yes	No
HCAQ9T	No	No	Yes	No	KF4ZWZ	No	Inc	Yes	No
HCU8PV	No	No	Yes	No	KF643V	No	No	Yes	No
HGLFXJ	No	No	Yes	No	KJ3F6M	No	No	Yes	No
HJRYV4	No	No	Yes	No	KJJUCW	No	No	Yes	No
HKLMDY	No	No	Yes	No	KM6G6K	No	Inc	Yes	No
HNKYAY	No	No	Yes	No	KMMA2N	No	No	Yes	No
HPWX49	No	Inc	Yes	No	KN2URD	No	No	Yes	No

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TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
KPA6MV	No	No	Yes	No	ME3CWE	No	No	Yes	No
KPUNHG	No	No	Yes	No	MEK3DY	No	No	Yes	No
KVYTYR	No	No	Yes	No	MGWRNN	No	No	Yes	No
KYZU3V	No	No	Yes	No	MMDEHF	No	No	Yes	No
L4PMUP	No	No	Yes	No	MQWCWH	No	No	Yes	No
L6JEL3	No	No	Yes	No	MRUT2T	No	No	Yes	No
L7BEQE	No	No	Yes	No	MZ6TXP	No	No	Yes	No
LAAT4G	No	No	Yes	No	N3KVUK	No	No	Yes	No
LJ2ZCM	No	No	Yes	No	NCBCNV	No	No	Yes	No
LKTBWN	No	No	Yes	No	NFP87D	No	No	Yes	No
LM37P8	No	No	Yes	No	NL2TG6	No	No	Yes	No
LWNBYT	Inc	No	Yes	Inc	NMBZLJ	No	Inc	Yes	No
LXKNLK	Inc	Inc	Inc	Inc	NNK8MQ	No	No	Yes	No
M43HT3	No	No	Yes	No	NTE48B	No	No	Yes	No
M789XW	No	No	Yes	No	NU8YRY	No	No	Yes	No
M84LKP	No	No	Yes	No	NVM2Y8	No	No	Yes	No
MB3Z9E	No	No	Yes	No	NVQJ2C	No	No	Yes	No
MCFC96	No	No	Yes	No	NY84NR	No	No	Yes	No
MDUWYU	No	No	Yes	No	NYM9K6	No	No	Yes	No

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TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
P3K4KJ	No	No	Yes	No	RE8XYC	No	No	Yes	No
P4XLNC	No	No	Yes	No	RNFR3P	No	No	Yes	No
P6LCKM	No	No	Yes	No	RPQQYJ	No	No	Yes	No
PAYZAD	No	No	Yes	No	RQXZ3A	Inc	No	Yes	Inc
PF4ZFL	No	No	Yes	No	RVCNM8	No	No	Yes	No
PF8HHR	No	No	Yes	No	RW6J4N	No	No	Yes	No
PM4DFP	No	No	Yes	No	RZ8D7Y	No	No	Yes	No
PNKA8P	No	No	Yes	No	T2GMWB	No	No	Yes	No
PQ92YL	No	No	Yes	No	T4MCWY	No	No	Yes	No
PYXRG8	No	No	Yes	No	T6CEW9	Inc	No	Yes	Inc
Q46NFD	No	No	Yes	No	T7NDWW	No	No	Yes	No
QCPFC8	No	No	Yes	No	T8FC2A	No	No	Yes	No
QM3V2R	No	No	Yes	No	T9F3PP	No	No	Yes	No
QVFR2R	No	No	Yes	No	TAPK99	No	No	Yes	No
R6HEDC	No	No	Yes	No	TD9HMB	Inc	Inc	Yes	Inc
R7RG4G	No	No	Yes	No	TEGTJE	No	No	Yes	No
R86Z4Q	No	No	Yes	No	TFFNDJ	Inc	Inc	Inc	Inc
RAUCYQ	No	No	Yes	No	TJZHAJ	No	No	Yes	No
RCGTC6	No	No	Yes	No	TL4DR2	No	No	Yes	No

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TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
TTLMFX	No	No	Yes	No	VDEKLF	No	No	Yes	No
TV8LEE	No	No	Yes	No	VF932A	No	No	Yes	No
TXRKHB	No	No	Yes	No	VFMRVZ	No	Inc	Yes	No
TY8NNB	No	No	Yes	No	VMM8JL	No	No	Yes	No
TYT982	No	No	Yes	No	VN2E7N	No	No	Yes	No
U3Q4CL	No	No	Yes	No	VU6JR9	No	No	Yes	No
U8GLK7	No	No	Yes	No	VX7NBT	No	No	Yes	No
UBGPHK	No	No	Yes	No	VXPA4J	No	No	Yes	No
UCU7QR	No	No	Yes	No	W4UG9E	No	No	Yes	No
UJUN9P	No	No	Yes	No	W6KMMJ	No	No	Yes	No
UK6JUG	No	No	Yes	No	WAKXJJ	No	No	Yes	No
ULKULU	No	No	Yes	No	WDEZ87	No	No	Yes	No
UMCUQ8	No	No	Yes	No	WEC8NB	No	No	Yes	No
UMUYZH	No	No	Yes	No	WFLAEF	No	No	Yes	No
UN9G3N	No	Inc	Yes	No	WGW2LC	No	No	Yes	No
UQB6M8	No	No	Yes	No	WH79HD	No	No	Yes	No
UUBEXA	No	No	Yes	No	WQP8JJ	No	No	Yes	No
UWJPKP	No	No	Yes	No	X3XMNE	No	Inc	Yes	No
VCNGZZ	No	No	Yes	No	XBQV8K	No	No	Yes	No

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TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
XD88ZV	No	No	Yes	No	YNBKZV	No	No	Yes	No
XHQ369	No	No	Yes	No	YPMCWJ	No	Inc	Yes	No
XJJVZR	No	No	Yes	No	YRAXJE	No	No	Yes	No
XKBYM8	No	No	Yes	No	YUGC88	Inc	No	Yes	Inc
XP4B7A	No	No	Yes	No	YUKWYG	No	No	Yes	No
XW78AF	No	No	Yes	No	YVNQDD	No	No	Yes	No
XZMTT3	Inc	Inc	Yes	Inc	YYAD72	No	No	Yes	No
Y2XRVB	No	No	Yes	No	YYRKCH	No	No	Yes	No
Y3N3L4	No	No	Yes	No	YZ34H8	No	No	Yes	No
Y788ZT	No	No	Yes	No	Z2RWPA	No	No	Yes	No
YA32V9	No	No	Yes	No	Z6T6TK	No	No	Yes	No
YA8EMC	Inc	No	Yes	Inc	Z8FJHU	No	No	Yes	No
YB26J6	Inc	Inc	Yes	Inc	Z8XQJ7	No	No	Yes	No
YB3WPD	No	No	Yes	No	ZBXW3H	No	No	Yes	No
YEMQLD	No	No	Yes	No	ZCQWYT	No	No	Yes	No
YFEPZC	No	No	Yes	No	ZFUN9U	No	No	Yes	No
YG9NXB	No	No	Yes	No	ZG8246	No	No	Yes	No
YH48ZC	No	No	Yes	No	ZG9R67	No	No	Yes	No
YMGWGZ	No	No	Yes	No	ZHH3W4	Inc		No	Inc

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TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
ZKMPA9	No	No	Yes	No					
ZLGDT4	No	Inc	Yes	No					
ZQR8Z9	No	No	Yes	No					
ZY7BWM	No	No	Yes	No					

Response Summary

Participants: **342**

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

Responses	Item 2	Item 3	Item 4	Item 5
Yes	**1** ***(0.3%)***	**2** ***(0.6%)***	**337** ***(98.5%)***	**1** ***(0.3%)***
No	**318** ***(93.0%)***	**307** ***(89.8%)***	**2** ***(0.6%)***	**318** ***(93.0%)***
Inc	**23** ***(6.7%)***	**32** ***(9.4%)***	**3** ***(0.9%)***	**23** ***(6.7%)***

Conclusions

TABLE 2

WebCode	Conclusions
22QL9X	The submitted bullets were physically, visually, and microscopically examined and their characteristics noted. Microscopic examination and comparison of the test fired bullets in Item 1.1 to Item 1.4 reveals agreement of all discernable class characteristics along with areas of corresponding individual characteristics establishing that 1.4 was fired from the same firearm that fired the bullets in Item 1.1. Microscopic examination and comparison of the test fired bullets in Item 1.1 to Items 1.2, 1.3 and 1.5 reveals disagreement of individual characteristics establishing that Items 1.2, 1.3 and 1.5 were not fired from the same firearm that fired the bullets in Item 1.1. Microscopic examination and comparison of Item 1.2 to 1.5 reveals agreement of all discernable class characteristics along with areas of corresponding individual characteristics establishing that Items 1.2 and 1.5 were fired from the same unknown 9 mm caliber firearm. Microscopic examination and comparison of Items 1.2 and 1.5 to Item 1.3 reveals disagreement of individual characteristics establishing that Item 1.3 was not fired from the same unknown 9 mm caliber firearm that fired Items 1.2 and 1.5.
24FVDT	Items 1, 2, 3, 4, 5: A microscopic comparison was conducted between Item 1 and Item 4. The examinations determined that Item 1 and Item 4 were fired from the same firearm due to a sufficient agreement between striations. A microscopic comparison was conducted between Item 2 and Item 5. The examinations determined that Item 2 and Item 5 were fired from the same firearm due to a sufficient agreement between striations. A microscopic comparison was conducted between Item 1 and Item 2. The examinations determined these items were fired from two different firearms due to a disagreement of individual characteristics. A microscopic comparison was conducted between Item 3 and Item 1 and Item 2. The examinations determined these items were fired from three different firearms due to a disagreement of individual characteristics. Disposition: The above listed evidence will be forwarded to the Property Custody Division. All firearm comparison examinations were conducted using the AFTE's (Association of Firearm & Tool Mark Examiners) Theory of Identification. Identifications are the opinion of a qualified examiner that two tool marks were made by the same tool based on sufficient agreement of individual characteristics. The agreement of individual characteristics is of a quantity and quality that the likelihood another (different) tool could have made the mark is so remote as to be considered a practical impossibility. All exclusions and inconclusive findings were based upon exemplars available at the time of the examinations.
24TKG6	Compared test bullets from the 9mm Luger caliber Beretta semiautomatic pistol serial number against the bullet marked #4 with positive results. (Identification). The bullet marked #4 was identified as having been discharged from the Beretta pistol. Compared test bullets from the 9mm Luger caliber Beretta semiautomatic pistol serial number against the three bullets marked #2, #3 and #5 with negative results. (Elimination). The three bullets marked #2, #3 and #5 were eliminated as having been discharged from the Beretta pistol. Compared the two bullets marked #2 and #5 against each other with positive results. (Identification). The two bullets marked #2 and #5 were identified as having been discharged from the same firearm. Compared the bullet marked #3 against the two bullets marked #2 and #5 with negative results. (Elimination). The bullet marked #3 was eliminated as having been discharged from the same firearm as the two bullets marked #2 and #5.
272GF3	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 is fired by the submitted firearm. H2: The questioned bullet is fired by 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

TABLE 2

WebCode	Conclusions
	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: Due to other class characteristics this bullet is fired by another firearm then the submitted firearm. Item 4: The findings are extremely more probable when H1 is true than when H2 is true. Item 5: The findings are extremely more probable when H2 is true than when H1 is true.
29AL8J	Fired projectile Item 2 and Item 5 were identified as having been fired in the same firearm based on agreement of class characteristics and sufficient agreement of individual characteristics within the land impressions. Fired projectile Item 4 was identified as having been fired in the same firearm as test fired projectiles within Item 1 based on agreement of class characteristics and sufficient agreement of individual characteristics within the land impressions. Fired projectile Item 2 and Item 5 were eliminated from having been fired in the same firearm as Item 4 and test fired projectiles within Item 1 based on agreement of class characteristics but significant disagreement of individual characteristics within the land impressions. Fired projectile Item 3 was eliminated from having been fired in the same firearm as Item 2, Item 4, Item 5, and the test fired projectiles within Item 1 based on disagreement of class characteristics.
29NBP2	Through macroscopic/microscopic examination and based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets, Laboratory Items 1 and 4, were identified as having been fired from the same firearm. Through macroscopic/microscopic examination and based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets, Laboratory Items 2 and 5, were identified as having been fired from the same firearm. Through macroscopic/microscopic examination and based on significant disagreement of individual characteristics, the fired bullets, Laboratory Items 1 and 4, could not have been fired from the same firearm as the fired bullets, Laboratory Items 2 and 5. Through macroscopic/microscopic examination and based on significant disagreement of class characteristics, the fired bullet, Laboratory Item 3, could not have been fired from the same firearm as the fired bullets, Laboratory Items 1 and 4, or from the same firearm as the fired bullets, Laboratory Items 2 and 5.
2A2NUY	Item 4 was discharged from the same pistol which discharged Item 1. Item 2 and Item 5 were discharged from the same pistol (different pistol that discharged Item 1). Item 3 was discharged from a third pistol (different pistol that the others).
2AEKTB	The fired bullets in items 1 (a-c) and 4 were identified as having been fired from the same firearm. The fired bullets in items 2 and 5 were identified as having been fired from the same firearm; however, a different firearm than the one that fired the bullets in items 1(a-c) and 4. The fired bullet in item 3 was excluded as having been fired from either firearm. Identification is the strongest level of positive association.
2DH7PN	Items 1 and 4: The Item 4 bullet was Identified to the Item 1 bullets. Items 1 and 4 were Eliminated to the Items 2, 3 and 5 bullets. Items 2 and 5: Items 2 and 5 were Identified to each other. Items 2 and 5 have design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. Items 2 and 5 were Eliminated to the Items 1, 3 and 4 bullets. Item 3: Item 3 was Eliminated to the Items 1, 2, 4, and 5 bullets. Item 3 has design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics.

TABLE 2

WebCode	Conclusions
2HC3DF	3. On 2022-06-29 during the performance of my official duties I received a sealed evidence bag with number PA4001966837 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) 9mm calibre fired bullets marked by me "369782/22" each and "T1A", "T1B" and "T1C" respectively (known to be fired from a Pietro Beretta model 92F semi-automatic pistol). 3.2: One (1) jewel box marked "Item 2" containing the following exhibit: 3.2.1: One (1) 9mm calibre fired bullet marked by me "369782/22 2". 3.3: One (1) jewel box marked "Item 3" containing the following exhibit: 3.3.1: One (1) 9mm calibre fired bullet marked by me "369782/22 3". 3.4: One (1) jewel box marked "Item 4" containing the following exhibit: 3.4.1: One (1) 9mm calibre fired bullet marked by me "369782/22 4". 3.5: One (1) jewel box marked "Item 5" containing the following exhibit: 3.5.1: One (1) 9mm calibre fired bullet marked by me "369782/22 5". 4. The intention and scope of this forensic examination comprise of the following Ballistics techniques: 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 bullet mentioned in paragraph 3.4.1 marked "369782/22 4" was fired from the same firearm that fired the bullets mentioned in paragraph 3.1.1 marked "369782/22" each and "T1A", "T1B" and "T1C" respectively. 5.2: The bullets mentioned in paragraphs 3.2.1 and 3.5.1 marked "369782/22" each and "2" and "5" respectively, were fired from the same firearm. The bullets were however not fired from the firearm that fired the bullets mentioned in paragraph 5.1. 5.3: The bullet mentioned in paragraph 3.3.1 marked "369782/22 3" was not fired from either of the firearms that fired the bullets mentioned in paragraph 5.1 and 5.2.
2JTY4U	Visual and microscopic analyses of the evidence bullets Item 2 through Item 5 (QB1 through QB4), and the test fired bullets from the Beretta 92F 9mm Luger firearm K1 (Item 1) were initiated on June 8, 2022. The results of the comparisons and evaluations are as follows: Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, Item 4 (QB3) is identified as having been fired with K1 (Item 1). Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, Item 2 (QB1) and Item 5 (QB4) are identified as having been fired with a second firearm (Unknown Firearm 1). Based on disagreement of individual characteristics, Item 2 (QB1) and Item5 (QB4) are eliminated as having been fired with K1 (Item 1). Based on disagreement of individual characteristics, Item 3 (QB2) is eliminated as having been fired with K1 or with the same unknown firearm as Item 1 (QB1) and Item 5 (QB4). Item 3 (QB2) was fired with a third firearm (Unknown Firearm 2). Item 3 (QB2) exhibits marks of value and is suitable for future microscopic comparisons.
2N2RPC	The Item 4 .38/.357/9mm calibre class bullet was identified, within the limits of practical certainty1, as having been fired by the 9mm Luger calibre Pietro Beretta, model 92F semi-automatic pistol, as represented by the Item 1 test fired 9mm Luger calibre bullets. The Item 2, 3, and 5 .38/.357/9mm calibre class bullets were not fired by the 9mm Luger calibre Pietro Beretta, model 92F semi-automatic pistol, as represented by the Item 1 test fired 9mm Luger calibre bullets. The Item 2 and 5 .38/.357/9mm calibre class bullets were fired in the same firearm. The Item 3 .38/.357/9mm calibre class bullet was not fired in the same firearm that generated the Item 2 and 5 bullets. A minimum of three (3) firearms are represented by the Item 2 to 5 bullets.
2ZYJLH	The below listed spent bullet was macroscopically and microscopically examined and compared with test fires (001-A1) from the Beretta 92F pistol. It is my opinion that the below

TABLE 2

WebCode	Conclusions
	listed item was fired from this firearm (identification). Property# Lab Evidence# Description 22-5261 001-A4 Spent 38 caliber bullet The below listed bullets were macroscopically and microscopically examined and compared with test fires (001-A1) from the Beretta 92F pistol. It is my opinion that the below listed items were not fired from this firearm (elimination). The below listed bullets were further compared with each other. It is my opinion that the below listed bullets were fired from the same unknown firearm (identification). Property# Lab Evidence# Description 22-5261 001-A2 Spent 38 caliber bullet 22-5261 001-A5 Spent 38 caliber bullet The below listed bullet was macroscopically and microscopically examined and compared with test fires (001-A1) from the Beretta 92F pistol. It is my opinion this bullet was not fired from this firearm (elimination). The below listed item was further compared with the above listed spent bullets. It is my opinion That the below listed bullet was fired from a second unknown firearm (elimination). Property# Lab Evidence# Description 22-5261 001-A3 Spent 38 caliber bullet
33CMP6	Item 4 was identified as having been fired from the Item 1 pistol based upon sufficient agreement of individual characteristics. Item 2 and Item 5 were identified as having been fired from the same unknown firearm based upon sufficient agreement of individual characteristics. (Unknown Firearm '1'). Item 3 retains marks of value for future comparative microscopy. (Unknown Firearm '2').
366JCE	1. Examination of Exhibits 2 though 5 revealed each contains one fired 9mm Luger bullet displaying six (6) land and groove engraved areas with a right twist. 2. Microscopic comparison revealed Exhibit 4 was fired from the same firearm as Exhibit 1 due to sufficient agreement of individual characteristics. 3. Microscopic comparison revealed Exhibit 2 was fired from the same firearm as Exhibit 5 due to sufficient agreement of individual characteristics. 4. Microscopic comparison revealed Exhibits 1 and 4 were not fired from the same firearm as Exhibits 2 and 5 due to sufficient disagreement of individual characteristics. 5. Microscopic comparison revealed Exhibit 3 was not fired from the same firearm as Exhibits 1 and 4, nor the same firearm that fired Exhibits 2 and 5 due to sufficient disagreement of individual characteristics.
3F66HD	2.1: Exhibit bullet marked 338038/22 C (Item 4) was fired from the same firearm as the tests bullets marked 038TB1, 038TB2, 038TB3 (Item 1)- !st firearm. 2.2: Exhibits bullets marked 338038/22 A (item 2) and D (item 5) were fired from the same firearm - 2nd firearm. 2.3: Exhibit B (item 3) was fired from the third firearm.
3FPNP6	The four evidence bullets were fired in three different firearms. One of the bullets recovered at the scene (Item 4) was fired in the Beretta pistol recovered in the suspect's vehicle. The bullet recovered by the medical examiner (Item 2) and one of the bullets recovered at the scene (Item 5) were fired in a second firearm. The remaining bullet from the scene (Item 3) was fired in a third firearm.
3H86HA	Bullet 4 was identified as having been fired by the recovered firearm. Bullets 2, 3, and 5 were eliminated as having been fired by the recovered firearm. Bullets 2 and 5 were identified as having been fired from the same unknown firearm.
3QH9MN	On June 07, 2022, [Name], delivered the following to this section for examination: 1-1: Three (3) Spent Projectiles (A/B/C), fired using the recovered firearm (known). 1-2: One (1) Spent Projectile, recovered from the victim (questioned). 1-3: One (1) Spent Projectile, First bullet recovered from the scene (questioned). 1-4: One (1) Spent Projectile, Second bullet recovered from the scene (questioned). 1-5: One (1) Spent Projectile, Third bullet recovered from the scene (questioned). The submitted weapon has a cut rifling system consisting of Six/6/lands and grooves with a right twist. The submitted weapon was test fired using Three (3) 9mm Luger

TABLE 2

WebCode	Conclusions
	live cartridges from section ammunition, with no malfunctions noted.
3XNZWK	3. On 2022-06-29 during the performance of my official duties I received an intact sealed evidence bag with number PA4001966593 marked inter alia Ballistics w/c, 22-5261S, from Case Administration of the Ballistics Section. I opened the bag and found the following exhibits: 3.1 Three (3) 9mm calibre test fired bullets marked by me as "369834/22" each and "1A", "1B", and "1C" respectively (Fired in the known Pietro Beretta Model 92F). 3.2 One (1) 9mm calibre fired bullet marked by me as "369834/22 2". 3.3 One (1) 9mm calibre fired bullet marked by me as "369834/22 3". 3.4 One (1) 9mm calibre fired bullet marked by me as "369834/22 4". 3.5 One (1) 9mm calibre fired bullet marked by me as "369834/22 5". 4. The intention and scope of this forensic examination comprises of the following Ballistics techniques: 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, 3.2, 3.3, 3.4 and 3.5 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 following: 5.1 The bullet mentioned in paragraph 3.4 marked "369834/22 4" was fired from the firearm that fired the bullets mentioned in paragraph 3.1 (Pietro Beretta Model 92F). 5.2 The bullets mentioned in paragraphs 3.2 and 3.5 marked "369834/22" each and "2" and "5" respectively were fired from a second (2nd) firearm. 5.3 The bullet mentioned in paragraph 3.3 marked "369834/22 3" was fired from a third (3rd) firearm.
42GHRC	Items 2 and 5 were Identified to each other. They have design features consistent with bullets loaded in 9mm Luger caliber cartridges and display rifling characteristics similar to pistols by Beretta, FN/Browning, Ruger, Taurus, and Walther, among others. Items 2 and 5 were Eliminated to the Item 1 pistol and the Item 4 bullet. Item 3 was Eliminated to the Item 1 pistol, the Item 2 and 5 bullets, and the Item 4 bullet, based on a difference in class characteristics. It has design features consistent with bullets loaded in 9mm Luger caliber cartridges and displays rifling characteristics similar to pistols by FN/Browning, Ruger, Springfield Inc., Taurus, and Walther, among others. Item 4 was Identified to the Item 1 pistol.
42Z7A7	1. According to the class characteristics and the individual characteristics, it can be determined that the bullet with a number identified as item 4 was fired by the same weapon as the bullets (item 1). 2. The item 2 and item 5 bullets were fired from the same firearm and were not fired from the same firearm as the item 1 bullets. 3. The Item 3 bullet was not fired from the same gun as the Item 1 and Item 4 bullets, nor from the same gun as the Item 2 and Item 5 bullets.
462DAB	Items 2 through 5 were compared to each other and to the Item 1 test fires. Microscopic examination of items 1 through 5 indicates three firearms were used. Items 2 and 5 have the same class of rifling and sufficient corresponding individual microscopic marks to conclude that they were fired in a single firearm (firearm #1). Items 1 and 4 have the same class of rifling and sufficient corresponding individual microscopic marks to conclude that item 4 was fired in the same firearm as item 1 (firearm #2). Items 1 and 3 have significant differences in rifling class marks. Item 3 was fired in a different firearm (firearm #3). Items 2 and 5 have similar class marks as items 1 and 4, but significant differences in individual marks. In the absence of alteration, items 2 and 5 were fired in a different firearm than items 1 and 4. Item 3 has similar class marks as Items 2 and 5, but significant differences in individual marks. In the absence of alteration, item 3 was fired in a different firearm than items 2 and 5.
48QKWT	The three test fired bullets reportedly from the recovered firearm (Item 1) and the four individually packaged bullets (Items 2, 3, 4, 5) were microscopically intercompared to one another with the following results: The bullet in Item 4 was fired by the same firearm that reportedly produced the test fired bullets in Item 1 based on agreement in all discernable class

TABLE 2

WebCode	Conclusions
	characteristics and agreement of individual characteristics. The bullets in Items 2 and 5 displayed similar general rifling characteristics to the test fired bullets in Item 1, but the nature of the reproducing rifling toolmarks were significantly different, indicating that the bullets were fired from a different firearm than Item 1. A further inter-comparison of Items 2 and 5 concluded that they were very likely fired from the same unknown firearm based on agreement in all discernable class characteristics and agreement of individual characteristics. Due to the nature of the markings observed on the bullets, a subclass evaluation of the barrel is needed to confirm a shared firing source. These bullets are consistent with nominal caliber 9mm/38 bullets bearing six land impressions and six groove impressions with a right-hand twist. A list of commonly encountered manufacturers of firearms with class characteristics similar to the these bullets is extensive. Any firearm with suspected involvement in this case should be forwarded to the laboratory for evaluation/comparison. The bullet in Item 3 displayed different class characteristic rifling dimensions, indicating that it was also fired from a different firearm than Item 1. Additionally, Item 3 was eliminated as having been fired from the unknown firearm that fired Items 2 and 5 based on significant differences in the nature of the rifling toolmarks. Item 3 represents a second unknown firearm. Item 3 is consistent with a nominal caliber 9mm/38 bullet bearing six land impressions and six groove impressions with a right-hand twist. A list of commonly encountered manufacturers of firearms with class characteristics similar to the this bullet is extensive. Any firearm with suspected involvement in this case should be forwarded to the laboratory for evaluation/comparison.
492H74	SUMMARY OF RESULTS AND INTERPRETATIONS: ITEM 1.1-1.5: The expended bullets were originally components of 9mm class caliber cartridges that had been fired in a barrel with 6 lands and grooves of conventional style rifling with a right hand twist. A microscopic examination and comparison revealed the following: Item 1.1 and Item 1.4 were microscopically examined and compared. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Item 1.4 is identified as having been fired from the same firearm that created Item 1.1 (Pietro Beretta Model 92F). Item 1.2 and Item 1.5 were microscopically examined and compared. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Item 1.2 and Item 1.5 are identified as having been fired from a second unknown firearm. Item 1.3 and Items 1.1, 1.2, 1.4 & 1.5 were microscopically examined and compared. Based on the observed disagreement of class and individual characteristics, Item 1.3 is eliminated as having been fired from the same firearms as Items 1.1 &1.4, and Items 1.2 & 1.5. Item 1.3 was fired from a third unknown firearm.
49JEMW	Items 1A1, 1A2, and 1A3 (fired bullets) are reportedly test shots from a 9mm Luger caliber, Beretta, model 92F. Items 1B and 1E (fired bullets) are identified as having been fired from the same firearm. Item 1D (fired bullet) is identified as having been fired from the same firearm as Items 1A1, 1A2, and 1A3 (fired bullets). Item 1C (fired bullet) is inconclusive as having been fired from the same firearm as Items 1A1, 1A2, and 1A3 (fired bullets). These items share agreement of class characteristics but lack consistent and reproducible individual characteristics. Items 1B and 1E (fired bullets) are inconclusive as having been fired from the same firearm as Items 1A1, 1A2, and 1A3 (fired bullets). These items share agreement of class characteristics with some agreement of the individual characteristics observed in the land engraved areas. Items 1B and 1E (fired bullets) are inconclusive as having been fired from the same firearm as Item 1C (fired bullet). These items share agreement of class characteristics but lack consistent and reproducible individual characteristics. Items 1B, 1C, and 1E are consistent with being .38/9mm caliber class fired metal jacketed bullets displaying conventional rifling specifications of six land and grooves with a right twist. Rifling specifications and physical characteristics are consistent with bullets fired from firearms produced by several

TABLE 2

WebCode	Conclusions
	manufacturers. No suspected firearm should be overlooked.
4BMF9Z	Item 004 was fired in the same firearm as Item 001 (identification). This is also the opinion of Firearms Examiner NAME. Items 002 and 005 were fired in the same firearm (identification). This is also the opinion of Firearms Examiner NAME. Item 003 was not fired in the same firearm as Items 002 and 005 (elimination). This is also the opinion of Firearms Examiner NAME. Items 002, 003, and 005 were not fired in the same firearm as Item 001 (elimination). This is also the opinion of Firearms Examiner NAME.
4E79N9	Item 4 was identified as having been fired the same firearm as Item 1. Items 2 and 5 are each one 9mm caliber bullet fired from a firearm having six lands and grooves with a right-hand twist. Items 2 and 5 were identified as having been fired from the same unknown firearm. Items 2 and 5 were eliminated as having been fired from the same firearm as Item 1. A list of potential firearms for Items 2 and 5 was generated and will be forwarded to the requesting officer; however, this list is not all inclusive and does not exclude other firearms having similar rifling characteristics. Item 3 is a 9mm caliber bullet fired from a firearm having six-lands and grooves with a right-hand twist. Item 3 was eliminated as having been fired from the same firearm as Item 1. Item 3 is from a second unknown firearm and was not fired from the same firearm as Items 2 and 5. A list of potential firearms for Item 3 was generated and will be forwarded to the requesting officer; however, this list is not all inclusive and does not exclude other firearms having similar rifling characteristics.
4JET9Z	The four bullets (1A to 1C, 4) were fired from the same firearm. The four bullets (1A to 1C, 4) were not fired from the same firearm as the three bullets (2, 3, 5). The two bullets (2, 5) were not fired from the same firearm as the five bullets (1A to 1C, 3, 4). The two bullets (2, 5) were fired from the same unknown firearm. The two bullets (2, 5) are consistent with 38 caliber class and were fired from a firearm with six lands and grooves with a right twist and conventional rifling. The listing of possible firearms from which the two bullets (2, 5) may have been fired is too long to be useful for investigative purposes. The bullet (3) was not fired from the same firearm as the six bullets (1A to 1C, 2, 4, 5). The bullet (3) is consistent with 38 caliber class and was fired from a firearm with six lands and grooves with a right twist and conventional rifling. The listing of possible firearms from which the bullet (3) may have been fired is too long to be useful for investigative purposes.
4QKGB2	1.The bullet, Exhibit 4, was identified as having been fired from the same firearm as the test fired bullets, Exhibit 1. 2.Exhibits 2 and 5 were not fired from the same firearm as the test fired bullets, Exhibit 1. 3.The bullet, Exhibit 3, was neither identified nor eliminated as having been fired from the same firearm as the test fired bullets, Exhibit 1.
4XWGL4	The exhibit fired bullet (Item 4) had been discharged within the exhibit pistol (Item 1 - GUN 1) The exhibit fired bullets (Items 2, 3 & 5) were eliminated from Item 1.
4XWJ83	Item 4 was identified microscopically as having been fired from the same firearm as the test fires reportedly from Item 1 based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 2 and 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. Items 2 and 5 were microscopically eliminated as having been fired from the same firearm as the test fires reportedly from Item 1 due to disagreement of discernible individual characteristics. Item 3 was microscopically eliminated as having been fired from the same firearm as the test fires reportedly from Item 1, or the same unknown firearm as Items 2 and 5, due to disagreement of land and groove impression widths.

TABLE 2

WebCode	Conclusions
4YFCD7	B-3 (CTS #4) was microscopically compared to pistol, P-1 (CTS #1) and an identification was made. B-3 was fired from pistol, P-1. B-1 (CTS #2) was microscopically compared to fired bullet, B-4 (CTS #5) and an identification was made. B-1 and B-4 were fired from the same firearm, not submitted. B-2 (CTS #3) was eliminated as having been fired from pistol, P-1 (CTS #1) due to differences in individual characteristics. B-2 (CTS #3) was eliminated as having been fired from the same firearm as fired bullets, B-1 (CTS #2), B-3 (CTS #4) and B-4 (CTS #5) due to differences in individual characteristics.
4ZP9ZV	The bullet marked item 4 was fired from the Pietro Beretta pistol-type firearm, model 92F.
62XZ4W	By means of bullets and its derivatives examination, microscopic examination and microscopic comparison examinations it was determined that: 1. The bullets corresponding to item 001, marked E-1, E-2, E-3 and E-6 are caliber 9mm Luger, with striation to the right (R-6) and were fired by the same firearm (Identification). [Examiner]. 2. The bullets corresponding to item 001, marked E-4 and E-7, are caliber 9mm Luger, with striations to the right (R-6) and were fired by the same firearm (Identification). [Examiner]. 3. The bullet corresponding to item 001, marked E-5, is a 9mm Luger caliber, with striations to the right (R-6) and was fired from a firearm. [Examiner].
683HUW	The fired bullet, Item 4, was microscopically examined and compared versus the known test fired bullets, Item 1. Based on the observed agreement of their class characteristics and sufficient agreement of individual characteristics, Item 4 is identified as having been fired from the same firearm as Item 1. The fired bullets, Items 2, 3 and 5, were microscopically examined and compared versus the known test fired bullets, Item 1. Based on the observed disagreement of their individual characteristics, Items 2, 3 and 5 were not identified as having been fired from the same firearm as Item 1.
6A98TZ	The projectile in Item 4 was fired in the same gun that fired the projectiles in Item 1, based on agreement observed in individual characteristics. The projectile in Item 3 was not fired in the gun that fired the projectiles in Item 1, based on differences observed in class characteristics. The projectiles in Items 2 and 5 bear class characteristics consistent with the projectiles in Item 1. However, no significant similarities in individual characteristics were observed.
6FWRXZ	The projectile in Item 4 was fired in the gun that fired the projectiles in Item 1, based on agreement observed in individual characteristics. The projectile in Item 3 was not fired in the gun that fired the projectiles in Item 1, based on differences observed in class characteristics. The projectiles in Items 2 and 5 bear class characteristics consistent with those produced by the gun that fired the projectiles in Item 1; however, no significant similarities in individual characteristics were observed.
6G9J4A	Results of Examinations: Item 1 through Item 5 consist of seven (7) .38 caliber family bullets. The Item 4 bullet was identified as having been fired from the barrel of the firearm that fired the Item 1 bullets. The Item 2 bullet was identified as having been fired from the barrel of the firearm that fired the Item 5 bullet. A pattern examination of the Item 2/Item 5 bullets and the Item 1/ Item 4 bullets was inconclusive due to insufficient quality and/or quantity of corresponding individual characteristics. A pattern examination of the Item 3 bullet to the Item 2/Item 5 bullets and the Item 1/ Item 4 bullets was inconclusive due to insufficient quality and/or quantity of corresponding individual characteristics.
6JDEGK	Items 1-2 and 1-5 were both fired by the same unknown weapon, not the weapon that fired the tests in item 1-1 or the weapon that fired item 1-3. Item 1-3 was fired by an unknown weapon, not the weapon that fired the tests in item 1-1 of the weapon that fired items 1-2 and 1-5.

TABLE 2

WebCode	Conclusions
6N4PHX	The Item 4 fired bullet was fired from the same firearm that fired the Item 1 known test fired bullets. This identification is based on sufficient agreement of the combination of individual characteristics and all discernible class characteristics. The Item 2 and Item 5 fired bullets were fired from the same unknown firearm. This identification is based on sufficient agreement of the combination of individual characteristics and all discernible class characteristics. The Items 2 and 5 fired bullets were not fired from the same firearm that fired the Item 1 known test fired bullets. These eliminations are based on significant differences in the individual characteristic patterns. The Item 3 fired bullet was not fired from the same firearm that fired the Item 1 known test fired bullets. This elimination is based on differences in class characteristics (different land and groove impression widths). The Item 3 fired bullet was not fired from the same unknown firearm that fired the Items 2 and 5 fired bullets. These eliminations are based on significant differences in the individual characteristic patterns and slight differences in class characteristics (slightly different land and groove impression widths). Item 3 is a 38 caliber family fired bullet having six conventional land and groove impressions with a right hand twist. An AFTE General Rifling Characteristics Database search of possible firearms that could have fired Item 3 is attached. Item 5 is also a 38 caliber family fired bullet having six conventional land and groove impressions with a right hand twist. An AFTE General Rifling Characteristics Database search of possible firearms that could have fired Item 5 is also attached. Note: The attached GRC searches may not be all-inclusive; any recovered firearms of the appropriate caliber-class may be submitted to the laboratory for comparison purposes.
6N79KD	There is sufficient agreement of a combination of individual characteristics and some detectable class characteristics between bullet items 1 and 4 suggesting a possible common origin. Impressions on Items 2, 3 and 5 did not match with those on the known item 1 suggesting a possible uncommon origin. I am of the opinion that Item 4 was discharged from the same firearm as item 1 but different from firearms that discharged bullet items 2, 3 and 5.
6RQ3HE	The Item #1 firearm DID fire the Item #4 projectile, based on the correspondence of individual characteristics. The Item #1 firearm did not fire the Item #2 and #5 projectiles, based on differences in individual characteristics. The Item #1 firearm did not fire the Item #3 projectile, based on differences in class characteristics.
6T7KGD	I am of the opinion that questioned bullet 4 could have been fired in the same firearm as the known bullets (item 1). Also, questioned items 2 and 5 could have been fired in the same firearm. Lastly, questioned item 3 was fired by another firearm, different from the recovered firearm or the one that fired items 2 and 5.
6Y7Y6Z	The Item 2 - 5 bullets were microscopically compared to the Item 1 test fired bullets with the following results: Due to sufficient agreement of class and individual characteristics it was concluded that the Item 4 bullet was fired in the same firearm as the Item 1 test fired bullets. Due to lack of agreement of class and individual characteristics it was concluded that the Item 2, 3, and 5 bullets were not fired in the same firearm as the Item 1 test fired bullets. Due to sufficient agreement of class and individual charcteristics it was concluded that the Item 2 and Item 5 bullets were fired in the same (unknown) firearm.
6YQH8L	Item 1, Item 4: The Item 1 and Item 4 bullets were Identified to each other. The bullets were Eliminated to the Item 2 and Item 5 bullets. The bullets were Eliminated to the Item 3 bullet based on a difference in class characteristics. Item 2, Item 5: The Item 2 and Item 5 bullets were Identified to each other. The bullets have design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. The bullets were Eliminated to the Item 3 bullet based on a difference in class characteristics. Item 3: The bullet was Eliminated to the Item 1, 2, 4, and 5 bullets based on a

TABLE 2

WebCode	Conclusions
	difference in class characteristics. The bullet has design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics.
7383U2	The results of the comparison of Item 2 with Item 5 are inconclusive. The questioned bullet (Item 2) from the victim and the third questioned bullet (Item 5) recovered from the scene, were fired in the same firearm or in firearms with barrels manufactured with the same tool in the same approximate state of wear. These two bullets (Items 2 and 5) were not fired from the BERETTA pistol (Item 1) or from the same firearm as the other two questioned bullets (Items 3 and 4) from the scene. The results of the comparison of first bullet Item 3 recovered from the scene with Items 1 and 4 are inconclusive. The results of the comparison of Item 4 with Item 1 are inconclusive. The third questioned bullet (Item 4) recovered from the scene was fired in the BERETTA pistol (Item 1) or from a firearm with a barrel that was manufactured with the same tool in the same approximate state of wear.
73BMLB	Item 1A, Item 1B, Item 1C: The bullets were used for microscopic comparison purposes. Item 2, Item 5: The bullets were Identified to each other. The bullets were Eliminated to the Item 1A through 1C and 4 bullets. The bullets are 38 caliber class (38/357/9mm) based on their design features and display rifling characteristics similar to firearms by Beretta, Czechoslovakia, FN/Browning, Heckler & Koch, Ruger, Taurus, and Walther, among others. Item 3: The bullet was Eliminated to the Item 1A through 1C, 2, 4, and 5 bullets based on a difference in class characteristics. The bullet is 38 caliber class (38/357/9mm) based on its design features and displays rifling characteristics similar to firearms by Beretta, FN/Browning, Heckler & Koch, Intratec, Ruger, Springfield Inc., Taurus, and Walther, among others. Item 4: The bullet was Identified to the Item 1A bullet.
767MB7	One of the fired bullets, item 4, was identified as having been fired from the firearm used to generate the fired bullets submitted as item 1. Two (2) of the fired bullets, item 2 and item 5, were identified as having been fired from a second firearm. One of the fired bullets, item 3, was identified as having been fired from a third firearm. Items 2, 3, and 5 are most consistent with bullets loaded in 9mm Luger caliber cartridges. The manufacturers of firearms known to exhibit general rifling characteristics similar to these items include, but are not limited to the following: 80 Percent Arms, Agram, American Eagle, Arcus, Arex, Armalite, Beretta, Bergmann, Browning, Calico, Caracal, Ceska Zbrojovka (CZ), Colt, Daewoo, Diamondback, EAA Corp, Federal Engineering, FEG, FM, FMJ (Cobray), FN/Browning, Fox Co, Girsan, Glock, Heckler & Koch, Honor Defense, Industria Argentina, John Inglis, Kahr Arms, Kassnar, Kel-Tec, KSN Industries, Luger, Masterpiece Arms, Mauser, Mossberg, Navy Arms, Norinco, Nova Modul, Palmetto State Armory, Pleter, Polymer80, Radom, Remington, Ruger, Samsun Yurt Savunma (SYS), SAR Arms/Sarsilmaz, Sardius, Shadow Systems, SigSauer, Springfield Inc, Sten, Sterling Arms, Steyr, Steyr-Mannlicher, Stoeger Arms, SWD Inc, Tanfoglio (EAA), Taurus, Tisas, Tokarev, Vulcan Armament, Walther, Wilkinson Arms, and Zastava.
77L3MM	Item 1 (known) and item 4 (questioned) match and were discharged from the same firearm. Item 2 and item 5 (both questioned) match and were discharged from the same firearm. Item 3 did not match the other items and was discharged from a further unknown firearm. The items suggest discharge from three separate firearms.
78ETW8	The second bullet recovered from the scene (item 4) was fired from the same firearm that fired the known bullets (item 1). 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 for absolute certainty. The conclusion that sufficient agreement for identification exists between two firearm-produced toolmarks means that the

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	likelihood another firearm could have made the questioned mark is so remote as to be considered a practical impossibility. The bullet recovered from the victim (item 2) and the third bullet recovered from the scene (item 5) were eliminated as being fired from the same firearm that fired the known bullets (item 1). The first bullet recovered from the scene (item 3) was most likely not fired from the same firearm that fired the known bullets (item 1); however, the comparison was inconclusive.
7A3CVJ	A: Item's 1-2 & 1-5 Are Two (2) .38 caliber class FMJ Spent Projectiles HAVE BEEN FIRED FROM the same unknown weapon/barrel. These items WERE NOT FIRED FROM the submitted FIREARM used to test fire Items 1-1 (A,B,C). B: Item 1-3 is a .38 caliber class FMJ Spent Projectile that HAS BEEN FIRED FROM an unknown weapon/barrel. This item WAS NOT FIRED FROM the submitted FIREARM used to test fire Items 1-1 (A,B,C) or the unknown weapon/barrel used to fire Items 1-2 & 1-5. C: Item 1-4 is a .38 caliber class FMJ Spent Projectile that HAS BEEN FIRED FROM the firearm/barrel used to fire Item's 1-1 (A,B,C).
7FE2MV	Item 4 was fired in the same firearm as the item 1 test fires. Items 2 and 5 were fired in a second firearm. Items 2 and 5 are consistent with bullets from ammunition designated 9mm Luger. A list of makes of firearms which are common to the LAPD region and may have fired these items includes, but is not limited to: FMBUS (Ghost Gun), Ruger, Springfield Armory, Taurus, Beretta, Ceska Zbrojovka, Keltec, Heckler & Koch, Sig Sauer and Kahr Arms. Item 3 was fired in a third firearm. Item 3 is consistent with a bullet from ammunition designated 9mm Luger. A list of makes of firearms which are common to the LAPD region and may have fired this item includes, but is not limited to: FMBUS (Ghost Gun), Springfield Armory, Ruger, Taurus, Ceska Zbrojovka, Sig Sauer and Kahr Arms.
7H2WZZ	Bullets Item 2 and 5 were shooted by the same firearm, another than suspected weapon. Bullet Item 3 was shooted by another firearm than Item 2 and 5 and suspected weapon.
7HKHWX	Through macroscopic/microscopic examination and based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets, Laboratory Items 1 and 4, were identified as having been fired from the same firearm. Through macroscopic/microscopic examination and based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired bullets, Laboratory Items 2 and 5, were identified as having been fired from the same firearm. Through macroscopic/microscopic examination and based on significant disagreement of individual characteristics, the fired bullets, Laboratory Items 1 and 4, could not have been fired from the same firearm as the fired bullets, Laboratory Items 2 and 5. Through macroscopic/microscopic examination and based on significant disagreement of class characteristics, the fired bullet, Laboratory Item 3, could not have been fired from the same firearm as the fired bullets, Laboratory Items 1 and 4, or from the same firearm as the fired bullets, Laboratory Items 2 and 5.
7JNHMW	The two submitted fired projectiles, Agency Exhibits 2 and 5, were both fired in the same unknown firearm. They were eliminated as having been fired from the same firearm as the three submitted fired projectiles, Agency Exhibits 1A to 1C, reportedly fired from a Beretta Model 92F pistol. The submitted fired projectile, Agency Exhibit 4, was fired from the same firearm as the three submitted fired projectiles, Agency Exhibits 1A to 1C, reportedly from a Beretta Model 92F pistol. Agency Exhibit 3 is inconclusive due to lack of examiners consensus.
7K3VEY	Group 1: Item 1 and 4 have microscopic characteristics of identity common to each other meaning, that the projectile in ítem 4 was shot by the "Prieto Beretta" gun model 92F, seized from the suspect. Group 2: Item 2 and 5 have microscopic characteristics of identity common to each other meaning, that these projectiles were shot by the same gun but different from the

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	one shotted by the projectiles in group number 1. Group 3: Conformed by ítem 3 meanig that this projectile was shot by a gun but different from de guns shotted by the projectiles of groups 1 and 2.
7QTCP6	Items 1, 2, 3, 4 and 5: Item 1 was Identified to Item 4. Item 2 was Identified to Item 5. The Item 2 and 5 bullets have design features consistent with bullets loaded in 9mm Luger caliber cartridges and displays rifling characteristics similar to numerous manufacturers. Items 1 and 4 were Eliminated from Items 2 and 5. Item 3 was Eliminated from Items 1 and 4 and Items 2 and 5. The Item 3 bullet has design features consistent with bullets loaded in 9mm Luger caliber cartridges and displays rifling characteristics similar to numerous manufacturers.
7XE3DK	Item 1, Item 4: Item 4 and Item 1 were Identified to each other. Item 2, Item 5: Item 2 and Item 5 were Identified to each other. Item 2 and Item 5 were Eliminated to Item 1, Item 4, and Item 3. Based on their design features, the bullets are 38 caliber class (38/357/9mm) and are consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. Item 3: Item 3 was Eliminated to Item 1, Item 4, Item 2, and Item 5. Based on its design features, the bullet is 38 caliber class (38/357/9mm) and is consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics.
83NNRW	The bullets Item 1(known) were Identified to the bullet Item 4. The bullets Item 1(known) were Eliminated from the bullets Items 2, 3 and 5. The bullet Item 2 was Identified to the bullet Item 5. They are 38 caliber class (380/9mm) based on their design features. There are numerous firearms with similar rifling characteristics. The bullet Item 3 was Eliminated from the bullets Items 1(known), 2, 4 and 5. The bullet Item 3 is 38 caliber class (380/9mm) based on its design features. There are numerous firearms with similar rifling characteristics.
88QXTX	The Item 4 fired bullet was fired from the same firearm that fired the Item 1 known bullets. This identification is based on sufficient agreement of the combination of individual characteristics and all discernible class characteristics. The Items 2 and 5 fired bullets were fired from the same unknown firearm. This identification is based on sufficient agreement of the combination of individual characteristics and all discernible class characteristics. The Items 2, 3, and 5 fired bullets were not fired from the same firearm that fired the Item 1 known bullets. These eliminations are based on differences in class and/or individual characteristics. The Item 3 fired bullet was not fired from the same unknown firearm that fired the Items 2 and 5 fired bullets. This elimination is based on differences in class and individual characteristics. The Items 2 and 3 fired bullets that were eliminated from the Item 1 known bullets and that were eliminated from each other were used for General Rifling Characteristic search purposes. Items 2 and 3 are 38 caliber family fired bullets have conventional rifling consisting of six land and groove impressions and a right hand twist. Respectively, an Association of Firearm and Tool Mark Examiners General Rifling Characteristics Database search of possible firearms that could have fired Items 2 and 3 are attached. Note: The attached GRC searches may not be all-inclusive; any recovered firearms of the appropriate caliber-class may be submitted to the laboratory for comparison purposes. Note: There are a minimum of three firearms involved based on the submitted evidence.
89PZVU	A comparison of Items 2 through 5 to the test fired projectiles from Item 1 was performed. Based on the agreement of individual characteristics and all discernible class characteristics, it was determined that the projectiles from Item 4 was fired in Item 1. (Identification). The projectiles from Items 2, 3 and 5 has the same class characteristics as the projectiles from Item 1; however, because of the lack of sufficient suitable corresponding microscopic markings, it was not possible to identify Items 2, 3 and 5 as having been fired from the same firearm as the

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	projectiles from Item 1. (Inconclusive).
8AKHWV	Items 2, 3 and 5 were not discharged from the recovered firearm which was used to discharge Item 1. However, Item 2 and Item 5 were discharged from the same firearm. Item 4 was discharged from the recovered firearm which was used to discharge Item 1.
8CRZT7	Exhibit 4 was identified as having been fired in the same 9mm firearm that fired exhibit 1. Exhibits 2 and 5 were fired in a second 9mm firearm. Exhibits 2 and 5 were not fired in the same firearm as exhibits 1 and 4 based on differences in individual characteristics. Exhibit 3 was fired in a third 9mm firearm. Exhibit 3 was not fired in the same firearm as exhibits 1 and 4 or the same firearm as exhibits 2 and 5 based on differences in class characteristics.
8EWNBG	On 2020-06-29 during the performance of my official duties I received an intact sealed evidence bag with number PA4001966838 marked inter alia CTS 22-5261Q from Case Administration of the Ballistics Section. I opened the bag and found the following: 3.1: Three (3) 9mm calibre fired bullets marked by me "816TC1", "816TC2" and "816TC3" respectively. 3.2: Four (4) 9mm calibre fired bullets marked by me "369816/22" each and "2", "3", "4" and "5" respectively. 4. The intention and scope of this forensic examination comprise the following: 4.1: The examination and identification of fired bullets. 4.2: Microscopic individualisation 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 paragraphs 3.1 and 3.2 marked "816TC1", "816TC2", "816TC3" and "369816/22 4" respectively were fired from the same firearm. (1st firearm). 5.2: The bullets mentioned in paragraph 3.2 marked "369816/22" each and "2" and "5" respectively were fired from the same firearm. (2nd firearm). 5.3: The bullet mentioned in paragraph 3.2 marked "369816/22 3" was not fired from the firearms that discharged the bullets mentioned in paragraphs 5.1 and 5.2. (3rd firearm).
8HWY3A	The expended bullets contained in laboratory evidence items 1 and 4 were microscopically compared to each other with the following results. The expended bullets contained in laboratory items 1 and 4 were all identified as having been fired from the same firearm. The three bullets contained in item 1 were reportedly test fired from a 9mm Luger caliber, Beretta 92FS. The expended bullets contained in laboratory evidence item 1 were microscopically compared to expended bullets contained in items 2, 3, and 5 with the following results. Laboratory items 2, 3, and 5 were eliminated as having been fired in the same firearm as item 1. The expended bullets contained in laboratory evidence items 2 and 5 were microscopically compared to each other with the following results. Laboratory evidence items 2 and 5 could have been fired from the same firearm. They have the same general rifling characteristics and a significant amount of agreement of individual characteristics however an identification could not be made without an examination of the firearm to rule out subclass characteristics. The expended bullet contained in laboratory evidence item 3 was microscopically compared to expended bullets contained in items 2 and 5 with the following results. Laboratory item 3 was eliminated as having been fired in the same firearm as items 2 and 5.
8KJDQK	Examinations showed that Item 4 was discharged from the same firearm as the Item 1 test fired bullets. Examinations showed that Item 2, Item 3 and Item 5 were not discharged from the same firearm as the Item 1 test fired bullets.
8PAWXV	Item 4 was fired in the same firearm as the item 1 test fires. Items 2 and 5 were fired in a second firearm. Items 2 and 5 are consistent with bullets from ammunition designated 9mm Luger. A list of makes of firearms that may have fired these items is not provided due to its extensive length. Item 3 was fired in a third firearm. Item 3 is consistent with a bullet from

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	ammunition designated 9mm Luger. A list of makes of firearms that may have fired this item is not provided due to its extensive length.
8QMHJ4	Based on similar class characteristics and sufficient agreement of individual characteristics, it was determined that items 2 and 5 were identified as having been fired from the same firearm. Item 3 was eliminated as having been fired in the same firearm as 2 and 5 due to a difference in individual characteristics. Item 4 was eliminated as having been fired in the same firearm as 2 and 5 due to a difference in individual characteristics. Items 3 and 4 were eliminated as having been fired from the same firearm due to a difference in class characteristics. Based on similar class characteristics and sufficient agreement of individual characteristics, it was determined that item 4 was identified as having been fired from the same firearm as item 1 test fires (listed as being test fired from a Pietro Beretta, model 92F, 9mm Luger pistol). Items 2 and 5 were eliminated as having been fired in the same firearm as 1 test fires (listed as being test fired from a Pietro Beretta, model 92F, 9mm Luger pistol) due to a difference in individual characteristics. Item 3 was eliminated as having been fired in the same firearm as 1 test fires (listed as being test fired from a Pietro Beretta, model 92F, 9mm Luger pistol) due to a difference in class characteristics.
8R4EB4	Item 1 is matching with Item 4 only, while Item 2, Item 3 & Item 5 doesn't match with any of the three bullets fired using the recovered firearm (know) Item 1.
8UAY2N	The submitted bullets were physically, visually, and microscopically examined, and their characteristics noted. Item numbers: 2, 3, 4 and 5 are consistent in size, weight and physical appearance with 9mm /.38 caliber bullets. The four recovered bullets were microscopically compared to each other and to the test bullets from item number 1. Item number 4 displayed matching class rifling characteristics and areas of corresponding individual characteristics with the test bullets from item number 1. Item number 4 was microscopically identified as having been fired thru the same barrel as the test bullets from item number 1 (IDENTIFICATION). Item numbers 2 and 5 displayed matching class rifling characteristics and areas of corresponding individual characteristics with each other. Item numbers 2 and 5 were microscopically identified as having been fired thru the same barrel (IDENTIFICATION). Different areas of individual characteristics were noted when item numbers 2 and 5 were compared to the test bullets from item number 1. The different areas of individual characteristics allowed these two bullets (item numbers 2 and 5) to be eliminated as having been fired in the same gun that fired the test bullets (item number 1) (ELIMINATION). Item number 3 displayed generally similar class rifling characteristics as the test bullets from item number 1 and the three additional recovered bullets (item numbers 2, 4 and 5). No significant areas of corresponding individual characteristics were observed when item number 3 was microscopically compared to item numbers 1, 2, 4 and 5. Item number 3 was eliminated as having been fired thru the same barrel as item numbers 1, 2, 4 and 5 (ELIMINATION).
8VGCHQ	The projectile identified as item 4: second bullet recovered from the scene (questioned), was shot in the gun pistol type, pietro beretta, model 92f, which was seized from the trunk of a vehicle. Uniprocedent match (positive). The projectiles identified as item 2, 3 y 5, were not fired in the pistol-type firearm, pietro beretta, model 92f, which was seized from the trunk of a vehicle. Not Uniprocedent match (negative).
8WCUKR	Examination of Items 1.2 through 1.5 reveals four (4) fired copper jacket lead round nose bullets consistent with 9mm caliber ammunition. All four (4) fired bullets have cut rifling with six (6) lands and six (6) grooves with a right hand twist. Microscopic examination and comparison of the test fired bullets in Item 1.1 to Item 1.4 reveals agreement of all discernable class characteristics along with areas of corresponding individual characteristics establishing that 1.4

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	was fired from the same firearm that fired the bullets in Item 1.1. Microscopic examination and comparison of the test fired bullets in Item 1.1 to Items 1.2, 1.3 and 1.5 reveals disagreement of individual characteristics establishing that Items 1.2, 1.3 and 1.5 were not fired from the same firearm that fired the bullets in Item 1.1. Microscopic examination and comparison of Item 1.2 to 1.5 reveals agreement of all discernable class characteristics along with areas of corresponding individual characteristics establishing that Items 1.2 and 1.5 were fired from the same unknown 9 mm caliber firearm. Microscopic examination and comparison of Items 1.2 and 1.5 to Item 1.3 reveals disagreement of individual characteristics establishing that Item 1.3 was not fired from the same unknown 9 mm caliber firearm that fired Items 1.2 and 1.5.
8X9DK8	Item 2 was microscopically identified as having been fired from the same firearm as Item 5. Items 2 and 5 were determined to be of 9mm caliber, displaying rifling characteristics of six lands and grooves, right twist. Manufacturers of firearms that display similar rifling characteristics include, but are not limited to Astra, Beretta, Browning, Ceska, Zbrojovka, Colt, Fabrique Nationale, Heckler and Koch, IMI (Uzi), Keltec, Llama, Norinco, Ruger, Smith and Wesson, Tanfoglio (EAA), Taurus, and Walther. Item 2 was not fired from the same firearm as Item 1c (test). Item 3 was not fired from the same firearm as Item 1c (test). Further, Item 3 was not fired from the same firearm as Item 2. Item 3 was determined to be of 9mm 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, Browning, Ceska Zbrojovka, Colt, Heckler and Koch, IMI (Uzi), Keltec, Norinco, Ruger, SigSauer, Springfield Inc., Tanfoglio (EAA), Taurus, and Walther. Item 4 was microscopically identified as having been fired from the same firearm as Item 1c (test). Item 4 was determined to be of 9mm Luger caliber, displaying rifling characteristics of six lands and grooves, right twist.
9B8KUU	One of the bullets (4) was fired from the Pietro Beretta model 92F pistol (1). Two of the bullets (2, 5) were fired in the same firearm. Two of the bullets (2, 5) were not fired in the same firearm as was one of the bullets (3), bullet (4) or from the Pietro Beretta model 92F pistol (1). Two of the bullets (2, 5) are consistent with 38 caliber class and were fired from a firearm with six lands and grooves inclined to the right. Possible firearms from which two of the bullets (2, 5) may have been fired include, but are not limited to 357 Magnum caliber firearms marketed by Taurus and Rossi, 38 Special caliber firearms marketed by Rossi, Llama, Taurus, 38 Super Auto caliber firearms marketed by EEA Corp, and 9mm Luger caliber firearms marketed by Norinco, Heckler & Koch, Beretta, Ruger, Keltec, Browning, and Walther among other firearms not commonly encountered in this laboratory. One of the bullets (3) was not fired from the Pietro Beretta model 92F pistol (1). One of the bullets (3) was not fired from the same firearm as any of the other three bullets (2, 4, 5). The bullet (3) is consistent with 38 caliber class and was fired from a firearm with six lands and grooves inclined to the right. Possible firearms from which the bullet (3) may have been fired include, but are not limited to, 357 Magnum caliber firearms marketed by Astra, 38 Special caliber firearms marketed by Rossi, Llama, Taurus, 38 Super Auto caliber firearms marketed by EEA Corp, and 9mm Luger caliber firearms marketed by Norinco, Heckler & Koch, Intratec, Ruger, and Taurus among other firearms not commonly encountered in this laboratory. Three of the bullets (2, 3, 5) are suitable for comparison to a firearm if one is recovered.
9CFZ2Z	Items 1 through 5 were examined and analyzed using microscopy. The Item 1 bullets were identified as having been fired from the same firearm based on corresponding class and individual characteristics. The Item 4 caliber 38 class bullet was identified as having been fired from the same firearm as the Item 1 bullets based on corresponding class and individual characteristics. The Items 2 and 5 caliber 38 class bullets were identified as having been fired from the same firearm based on corresponding class and individual characteristics. The Item 3

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	caliber 38 class bullet was eliminated as having been fired from the same firearm as the Items 2 and 5 bullets due to differences in individual characteristics. The Items 2, 3 and 5 bullets were eliminated as having been fired from the same firearm as the Items 1 and 4 bullets due to differences in individual characteristics. Firearms that produce general rifling class characteristics like those present on Items 2 and 5 are too numerous to list. Firearms that produce general rifling class characteristics like those present on Item 3 are too numerous to list.
9ERJF6	Item #4 (B3) was identified as having been fired from Item #1 (P1). Item #3 (B2) when compared against Item #4 (B3) and Item #1 (P1) displayed insufficient corresponding microscopic markings to permit an identification or an elimination. Items #2, 5 (B1, B4) were identified as having been fired from the same firearm (not P1).
9NGCJN	After microscopic comparison, it was determined that Item# 4 was fired from Item# 1 based on sufficient agreement of class and individual characteristics of the land impression marks. After microscopic comparison, it was determined that Items# 2 and 5 were fired from the same firearm based on sufficient agreement of class and individual characteristics of the land impression marks. Item# 3 was not discharged from Item# 1 based on differences of class characteristics (land and groove widths). Item# 3 was not discharged from the same firearm as Items# 2 and 5 based on differences of individual characteristics.
9QKUZ6	Based on microscopic comparisons, it was determined that Items 1 and 4 were fired from the same firearm (reportedly a 9mm Luger caliber Beretta, model 92F, semiautomatic pistol). Based on microscopic comparisons, it was determined that Items 2 and 5 were both fired from a second unrecovered firearm. Microscopic comparisons, between Items 1 and 3, were inconclusive. There was some disagreement of individual characteristics observed; however, reproducibility could not be assessed with respect to Item 3. As a result, a more definitive conclusion could not be rendered at this time.
9YFV8W	By means of microscopic comparison, the bullets, (items 1 and 4) were identified as having been fired from the same firearm. This qualitative identification is based on the agreement of all discernible class and sufficient agreement of individual characteristics. Using comparison microscopy, a difference in class/individual characteristics were observed. Therefore, the bullets (items 2, 3, and 5) could not have been fired from same firearm as the bullets (item 1). By means of microscopic comparison, the bullets, (items 2 and 5) were identified as having been fired from the same firearm. This qualitative identification is based on the agreement of all discernible class and sufficient agreement of individual characteristics.
A2DZ32	Items 1 through 5 were microscopically examined. Item 4, a caliber 9mm Luger full metal jacketed bullet, was identified as having been fired from the firearm represented by Item 1, based on corresponding class and individual characteristics. Due to differences in individual characteristics, Items 2 and 5, each a caliber 9mm Luger full metal jacketed bullet, were eliminated as having been fired from the firearm represented by Item 1. Items 2 and 5 were identified as having been fired from the same firearm, based on corresponding class and individual characteristics. Firearms that produce general rifling class characteristics like those present on these items are too numerous to list. Due to differences in class characteristics, Item 3, a caliber 9mm Luger full metal jacketed bullet, was eliminated as having been fired from the firearm represented by Item 1 and the same firearm as Items 2 and 5. Firearms that produce general rifling class characteristics like those present on Item 3 include the following caliber 9mm Luger pistols. - FN/Browning, Ruger, Springfield Armory, Tanfoglio, Taurus and Walther This list is not all encompassing; it is possible another brand of firearm produced general rifling class characteristics like those present on Item 3 and is not listed due to the content of the

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	databases searched.
A7WZE2	Comparisons performed between the test fired bullets (Item 1) and the bullet (Item 4) resulted in an identification. The bullet (Item 4) was identified as having been fired from the barrel of the firearm. Comparisons performed between the test fired bullets (Item 1) and the remaining bullets (Items 2, 3, and 5) resulted in an exclusion. The bullets (Items 2, 3, and 5) were NOT fired from the barrel of the firearm. Comparisons performed between the bullet (Item 2) and the bullet (Item 5) resulted in an identification. Comparisons performed between the bullet (Item 2) and the bullet (Item 3) resulted in an exclusion.
A9GUB2	Specimen 4 was fired from the Beretta pistol, model 92F. Specimens 2 and 5 were fired from the same firearm; however, they were not fired from the Beretta pistol, model 92F. Specimen 3 did not possess sufficient individual markings for any conclusion to be made.
AB69XQ	Projectile No. 4 and three (3) projectiles of item No. 1, all of caliber 9 mm are single origin and were fired from the Pietro beletta Model 92F pistol.
ACHVBY	[No Conclusions Reported.]
AGVJ8N	SINGLE ORIGIN: Positive comparative comparison between Pietro Beretta Model 92F bullet with item 4. NO SINGLE ORIGIN: Comparative comparison between bullets from the Pietro Beretta Model 92F weapon with items 2, 3 and 5. SINGLE ORIGIN between the bullets of items 2 and 5.
AHQYL8	2.1: The bullet mentioned in 3.2 marked 338027/22 (item 4) was fired from the same firearm with the tests marked 027 1TB1, 027 1TB2,027 1TB3 (item 1). 2.2: The bullets mentioned in 3.2 marked 338027/22 (item 2 and 5) were negative with tests mentioned in 3.1 marked 027 1TB1, 027 1TB2,027 1TB3 (item 1). 2.3: The bullet mentioned in 3.2 marked 338027/22 (item 3) were negative with tests mentioned in 3.1 marked 027 1TB1, 027 1TB2,027 1TB3 (item 1).
ALQCZJ	Items 2, 3, 4, 5: A microscopic comparison was conducted between Test bullet # A, Item 1, that was fired from the recovered firearm and Items 2, 3, 4 and 5. The examinations determined that Item 4 was fired from the recovered firearm, due to a sufficient agreement between striations. The examinations determined that Items 2, 3 and 5 were not fired from the recovered firearm due to a disagreement of individual characteristics. A microscopic comparison was conducted between Items 2, 3 and 5. The examinations determined that Items 2 and 5 were fired from the same firearm due to a sufficient agreement between striations. The examinations determined Item 3 was fired from a different firearm than Items 2 and 5 due to a disagreement of individual characteristics. Disposition: The above listed evidence will be forwarded to the Property Custody Section. All firearm comparison examinations were conducted using the AFTE's (Association of Firearm & Tool Mark Examiners) Theory of Identification. Identifications are the opinion of a qualified examiner that two tool marks were made by the same tool based on sufficient agreement of individual characteristics. The agreement of individual characteristics is of a quantity and quality that the likelihood another (different) tool could have made the mark is so remote as to be considered a practical impossibility. All exclusions and inconclusive findings were based upon exemplars available at the time of the examinations.
AM4YHX	Bullets marked item 2, 3 and 5 had not been fired by the recovered firearm. The bullet marked item 4 was fired from the recovered firearm. More than one firearm was used at the scene.
AMXPLR	I concluded that the recovered questioned bullet, Item 4, was fired in the same firearm as the known bullet, Item 1. I also concluded that the recovered questioned bullets, Items 2 and 5

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	were both fired in the same firearm. I also concluded that the questioned bullet, Item 3 was fired in a third firearm. I concluded that three (3) firearms were used to fire the above recovered questioned bullets, Items 1 to 5.
ANPXLU	Examinations showed Item 4 was discharged from the same firearm as Item 1. Examinations showed Item 2 was discharged from the same unknown firearm as Item 5. Examinations showed Item 3 was not discharged from the same firearms as Items 1, 2, 4 or 5.
ATP3J9	Submission 004: The projectile was identified to the submission 001 Beretta pistol. Submission 002 , 003, and 005: These projectiles were eliminated from the submission 001 pistol.
AYT2Y6	Results of Examinations: Item 2 through Item 5 are .38 caliber copper full-metal jacketed bullets that were fired from barrels rifled with six grooves, right twist. The Item 4 bullet was identified as having been fired from the same barrel as the Item 1 bullets. The Item 2 bullet was identified as having been fired from the same barrel as the Item 5 bullet. A pattern examination between the Item 1/4 bullets and the Item 2/5 bullets was inconclusive due to insufficient quality and/or quantity of corresponding individual characteristics. The Item 3 bullet was excluded, based on measurable differences in land and groove impressions, as having been fired from the same barrels as the Item 1, 2, 4, and 5 bullets.
BBLNTU	Items 2 and 5 (fired bullets) are identified as having been fired from the same firearm. Item 4 (fired bullet) is identified as having been fired from the same firearm as Items T-1A, T-1B and T-1C (submitted known fired bullets). Item 3 (fired bullet) is eliminated as having been fired from the same firearm as Items 2, 4 and 5 (fired bullets) and T-1A, T-1B and T-1C (submitted known fired bullets). There are differences in class characteristics (rifling, land and groove measurements). Items 2 and 5 (fired bullets) are inconclusive as having been fired from the same firearm as Items 4 and T1-A, T1B and T-1C (fired bullet and submitted known fired bullets). These items share agreement of class characteristics, but disagreement of the individual characteristics observed in the land and groove markings. The disagreement observed suggests these items were fired from different a different firearm. Submission of those firearms is necessary for further examination. Items 2, 3 and 5 are consistent with being .38 caliber class fired metal jacketed bullet displaying conventional rifling specifications of six lands and grooves with a right twist. Conclusion Scale for Microscopic Comparisons: The following descriptions are meant to provide context to the levels of opinions reached in this report. Identification: This is the strongest statement of association that can be expressed. An identification is made to a degree of practical certainty when there is agreement of all discernible class characteristics and sufficient agreement of the individual characteristics of toolmarks. When sufficient agreement exists, in part, this means the likelihood of another tool producing the same marks is so remote it is considered a practical impossibility. Elimination: This is the strongest statement of non-association that can be expressed. An elimination is made when it is physically impossible (i.e., there is a clear, demonstrable incompatibility in class characteristics) for the items to have been marked by the same tool/fired in the same firearm. Inconclusive: An inconclusive is made when one of the following situations is true. Agreement of all discernible class characteristics and some agreement of individual characteristics, but insufficient for identification. Agreement of all discernible class characteristics without agreement or disagreement of individual characteristics due to an absence, insufficiency, or lack of reproducibility. Agreement of all discernible class characteristics and disagreement of individual characteristics. Unsuitable: An item is considered unsuitable for comparison when it does not bear any class, subclass, and/or individual toolmarks of value for microscopic comparison.
BCWM2U	Upon microscopic examination; it can be concluded that Item 002 (Q1) and Item 005 (Q4)

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	were fired within the same barrel due to consistent class characteristics and sufficient agreement of individual characteristics. It can further be concluded that Item 003 (Q2), Item 004 (Q3) were fired within the same barrel due to consistent class characteristics and sufficient agreement of individual characteristics. It can also be concluded that the known standards from the Bereta Model 92F handgun were consistent in class and individual characteristics as Item 003 (Q2) and Item 004 (Q3). Therefore it can be concluded that the barrel of the Beretta was a contributor to Item 003 (Q2) and item 004 (Q3). Furthermore, it cannot be determined whether or not item 002 (Q1) and Item 005 (Q4) were from the Beretta barrel due to not physically having the firearm present. It is unknown whether there were alterations done to the barrel of this handgun and therefore result in an inconclusive conclusion.
BD8JB6	Item 1A and Item 4: The Item 4 bullet is Identified to Item 1A. Item 2 and Item 5: The bullets are Identified to each other. The bullets were Eliminated to the Item 3 bullet, based on a difference in class characteristics. Item 3: The bullet is Eliminated to the Item 1A-1C, Item 2, Item 4, and Item 5 bullets, based on a difference in class characteristics.
BDQC2G	Results/Conclusions: 1) The Exhibit 1 bullets and the Exhibit 4 bullet were all fired in the same firearm, reportedly a recovered Beretta pistol. 2) The Exhibit 1 bullets were excluded from having been fired in the same firearm as the Exhibit 2, 3, & 5 bullets. 3) The Exhibit 2 & 5 bullets were fired in the same firearm. Possible firearms include those manufactured by: Beretta, FN/Browning, Ceska Zbrojovka (CZ), Diamondback, FEG, FMJ/Cobray, Heckler & Koch, Kahr Arms, Kel-tec, Masterpiece Arms, Polymer80, Remington, Ruger, SAR arms/Sarsilmaz, Sig Sauer, Springfield Armory, Tanfoglio, Taurus, or Walther firearms in 9mm Luger caliber. This list is not all-inclusive and does not exclude other firearms having similar general rifling characteristics. 4) The Exhibit 3 bullet was excluded from having been fired in the same firearm as the Exhibit 2 & 5 bullets. Possible firearms include those manufactured by: 80 Percent Arms, Beretta, FN/Browning, Ceska Zbrojovka (CZ), Heckler & Koch, Kahr Arms, Kel-tec, Polymer80, Remington, Ruger, SAR arms/Sarsilmaz, Sig Sauer, Springfield Armory, Sterling Arms, Tanfoglio, Taurus, or Walther firearms in 9mm Luger caliber. This list is not all-inclusive and does not exclude other firearms having similar general rifling characteristics.
BPKUMP	Item #4 (fired metal jacketed bullet) is identified as having been fired in the same firearm as Items #1A, #1B, & #1C (known test fired bullets from a Beretta pistol). Items #2 and #5 (fired metal jacketed bullets) are identified as having been fired in the same firearm. Items #2 and #5 (fired metal jacketed bullets) are inconclusive as having been fired in the same firearm as Items #1A, #1B, & #1C (known test fired bullets from a Beretta pistol). These items share agreement of class characteristics, but display disagreement of the individual characteristics observed in the land impressions. The disagreement observed suggested Items #2 and #5 were fired in a different firearm. Submission of that firearm is necessary for further examination. Item #3 (fired metal jacketed bullet) is inconclusive as having been fired in the same firearm as Items #1A, #1B, & #1C (known test fired bullets from a Beretta pistol). This item shares agreement of class characteristics, but lacks sufficient agreement of individual characteristics observed in the land impressions. Item #3 (fired metal jacketed bullet) is inconclusive as having been fired in the same firearm as Items #2 and #5 (fired metal jacketed bullets). These items share agreement of class characteristics, but disagreement of the individual characteristics observed in the land impressions. The disagreement observed suggested these items were fired in different firearms. Submission of those firearms is necessary for further examination. The following items are consistent with being .38 caliber class fired metal jacketed bullets displaying conventional rifling specifications of six lands and grooves with a right twist. Physical characteristics and rifling specifications are consistent with bullets fired from 9mm / .38 / .380 / .357 caliber firearms produced by numerous manufacturers. Therefore, no

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	suspected firearms should be overlooked: Items #2 and #5. Item #3. Conclusion Scale for Microscopic Comparisons: The following descriptions are meant to provide context to the levels of opinions reached in this report. Identification: This is the strongest statement of association that can be expressed. An identification is made to a degree of practical certainty when there is agreement of all discernible class characteristics and sufficient agreement of the individual characteristics of toolmarks. When sufficient agreement exists, in part, this means the likelihood of another tool producing the same marks is so remote it is considered a practical impossibility. Elimination: This is the strongest statement of non-association that can be expressed. An elimination is made when it is physically impossible (i.e., there is a clear, demonstrable incompatibility in class characteristics) for the items to have been marked by the same tool/fired in the same firearm. Inconclusive: An inconclusive is made when one of the following situations is true: Agreement of all discernible class characteristics and some agreement of individual characteristics, but insufficient for identification. Agreement of all discernible class characteristics without agreement or disagreement of individual characteristics due to an absence, insufficiency, or lack of reproducibility. Agreement of all discernible class characteristics and disagreement of individual characteristics. Unsuitable: An item is considered unsuitable for comparison when it does not bear any class, subclass, and/or individual toolmarks of value for microscopic comparison.
BRR7CQ	RESULTS OF EXAMINATION: K1 Bullets: The bullets were examined and determined to be three (3) fired, nominal 38 caliber (9mm), full metal (copper) jacket bullets with 6R conventional rifling characteristics. RESULTS OF EXAMINATION: QB2-QB5 Fired Bullets: QB2-QB5 were examined and determined to be four (4) fired, nominal 38 caliber (9mm) full metal (copper) jacket bullets each with 6R conventional rifling characteristics. QB2-QB5 were microscopically compared to the fired bullets TF1-TF3 from K1. It is my opinion that QB4 was fired by K1 based on sufficient agreement of markings seen in the land engraved areas of the rifling. See photos for areas of comparison. QB2, QB3, and QB5 were excluded as having been fired by K1.
BTGFER	Items 1 and 4: The bullets Items 1 and 4 were Identified as having been fired from the same firearm. Items 2 and 5: These bullets were Identified as having been fired from the same (second) firearm, and Eliminated from the bullets Items 1 and 4. Items 2 and 5 have design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. Item 3: The Item 3 bullet was Eliminated from bullets Items 1, 2, 4 and 5. Item 3 has design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics.
BW6RJC	A microscopic comparison was conducted between Test bullets #1 through #3, Item #1 and Items #2, #3, #4 and #5. The examinations determined that Item #4 was fired from the same firearm as Item #1 due to a sufficient agreement between striations. The examinations determined that Items #2, #3 and #5 were not fired from the same firearm as Item #1 due to a disagreement of individual characteristics. A microscopic comparison was conducted between Items #2, #3 and #5. The examinations determined that Items #2 and #5 were fired from the same firearm due to a sufficient agreement between striations. The examinations determined that Item #3 was fired from the different firearm than Items #2 and #5 due to a disagreement of individual characteristics.
C42292	Item 4 was fired from the same barrel, or from a barrel with the same class characteristics made at or near the same time on the same tooling, as the known bullets (Item 1). Items 2 and 5 were not fired from the barrel that fired Item 1, but they were fired from the same barrel, or from a barrel with the same class characteristics made at or near the same time on the same

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	tooling, as each other. Item 3 was not fired from the barrel that fired Item 1 or the barrel that fired Items 2 and 5.
C4JV8Q	The bullets No. 4 where shot from the same weapon as the three expended cartridge bullets discharged from the suspect's weapon (No. 1). Bullets No. 2 and 5 where shot from the same weapon other than three expended cartridge bullets (No. 1).
C4WNMQ	Items 2 and 5 have physical and design characteristics consistent with being .38/.357/9mm caliber. A list of firearms that could have fired them is too large for inclusion in this report, but can be provided upon request. Item 3 has physical and design characteristics consistent with being .38/.357/9mm caliber. A list of firearms that could have fired it is too large for inclusion in this report, but can be provided upon request. Item 4 and Item 1 (test fired bullets) were microscopically examined and compared. Based on observed agreement of class characteristics and sufficient agreement of individual characteristics, Item 4 was identified as having been fired from the same firearm that fired Item 1 (Beretta 92F handgun). Items 2 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 3, 4 and Item 1 (test fired bullets) were microscopically examined and compared. Agreement of class characteristics was observed. However, there is insufficient agreement or disagreement of individual characteristics to either identify or eliminate Item 3 as having been fired from same firearm that fired Items 1 and 4 (Beretta 92F handgun). Items 2, 3, 4, 5, and Item 1 (test fired bullets) were microscopically examined and compared. Based on observed disagreement of individual characteristics, Items 3, 4, and Item 1 (test fired bullets) were eliminated as having been fired from same firearm that fired Items 2 and 5.
C738LL	The bullet (item 2) described in ID EMP 1, shares the same class and individual characterictics with the bullet (item 5) described in ID EMP 2, that is, they are UNIPRODUCED (they were fired by the same firearm). The bullet (item 3) described in ID EMP 2, does not coincide in class characteristics such as the width of the groove and lands with the bullets (item 2, 4, and 5), was fired by a different firearm. After carrying out the comparative microscopic study of shells and bullets between the bullets (items 2, 3, 4, 5) and the reference sample bullets (item 1), it is concluded that there is total agreement or concordance between the class characteristics and/or characteristics between the bullet (item 4) and the bullets (item 1) are UNIPRODUCED, (they were fired by the same firearm).
C7PFWB	items 1 and 4 were fired from the same weapon, Beretta 92F pistol. items 2 and 5 were fired from another weapon. Item 3 was fired by a 3rd weapon. Best regards
C9QLAW	[No Conclusions Reported.]
CAL4AC	Items 1 and 4 were identified as having been fired by the same firearm based on agreement of class and individual characteristics. Items 2 and 5 were identified as having been fired by the same firearm based on agreement of class and individual characteristics. Item 3 was eliminated as having been fired by the same firearms that fired Items 1, 2, 4 and 5 based on differences in class characteristics. Items 1 and 4 were eliminated as having been fired by the same firearm that fired Items 2 and 5 based on differences in individual characteristics.
CCP473	Bullet Analysis: Methodology: Physical (Visual Examination), Electronic Balance/Digital Caliper/Digital Micrometer, Microscopy (Comparison Microscope). Items 2, 3, 4, and 5 are 38 caliber class bullets based upon the diameter. Item 4, the bullet, was fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the bullets, based upon corresponding class and individual microscopic characteristics. Items 2 and 5, the bullets, were fired through

TABLE 2

WebCode	Conclusions
	the barrel of the same firearm based upon corresponding class and individual microscopic characteristics. Items 2 and 5, the bullets, the bullets, were not fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the bullets, based upon different individual microscopic characteristics. Item 3, the bullet, was not fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the bullets, based upon different class characteristics. Item 3, the bullet, was not fired through the barrel of the same firearm as Items 2 and 5, the bullets, based upon different class and individual microscopic characteristics. Opinion/Interpretation: Items 2, 3, 4, and 5 are consistent with bullets loaded in 9mm Luger, .357 SIG, .38 Special, and .357 Magnum caliber cartridges based upon the weight and style.
CDNZY8	2.1 The bullets mentioned 3.1.1 marked item 1 and 3.4.1 marked with lab number 338024/22 item 1 and item 4 were fired from the same firearm 2.2 The bullets mentioned 3.2.1 and 3.5.1 marked with lab number 338024/22 item 2 & item 5 were fired from one firearm but not the same firearm as those in item 1 and item 4. 2.3 The bullets mentioned 3.3.1 and 338024/22 item 3 was fired from another firearm as item 1 but not the same firearm as those in item 1 and item 4.
CL3TB3	Items 1A, 1B and 1C were three nominal 9mm/.38 bullets (includes 9mm Luger) reportedly fired from the recovered firearm (known). All three bullets were fired by a gun with six lands and grooves of conventional right twist rifling. Items 2, 3, 4 and 5 (the questioned bullets) were all nominal 9mm/.38 bullets (includes 9mm Luger) fired by a gun with six lands and grooves of conventional right twist rifling. Item 4 was compared to items 1A, 1B and 1C (knowns) using a comparison microscope. Sufficient agreement of class and individual characteristics was observed to conclude that item 4 was fired from the same firearm as the known bullets (item 1). Item 2 was compared to item 5 using a comparison microscope. Sufficient agreement of class and individual characteristics was observed to conclude that item 2 was fired from the same firearm as item 5. Item 2 was compared to items 1A, 1B and 1C (knowns) using a comparison microscope. Although class characteristics agreed significant disagreement of individual characteristics was observed to conclude that item 2 was not fired from the same firearm as the known bullets (item 1). Item 5 was compared to items 1A, 1B and 1C (knowns) using a comparison microscope. Although class characteristics agreed significant disagreement of individual characteristics was observed to conclude that item 5 was not fired from the same firearm as the known bullets (item 1). Item 3 was compared to items 1A, 1B and 1C (knowns) using a comparison microscope. Differences in class characteristics and significant disagreement of individual characteristics were observed to conclude that item 3 was not fired from the same firearm as the known bullets (item 1).
CLJZH7	When comparing the tested fired bullets Item 1 with the bullets Items 2 to 5, it was determined that due to matches in the individual trace areas, the questioned bullet Item 4 was fired from the seized pistol Beretta Model 92F. The bullets Item 2, Item 3 and Item 5 do not match the individual striations with the test firings Item 1. Consequently, they were not fired in the seized Beretta 92 F weapon. The bullets Item 2 and Item 5 show similarities in the individual trace areas. They were therefore fired in one firearm, but not from the seized Beretta 92F weapon. The bullet Item 3 was neither fired from the seized weapon nor from the same firearm as the bullets Item 2 and Item 5, it was fired from a third (unknown) weapon.
CN8GN8	Exhibit 4 was fired from the same firearm (9mm caliber Pietro Beretta pistol, model 92F) used to produce the test fired bullets described in exhibit 1; based on sufficient agreement of individual characteristics. Exhibits 2 and 5 were fired by the same unknown firearm based on sufficient agreement of individual characteristics. Exhibit 3 was eliminated from being fired from the same firearms used to fire exhibits 1, 2, 4 and 5, based on differences of class characteristics (LIMP width).

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CTJJFU	One of the four copper jacketed bullets (Item 4) was fired from the same firearm as the copper jacketed bullets (Item 1) reportedly fired from a Beretta pistol. Two of the four copper jacketed bullets (Items 2 and 5) were fired from a second firearm. The remaining copper jacketed bullet (Item 3) was fired from a third firearm.
CV8Y66	Item 1 fired using the recovered firearm (known) positive with Item 4. Therefore Item 4 second bullet recovered from the scene (questioned) was fired from PB Model 92F. Item 2 and Item 3 are positive with each other therefore there were fired from the same firearm (2nd firearm). Item 5 negative with the others, therefore was fired from 3rd firearm.
D3JE8X	I compared Item 001-04 to Item 001-1A and observed agreement of all discernable class characteristics and sufficient agreement of individual characteristics to conclude that Item 001-04 was fired in the Beretta brand pistol. I observed agreement of all discernable class characteristics between Items 001-02 and 001-05. The possible individual characteristics have a high potential for subclass influence, but subclass could not be evaluated in the absence of the firearm that produced these bullets. Therefore I concluded Items 001-02 and 001-05 were likely fired in a single firearm but could not reach a stronger conclusion at this time. I compared Item 001-02 to a test fired bullet (001-1A) from the Beretta brand pistol. I observed agreement of all discernable class characteristics but differences between the individual characteristics of Item 001-1A and the possible individual characteristics present in Item 001-02. Therefore, Items 001-02 and 001-05 were not fired in the Beretta brand pistol. Item 001-03 had land and groove widths of a different size than all other submitted bullets; therefore, it was not fired in the Beretta pistol or the pistol(s) that fired Items 001-02 and 001-05.
D4DXD7	2.1: The bullets mentioned in 3.2 marked with lab number 338027/22(item 4) was fired from the same firearm as tests mentioned in 3.1 marked 027 1TB1, 027 1TB2,027 1TB3 (all item 1) (item 4 positive with item 1). 2.2: The bullet mentioned in 3.2 marked 338027/22 (item 2 and 5) were negative with tests mentioned in 3.1 marked 027 1TB1, 027 1TB2,027 1TB3 (item 1). 2.3: The bullet mentioned in 3.2 marked 338027/22 (item 3) were negative with tests mentioned in 3.1 marked 027 1TB1, 027 1TB2,027 1TB3 (item 1).
D4E2K3	Bullet Analysis: Methodology: Physical (Visual Examination), Electronic Balance/Digital Caliper/Digital Micrometer, Microscopy (Comparison Microscope). Items 2, 3, 4 and 5 are 38 caliber class bullets. Opinion/Interpretation: Items 2, 3, 4 and 5 are consistent with bullets loaded in 9mm Luger caliber cartridges based upon the weight and style. Items 2, 3 and 5, the bullets exhibit characteristics found in (but not limited to) the following firearms: Beretta, KelTec, Ruger, Sig Sauer, Springfield INC., Tanfoglio (EAA) and Taurus 9mm Luger caliber firearms. Items 2 and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics. Items 2 and 5, the bullets, were not fired through the barrel of the same firearm as Items 1A, 1B and 1C, the bullets, based upon different individual microscopic characteristics. Item 3, the bullet, was not fired through the barrel of the same firearm as Items 1A, 1B and 1C, the bullets, nor the barrel of the same firearm as Items 2 and 5, the bullets, based upon different class characteristics. Item 4, the bullet, was fired through the barrel of the same firearm as Items 1A, 1B and 1C, the bullets, based upon corresponding class and individual microscopic characteristics.
D4TGX4	2.1: Item 4 was fired from the same firearm as item 1 (known Firearm). 2.2: Items 2,3 and 5 were not fired from the (Pietro Berretta Model 92F). 2.3: The scenario might have consisted of three firearms.
D7JMC9	The Exhibit 1 test fired bullets were microscopically compared to each other and to the Exhibits

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	2 through 5 bullets. Based on an agreement of class characteristics and sufficient agreement of individual characteristics, the Exhibit 4 bullet was identified as having been fired from the same firearm as the Exhibit 1 bullets. The probability that the Exhibit 1 and 4 bullets were fired from a different firearm is so small that it is negligible. Based on an agreement of class characteristics and sufficient agreement of individual characteristics, the Exhibit 2 bullet was identified as having been fired from the same firearm as the Exhibit 5 bullet. The probability that the Exhibit 2 and 5 bullets were fired from a different firearm is so small that it is negligible. Based on a disagreement of individual characteristics, the Exhibit 1 and 4 bullets were excluded as having been fired from the same firearm as the Exhibit 2 and 5 bullets. The manufacturer of the firearm that could have fired Exhibits 2 and 5 includes, but is not limited to, 9mm caliber Beretta, Ruger, and Taurus pistols. This does not preclude the possibility of a make not listed being used. Based on disagreement of individual characteristics, the Exhibit 3 bullet was excluded as having been fired from the same firearm as the bullets in Exhibits 1, 2, 4 and 5. The manufacturer of the firearm that could have fired Exhibit 3 includes, but is not limited to, 9mm caliber Beretta, Ruger, and Taurus pistols. This does not preclude the possibility of a make not listed being used.
D8BQYN	The Items 01-01 and 01-04 bullets were identified as having been fired from the same unknown firearm. The Items 01-02 and 01-05 bullets were unable to be identified or eliminated as having been fired from the same firearm as the Item 01-01 and 01-04 bullets due to a lack of reproducible marks. The Items 01-02 and 01-05 bullets were identified as having been fired from the same unknown firearm. The Item 01-03 bullet was eliminated as having been fired from the same unknown firearm(s) as the Items 01-01, 01-02, 01-04, or 01-05 bullets. The Item 01-03 bullet was fired from an unknown 38 caliber class firearm with six conventionally rifled lands and grooves with a right hand twist. Calibers within the 38 caliber class include, but are not limited to, 9mm Luger, 357 Sig, and 38 Super Auto. Possible manufacturers of the firearm that could have fired this bullet include, but are not limited to, FN/Browning, Norinco, Radom, Ruger, Springfield Armory, Tanfoglio, Taurus, and Walther.
D8DBV4	Based on an agreement of class and individual characteristics, Item 4 was identified as having been fired by the same firearm that reportedly fired Item 1. Based on an agreement of class and individual characteristics, Items 2 and 5 were identified as having been fired by the same unknown firearm. Microscopic comparisons of the individual characteristics observed on Item 3 did not reveal sufficient detail to identify or eliminate it as having been fired by the same unknown firearm as Items 2 and 5. Items 2, 3 and 5 were eliminated as having been fired by the same firearm that reportedly fired Item 1 based on differences in class characteristics.
DAN7K3	Items 1A, 1B, 1C, 4: The Item 1B bullet was Identified to the Item 4 bullet. Items 1A and 1C were used for comparison purposes. Items 2, 5: The Item 2 bullet was Identified to the Item 5 bullet. The Item 2 bullet is 38 caliber class (38/357/9mm) based on its design features. There are numerous manufacturers of firearms with similar rifling characteristics. Item 3: The Item 3 bullet was Eliminated to the Item 1A, 1B, 1C, 2, 4, and 5 bullets. The Item 3 bullet is 38 caliber class (38/357/9mm) based on its design features. There are numerous manufacturers of firearms with similar rifling characteristics.
DFB46J	Through microscopic examination and comparison, it was determined that [Lab] Items 001-01 and 001-04 were fired by a single firearm. Through microscopic examination and comparison, it was determined that [Lab] Items 001-02 and 001-05 were fired by a second firearm. Through microscopic examination and comparison, it was determined that [Lab] Item 001-03 was not fired by the same firearms as [Lab] Items 001-01, 001-02, 001-04, and 001-05.
DG343U	In my opinion, a exhibit fired bullet recovered from the scene (Item 4) was discharged in the

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	exhibit Pietro Beretta Model 92F pistol (Item 1). The exhibit fired bullets recovered from the deceased and the scene (Items 2 and 5) were both discharged in a second/unknown firearm. The exhibit fired bullet recovered from the scene (Item 3) was discharged in a third/unknown firearm.
DHD42A	Item 4 (a bullet) and Item 1 (three bullets said to be test fired in a Beretta Model 92F 9mm Luger caliber pistol) were identified* as having been fired by the same firearm. Items 2 and 5 (two bullets) were fired in a different firearm than Item 1. Items 2 and 5 were identified* as having been fired by the same firearm. Item 3 (a bullet) was fired in a different firearm than Items 1, 2, and 5. *Source identification is reached when the discernable class and individual characteristics have corresponding detail and the examiner would not expect to see the same arrangement of details repeated in another source.
DLCDCC	The suspected firearm (Pietro Beretta, model 92f, fired the recovered bullet at the scene marked with item 4. The remaining bullets marked with items 2, 3 and 5 were fired by other firearms.
DV27LM	1) Examinations showed Item 4 was discharged from the firearm listed as Item 1 (Beretta 92F - three test fires). 2) Examinations showed Item 2 and Item 5 were not discharged from the firearm that discharged Item 1 and Item 4 due to differences in class characteristics. Examinations showed Item 2 and Item 5 were discharged from the same unknown firearm. 3) Examinations showed Item 3 was not discharged from the firearm that discharged Item 1, Item 2, Item 4 and Item 5 due to differences in class characteristics. Examinations showed Item 3 was discharged from a second unknown firearm.
DYXE7W	Results and Interpretations: Items 1, 2, 3, 4, and 5 were microscopically examined. The Item 4 caliber 38 class bullet was identified as having been fired from the same firearm as the Item 1 bullets based on corresponding class and individual characteristics. Items 2 and 5, each a caliber 38 class bullet, were identified as having been fired from the same firearm based on corresponding class and individual characteristics. Items 2 and 5 were eliminated as having been fired from the same firearm as the Item 1 bullets due to differences in individual characteristics. The Item 3 caliber 38 class bullet was eliminated as having been fired from the same firearm as the Item 1 bullets and from the same firearm as Items 2 and 5 due to differences in class and individual characteristics.
E3F8JB	Items 1 & 4: The Item 4 bullet was Identified to the Item 1 test fires. Items 2 & 5: The bullets were Identified to each other. The bullets were Eliminated to the Item 1 test fires and the Item 3 bullet. The bullets have design features consistent with bullets loaded in 38 caliber class (38/357/9mm) ammunition. There are numerous manufacturers of firearms with similar rifling characteristics. Item 3: The bullet was Eliminated to the Item 1 test fires and the Item 2 & 5 bullets. The bullet has design features consistent with bullets loaded in 38 caliber class (38/357/9mm) ammunition. There are numerous manufacturers of firearms with similar rifling characteristics.
E7EMTK	The questioned bullet, identified as item 4, was part of a 9 mm caliber cartridge and was fired from the suspected Pietro Beretta Model 92F pistol-type firearm. The questioned bullets, identified with item 2, item 3 and item 5, were part of 9 mm caliber cartridges, which were not fired from the suspected firearm, a Pietro Beretta Moedl 92F pistol.
E88HA2	Our laboratory is not reporting potential associations in terms of "identification" or "inconclusive", but indicates the level of support that the observations bring to the proposition that the questioned bullet was fired from the firearm at the source of the control bullets (Item 1) as opposed to another unknown firearm. In the present case, we reached the following

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	conclusions: The observations provide strong support for the proposition that Item 4 was fired from the firearm at the source of the control bullets under Item 1, rather than by another unknown firearm. We consider the observation to be at least a thousand times more probable if the bullet was fired from the same firearm as the bullets under Item 1, rather than by another unknown firearm. The scale used by our laboratory has been published in: Marquis R, Biedermann A, Cadola L, Champod C, Gueissaz L, Massonnet G, et al. Discussion on How to Implement a Verbal Scale in a Forensic Laboratory: Benefits, Pitfalls and Suggestions to Avoid Misunderstandings. Science & Justice, 2016; 56 (5): 364-370. The bullets under Item 2, 3 and 5 cannot have been fired from the same firearm as the one under Item 1 due to differences observed in terms of class characteristics and accidental characteristics.
E98E46	The evidence bullets (items 2-5), were fired through the barrel of the firearm that fired the test bullets (items 1).
EEBDH2	The Item 4 bullet was Identified to the Item 1 pistol. Item 4 and the Item 1 pistol were Eliminated to Items 2 and 5 based on a difference in individual characteristics. Item 4 and the Item 1 pistol were Eliminated to Item 3 based on a difference in class and individual characteristics. Items 2 and 5 were Identified to each other. Items 2 and 5 were Eliminated to Item 3 based on a difference in class and individual characteristics.
EGWCLX	Item 4 was fired in the Beretta pistol. Items 2, 3, and 5 were not fired in the Beretta pistol, however, Items 2 and 5 were fired in the same unknown firearm.
EJ67NP	1. The three bullets (Item 01-01) were fired from a single firearm; presumably the Beretta pistol listed in the given scenario. 2. The bullet (Item 01-04) was fired from the Beretta pistol. 3. The bullets (Items 01-02 and 01-05) were fired from a single firearm. The bullets (Items 01-02 and 01-05) were neither identified nor eliminated as having been fired from the Beretta pistol or from the same firearm that fired the bullet (Item 01-03) due to the agreement of class characteristics and disagreement of individual characteristics, but insufficient for an elimination. 4. The bullet (Item 01-03) was neither identified nor eliminated as having been fired from the Beretta pistol due to the agreement of class characteristics and disagreement of individual characteristics, but insufficient for an elimination.
EKJL2Q	The four fired 38/9mm caliber class bullets (Items 2, 3, 4, 5) were examined and determined to have been fired by three firearms. The test fired bullets from the Pietro Beretta Model 92F firearm (Item 1) were compared to the fired bullet (Item 4) and the same class of rifling and sufficient corresponding individual microscopic marks were found. The Beretta pistol (Item 1) fired the bullet (Item 4). The bullets (Items 2 and 5) had the same class of rifling and sufficient corresponding individual microscopic marks to conclude that they were fired by a single firearm, but eliminated from having been fired by the Beretta pistol (Item 1). The bullet (Item 3) had different rifling characteristics and individual microscopic marks than the other items 1, 2, 4, 5 and was fired by a different firearm.
EWBFAD	Microscopic comparison revealed the following: The bullet of Exhibit 4 (Item 4) was identified as having been fired from the same firearm that fired the known bullets of Exhibit 1 (Item 1). The bullets of Exhibits 2 (Item 2) and 5 (Item 5) were identified as being fired from the same firearm. Exhibits 2 and 5 were excluded as being fired from the firearm that fired the known bullets of Exhibit 1. The bullet of Exhibit 3 (Item 3) was excluded as being fired from the firearm that fired the known bullets of Exhibit 1 and the firearm that fired Exhibits 2 and 5.
EYBTNQ	Item 4 was identified microscopically as having been fired from the same firearm that fired the test fires, Item 1, based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 2 and 5 were microscopically eliminated as having been

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	fired from the same firearm that fired the test fires, Item 1, due to disagreement of individual characteristics. Items 2 and 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. Visual and microscopic examination of Items 2 and 5 revealed them to be 38/9mm caliber-class bullets fired from a firearm with a rifling pattern of six (6) lands and grooves with a right twist. The size, weight and style of Items 2 and 5 are most consistent with bullets typically found loaded in 9mm Luger cartridges. The list of firearms with a similar rifling pattern that could have fired Items 2 and 5 from a 9mm Luger firearm was too inclusive to be of any investigative value. The complete list of firearms that could possibly have fired Items 2 and 5 will be retained in the case file. Item 3 was microscopically eliminated as having been fired from the same firearm that fired the test fires, Item 1, and from the same unknown firearm as Items 2 and 5 due to disagreement of individual characteristics. Visual and microscopic examination of Item 3 revealed it to be a 38/9mm caliber-class bullet fired from a firearm with a rifling pattern of six (6) lands and grooves with a right twist. The size, weight and style of Item 3 are most consistent with bullets typically found loaded in 9mm Luger cartridges. The list of firearms with a similar rifling pattern that could have fired Item 3 from a 9mm Luger firearm was too inclusive to be of any investigative value. The complete list of firearms that could possibly have fired Item 3 will be retained in the case file. Current Integrated Ballistics Identification System (IBIS)/BrassTRAX technology in this laboratory is not capable of bullet imaging; therefore, no entries were made. Test fires are being retained by the Firearms Identification Laboratory; all other items of evidence are being returned.
F3U63M	The submitted fired bullet, Item 4, was fired from the same firearm as the submitted test fired bullets, Items 1A, 1B, and 1C. The submitted fired bullets, Items 2 and 5, were fired from the same firearm. The submitted fired bullets, Items 2 and 5, were not fired from the same firearm as the submitted test fired bullets, Items 1A, 1B, and 1C. The submitted fired bullet, Item 3, was not fired from the same firearm as the submitted fired bullets, Items 2 and 5. The submitted fired bullet, Item 3, was not fired from the same firearm as the submitted fired bullet, Item 4 and the submitted test fired bullets, Items 1A, 1B, and 1C. The submitted fired bullet, Item 3, is consistent with being a .38 caliber class bullet that was fired from a firearm having six lands and grooves, right twist. Possible calibers would include, but not be limited to: 9mm Luger. A list of possible firearm manufacturers would include, but not be limited to, the following: Beretta, Browning, Ceska Zbrojovka, Colt, Diamondback, FEG, Fabrique Nationale, Heckler and Koch, Kel-Tec, Luger, Norinco, Remington, Ruger, Springfield Armory, Tanfoglio, Taurus, Walther, and Zastava. The submitted fired bullet, Item 5, is consistent with being a .38 caliber class bullet that was fired from a firearm having six lands and grooves, right twist. Possible calibers would include, but not be limited to: 9mm Luger. A list of possible firearm manufacturers would include, but not be limited to, the following: Beretta, Browning, Ceska Zbrojovka, Colt, Diamondback, FEG, Fabrique Nationale, Heckler and Koch, Kel-Tec, Luger, Norinco, Remington, Ruger, Springfield Armory, Tanfoglio, Taurus, Walther, and Zastava.
F4NLLB	Item 001-04 was identified to Item 001-01 based on the agreement of class characteristics, and individual characteristics observed in the land impressions. Item 001-03 was eliminated to Items 001-01, 001-02, 001-04 and 001-05 based on differences in class characteristics. The difference being land impression width. Items 001-02 and 001-05 were eliminated to Item 001-01 based on the disagreement of individual characteristics observed in the land impressions. Items 001-02 and 001-05 were identified as having been fired from the same unknown firearm based on the agreement of class characteristics, and individual characteristics observed in the land impressions.
F6K4MC	Item 4 was discharged from the recovered firearm. Item 2, Item 3, and Item 5 were not

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	discharged from the recovered firearm.
FAEZ9W	Item 4 was identified as having been fired from the same firearm as Item 1. Items 2 and 5 were identified as having been fired from the same unknown firearm. Items 2 and 5 were not fired from the same firearm as Item 1. Items 2 and 5 are 38/9mm caliber bullets which were fired from a firearm having six lands and grooves with a right-hand twist. Item 3 was fired from a different unknown firearm. Item 3 is a 38/9mm caliber bullet which was fired from a firearm having six lands and grooves with a right-hand twist. A list of firearms having the characteristics of Items 2 and 5 and a list for the characteristics of Item 3 will be sent electronically to the submitting agency. It should be noted that these lists do not necessarily contain all firearms having the observed characteristics.
FFX9RM	Lab Items #1, #2, #3, #4, and #5 (seven ~9mm fired projectiles) were examined and microscopically compared on 7/11/2022. Based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics, Lab Item #4 (~9mm fired projectile) was positively identified as having been fired in Lab Item #1. Based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics, Lab Items #2 and #5 (two ~9mm fired projectiles) were positively identified as having been fired in the same firearm. No firearm was submitted. Based on disagreement of individual characteristics, Lab Items #1 and #4 (four ~9mm fired projectiles) were eliminated as having been fired from the same firearm as Lab Items #2 and #5 (two ~9mm fired projectiles). Based on disagreement of class and individual characteristics, Lab Item #3 was eliminated as having been fired in the same firearm as Lab Items #1, #2, #4, and #5.
FJYCHN	The submitted fired bullets (Items 2 and 5) were fired from the same unknown firearm. The submitted fired bullets (Items 2 and 5) were not fired from the same unknown firearm as the submitted fired bullets (Items 1-1 through 1-3, 3, and 4) due to differences in class characteristics. The submitted fired bullets (Items 2 and 5) were consistent with .38 caliber class and was fired from a firearm with six lands and grooves with a right twist. Some possible firearm manufacturers would include, but not be limited to, the following: Heckler & Koch, Ruger, Walther, Taurus, and Beretta. The submitted fired bullet (Item 3) was neither identified nor eliminated as having been fired from the same firearm as the fired bullet (Item 4) and test fires (Items 1-1 through 1-3) reportedly fired from a Pietro Beretta pistol due to insufficient corresponding markings. The submitted fired bullet (Item 4) was fired from the same firearm as test fires (Items 1-1 through 1-3) reportedly fired from a Pietro Beretta pistol.
FP73KU	The one (1) fired bullet, item 1.4, was identified as having been fired in the Beretta pistol, item 1.1. The one (1) fired bullet, item 1.3, was eliminated as having been fired in the Beretta pistol, item 1.1, based on a difference in class characteristics (widths of lands and grooves). The two (2) fired bullets, items 1.2 and 1.5, were consistent in all observable class characteristics (caliber, number of lands and grooves, rifling, twist, and widths of lands and grooves) as the Beretta pistol, item 1.1. While there is some disagreement of microscopic markings, the markings present are insufficient for an elimination. The results are inconclusive. The one (1) fired bullet, item 1.5, was identified as having been fired in the same firearm as the one (1) fired bullet, item 1.2. The two (2) fired bullets, items 1.2 and 1.5, were each eliminated as having been fired in the same firearm as the one (1) fired bullet, item 1.3, based on a difference in class characteristics (widths of lands and grooves). Note: Identifications are based on the agreement of all discernable class characteristics and agreement of corresponding individual microscopic markings.
FQZQ4P	Item 4 was identified microscopically as having been fired from the same firearm that reportedly fired the test fires, Items 1A - 1C, based on agreement of the combination of

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	individual characteristics and all discernible class characteristics. Items 2 and 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. Items 2 and 5 were microscopically eliminated as having been fired from the same firearm that reportedly fired the test fires, Items 1A - 1C, due to disagreement of discernible individual characteristics. Visual and microscopic examination of Items 2 and 5 revealed them to be 38/9mm caliber-class bullets fired from a firearm with a rifling pattern of six (6) lands and grooves with a right twist. The size, weight and configuration of Items 2 and 5 are most consistent with bullets typically found loaded in 9mm Luger and 38 Special cartridges. The list of firearms with a similar rifling pattern that could have fired Items 2 and 5 from a 38/9mm caliber-class firearm was too inclusive to be of any investigative value. The complete list of possible firearms that could possibly have fired Items 2 and 5 will be retained in the case file. Item 3 was microscopically eliminated as having been fired from the same firearm that reportedly fired the test fires, Items 1A - 1C, and from the same unknown firearm as Items 2 and 5, due to disagreement of land and groove dimensions. Visual and microscopic examination of Item 3 revealed it to be 38/9mm caliber-class bullet fired from a firearm with a rifling pattern of six (6) lands and grooves with a right twist. The size, weight and configuration of Item 3 are most consistent with bullets typically found loaded in 9mm Luger and 38 Special cartridges. The list of firearms with a similar rifling pattern that could have fired Item 3 from a 38/9mm caliber-class firearm was too inclusive to be of any investigative value. The complete list of possible firearms that could possibly have fired Items 2 and 5 will be retained in the case file. The lists of possible firearms were generated using an in-house expanded version of the General Rifling Characteristics Database created by the Federal Bureau of Investigation. These are not meant to be all-inclusive lists but rather investigative aides; and any suspect firearm(s) of the appropriate caliber-class should be submitted for comparison; however, complete lists of the search results will be maintained in the case file. Current Integrated Ballistics Identification System (IBIS) / BrassTRAX technology in this laboratory is not capable of bullet imaging; therefore, no entry was made. All evidence items are being returned.
FUJTWG	The evidence in items 1 through 5 was analyzed by physical and microscopic examination. The four bullets in items 2, 3, 4, and 5 were 9mm bullets which had been fired from the barrel of a weapon rifled with six lands and grooves, right twist. The bullet in item 4 was determined to have been fired from the same weapon as the three known bullets in item 1. The three bullets in items 2, 3, and 5 were determined not to have been fired from the same weapon as the three known bullets in item 1. The two bullets in items 2 and 5 were fired from one weapon. The bullet in item 3 was fired from a different weapon than the two bullets in items 2 and 5. Further analysis is pending submission of two weapons for additional comparisons.
G4M9FU	Items 1 and 4: Item 1 was Identified to Item 4. Items 1 and 4 were Eliminated from Items 2, 3 and 5. Items 2 and 5: Item 2 was Identified to Item 5. Items 2 and 5 were Eliminated from Item 3. Items 2 and 5 have design features consistent with bullets loaded in 9mm Lug caliber cartridges and display rifling characteristics similar to firearms by numerous manufacturers. Item 3: Item 3 has design features consistent with bullets loaded in 9mm Luger calibecartridges and displays rifling characteristics similar to firearms by numerous manufacturers.
GBGHJX	1). Exhibit item 4 was identified within the limits of practical certainty as having been fired from the exhibit Pietro Beretta Model 92F handgun. 2). Exhibit items 2, 3 and 5 were eliminated as having been fired from the same the exhibit Pietro Beretta Model 92F handgun. 3). Exhibit items 2 and 5 were identified within the limits of practical certainty as having been fired from the same firearm that is unknown and currently outstanding.
GJWYFD	Comparisons: The submitted bullets were examined and microscopically compared with the

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	following results: The bullets, Lab Items 1-5, were determined to be consistent in weight and dimensions with .38 nominal caliber, to include 9mm Luger. One bullet, Lab Item 4, was identified as having been fired from the same firearm that fired the three bullets in Lab Item 1 due to sufficient agreement of class and individual characteristics. Two bullets, Lab Items 2 and 5, were identified as having been fired from a single firearm due to sufficient agreement of class and individual characteristics. These bullets were eliminated as having been that fired from the same firearm that fired the three bullets in Lab Item 1 due to differences in individual characteristics. Firearms manufactured with general rifling characteristics similar to those present on the two bullets, Lab Items 2 and 5 include, but may not be limited to, American Eagle, Beretta, FN/Browning, Calico, Caracal, Colt, CZ, Diamondback, FEG, H&K, Kahr, KelTec, Mauser, Mossberg, Norinco, Radom, Remington, Ruger, SAR Arms, SigSauer, Springfield, SWD, Tanfoglio, Taurus, Walther, and Zastava firearms. One bullet, Lab Item 3, was eliminated as having been that fired from the same firearm that fired the three bullets in Lab Item 1, or the firearm that fired the bullets in Lab Items 2 and 5 due to differences in general rifling characteristics and individual characteristics. Firearms manufactured with general rifling characteristics similar to those present on the bullet, Lab Item 3 include, but may not be limited to, American Eagle, Beretta, FN/Browning, Caracal, Colt, CZ, Daewoo, EAA Corp, FMJ, H&K, Kahr, KelTec, Mauser, Norinco, Radom, Remington, Ruger, SAR Arms, SigSauer, Springfield, SWD, Tanfoglio, Taurus, Walther, and Zastava firearms.
GL6ABW	Laboratory Item 001.D (Item 4) copper jacketed FMJ bullet is identified as being fired by the same firearm as the Laboratory 001.A (Item 1) test fires from the recovered Beretta model 92F firearm. Laboratory Items 001.B (Item 2) and 001.E (Item 5): two copper jacketed FMJ bullets are eliminated as being fired by the same firearm as the Laboratory 001.A (Item 1) test fires from the recovered Beretta model 92F firearm. Laboratory Item 001.C (Item 3): copper jacketed FMJ bullet is eliminated as being fired by the same firearm as the Laboratory 001.A (Item 1) test fires from the recovered Beretta model 92F firearm. Laboratory Items 001.B (Item 2) and 001.E (Item 5): two copper jacketed FMJ bullets are identified as being fired by the same firearm. Laboratory Items 001.B (Item 2) and 001.E (Item 5): two copper jacketed FMJ bullets are eliminated as being fired by the same firearm as Laboratory Item 001.C (Item 3) copper jacketed FMJ bullet.
GNDD8T	CTS Item#4 [Lab]# 22-0007577 was microscopically compared to firearm, CTS P-1 [Lab]# 22-0007577 and an identification was made. CTS Item#4 [Lab]# 22-0007577 was fired from firearm, CTS P-1 [Lab]# 22-0007577. CTS Item#2 [Lab]# 22-0007577 was microscopically compared to fired bullets, CTS Item#5 [Lab]# 22-0007577 and an identification was made. CTS Item#2 [Lab]# 22-0007577 and CTS Item#5 [Lab]# 22-0007577 were fired from the same firearm. CTX Item#3 was eliminated as having been fired from the same firearm due to differences in class characteristics.
GQX84T	Bullets Item 2, Item 3, Item 4, and Item 5 were not fired from the recovered firearm.
GUFLBZ	The Item 4 bullet was identified as having been fired from the same firearm as the Item 1 known bullets based on sufficient agreement of individual and class characteristics. The Item 2 and 5 bullets were determined to be 38/9mm caliber class bullets with a rifling pattern of 6 lands and grooves with a right twist. The Item 2 and 5 bullets were identified as having been fired from the same unknown firearm based on sufficient agreement of individual and class characteristics. Items 2 and 5 were eliminated as having been fired from the same firearm as the Item 1 known bullets based on disagreement of individual characteristics. The Item 3 bullet was determined to be a 38/9mm caliber class bullet with a rifling pattern of 6 lands and grooves with a right twist. The Item 3 bullet was eliminated as having been fired from the same firearms as the Item 1 known bullets as well as the Items 2 and 5 bullets based on a

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	combination of class and individual characteristics.
GUT8TN	Item 4 was identified microscopically as having been fired from the same firearm that reportedly fired the Item 1 test fires based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 2 and 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. Items 2 and 5 were microscopically eliminated as having been fired from the same firearm that reportedly fired the Item 1 test fires due to disagreement of individual characteristics. Visual and microscopic examination of Items 2 and 5 revealed them to be 38/9mm caliber-class bullets fired from a firearm with a rifling pattern of six (6) lands and grooves with a right twist. The size, weight and configuration of Items 2 and 5 are most consistent with bullets typically found loaded in 9mm Luger cartridges. Among the more common firearms that could have possibly fired Items 2 and 5 include, but are not limited to, the following: Beretta, Browning, Calico, Canik 55, China (PRC), Daewoo, Diamondback, EAA Corp., Heckler & Koch, Keltec, Luger, Masterpiece Arms, Mossberg, Norinco, Ruger, Sig Sauer, Springfield Armory, SWD INC., Taurus, and Walther brands of 9mm Luger semi-automatic pistols. Item 3 was microscopically eliminated as having been fired from the same firearm that reportedly fired the Item 1 test fires due to disagreement of individual characteristics Item 3 was microscopically eliminated as having been fired from the same unknown firearm as Items 2 and 5 due to disagreement of individual characteristics. Visual and microscopic examination of Item 3 revealed it to be a 38/9mm caliber-class bullet fired from a firearm with a rifling pattern of six (6) lands and grooves with a right twist. The size, weight and configuration of Item 3 are most consistent with bullets typically found loaded in 9mm Luger semi-automatic cartridges. Among the more common firearms that could have possibly fired Item 3 include, but are not limited to, the following: Browning, Canik 55, China (PRC), Daewoo, FN/Browning, Heckler & Koch, IMI (UZI), Intratec, Luger, Norinco, Ruger, Sig Sauer, Springfield Armory, Tanfogliom Taurus, and Walther brands of 9mm Luger semi-automatic pistols. The lists of possible firearms were generated using an in-house expanded version of the General Rifling Characteristics Database created by the Federal Bureau of Investigation. These are not meant to be all-inclusive lists but rather investigative aides; and any suspect firearms of the appropriate caliber-class should be submitted for comparison; however, complete lists of the search results will be maintained in the case file. Current Integrated Ballistics Identification System (IBIS)/BrassTRAX technology in this laboratory is not capable of bullet imaging; therefore, no entry was made. All evidence items are being returned.
GVBZ3L	Item 1 and Item 4 fired bullets were fired through the same barrel (firearm #1). Item 2 and Item 5 fired bullets were fired through the same barrel (firearm #2). Item 3 fired bullet was fired through another barrel (firearm 3).
GWMTR8	a. The spent projectile mentioned in Item 1-4 above was fired from the weapon that fired the Item 1-1 test firings. b. The spent projectile mentioned in Item 1-2 and Item 1-5 above were fired from the same unknown weapon capable of chambering and firing .38 caliber class ammunition, to exclude the weapon that fired the Item 1-1 test firings. c. The spent projectile mentioned in Item 1-3 above was fired from and unknown weapon capable of chambering and firing .38 caliber class ammunition, to exclude the weapon that fired the Item 1-1 test firings and the unknown weapon that fired the Item 1-2 and Item 1-5 spent projectiles.
H44MLH	Item CTS 4 bullet was fired from the same firearm as the Item CTS 1 test-fired bullets. Items CTS 2 and CTS 5 bullets were fired by a second firearm. These bullets are most consistent with bullets commonly found loaded in some 9mm Luger caliber cartridges. See the attachment for a list of possible 9mm Luger caliber firearm manufacturers/origins that may have fired these

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	bullets. Note that this list may not be all inclusive. Item CTS 3 bullet was fired by a third firearm. This bullet is most consistent with bullets commonly found loaded in some 9mm Luger caliber cartridges. See the attachment for a list of possible 9mm Luger caliber firearm manufacturers/origins that may have fired this bullet. Note that this list may not be all inclusive.
H6WH77	The submitted specimens marked as Items 2-5 were examined and identified as four (4) fired bullets consistent with 9mm Luger caliber exhibiting six (6) land and groove impressions with a right twist. Items 2-5 were microscopically inter-compared and compared to Item 1 sample bullets. As a result of microscopic comparison, it was concluded that : Item 4 was identified as having been fired from the firearm that fired Item 1 sample bullets. Item 2 and Item 5 were identified as having been fired from the same unknown firearm. Item 2 and Item 5 were eliminated as having been fired from the same firearm that fired Item 1 sample bullets due to significant disagreement of individual characteristics. Item 3 was eliminated as having been fired from the same firearm that fired Item 1 sample bullets due to disagreement of discernible class characteristics. Item 3 was eliminated as having been fired from the same unknown firearm that fired Item 2 and Item 5 due to disagreement of discernible class characteristics. Firearms that produce similar rifling characteristics as those exhibited on Item 3 and Item 5 are too numerous to list.
HCAQ9T	I was requested to compare the submitted bullets (Items 001-2 through 001-5) to the test-fired bullets (Item 001-1) submitted in this case. The examination of the evidence in this request began on 06/23/2022. Bullet Examination: Item 001-1 are three test-fired bullets reportedly fired from a Beretta brand, model 92F, 9mm Luger caliber pistol. Items 001-2 through 001-5 are four fired nominal .38 caliber bullets. I microscopically compared these four bullets to each other. I observed agreement of all discernable class characteristics with sufficient agreement of the individual characteristics to conclude that Item 001-2 and 001-5 were fired in a single firearm. I observed agreement of all discernable class characteristics with significant differences in their individual characteristics to conclude that Item 001-2 was not fired in the same firearm as either Item 001-3 or 001-4. I also observed differences in their class characteristics to conclude that Item 001-3 and 001-4 were not fired in the same firearm. Therefore, three different firearms were used to fire the four submitted bullets: one firearm fired Items 001-2 and 001-5, a different firearm fired Item 001-3, and another different firearm fired Item 001-4. I microscopically compared one of the test-fired bullets from Item 001-1 to Item 001-2. I observed agreement of all discernable class characteristics with significant differences in their individual characteristics to conclude that Item 001-2 was not fired in the firearm that produced the test fires, Item 001-1; therefore, Items 001-2 and 001-5 were not fired in the firearm that produced the test fires, Item 001-1. I microscopically measured the widths of the land and groove impressions of Item 001-2. Using these measurements and the general rifling characteristics, I searched the Association of Firearm and Toolmark Examiner's (AFTE) General Rifling Characteristics (GRC) database to generate a list of firearms that could have fired Items 001-2 and 001-5. This list is available upon request. I microscopically compared one of the test-fired bullets from Item 001-1 to Item 001-3. I observed differences in their class characteristics to conclude that Item 001-3 was not fired in the firearm that produced the test fires, Item 001-1. I microscopically measured the widths of the land and groove impressions of Item 001-3. I searched the AFTE GRC database to generate a list of firearms that could have fired Item 001-3. This list is available upon request. I microscopically compared one of the test-fired bullets from Item 001-1 to Item 001-4. I observed agreement of all discernable class characteristics with sufficient agreement in their individual characteristics to conclude that Item 001-4 was fired in the firearm that produced the test fires, Item 001-1.
HCU8PV	Items 1 & 4: The Item 4 bullet was microscopically identified as having been fired from the

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	same firearm that fired Item 1. Item 3: The bullet was not fired from the same firearm that fired Item 5. Further, the bullet was not fired from the same firearm that fired Item 1. The bullet was determined to be 9mm caliber displaying rifling characteristics of 6 lands and grooves, right twist. Manufacturers of firearms displaying similar rifling characteristics are numerous and a list can be provided upon request. Items 2 & 5: The two bullets were microscopically identified as having been fired from the same unknown firearm; however, they were not fired from the same firearm that fired Item 1. The bullets were determined to be 9mm caliber displaying rifling characteristics of 6 lands and grooves, right twist. Manufacturers of firearms displaying similar rifling characteristics are numerous and a list can be provided upon request.
HGLFXJ	After a microscopic examination, the fired bullet (Item 4) was identified as having been fired in suspect's Pietro Beretta Model 92F 9mm Luger firearm based on a sufficient agreement of individual characteristics in the rifling marks. Two fired bullets (Items 2 and 5) were identified as having been fired in the same, at this time unknown, firearm based on a sufficient agreement of individual characteristics in the rifling marks. Item 3 was eliminated has having been fired in the suspect's firearm or the firearm that fired Items 2 and 5 based on the disagreement of class characteristics.
HJRYV4	Microscopic examination and comparison reveal that the bullet, Exhibit 4, was fired from the same firearm as the test-fired bullets Exhibit 1. Microscopic examination and comparison reveal that the bullets, Exhibits 2 and 5, were fired from the same firearm. The class characteristics of Exhibits 2 and 5 are consistent with, but not limited to, Beretta, Colt, CZ, Keltec, Radom, and Ruger 9mm pistols. Microscopic examination and comparison reveal that the bullets, Exhibits 2 and 5, were not fired from the same firearm as the test-fired bullets, Exhibit 1. Microscopic examination and comparison reveal that the bullet, Exhibit 3, was not fired from the same firearms as the test-fired bullets Exhibit 1 or the bullets Exhibits 2 and 5. The class characteristics of Exhibit 3 are consistent with, but not limited to, Beretta, FN/Browning, Ruger, Tanfoglio, Taurus, and Walther 9mm pistols.
HKLMDY	Item 4 was identified as having been fired by the same firearm that fired (known) Item 1 based on the agreement of class and individual characteristics. Items 2, 3 and 5 were not fired by the same firearm that fired (Known) Item 1 based on differences in class and/or individual characteristics. Items 2 and 5 were identified as having been fired by the same unknown firearm based on the agreement of class and individual characteristics. Item 3 was not fired by the same unknown firearm that fired Items 2 and 5 based on differences in class and or individual characteristics.
HNKYAY	Item 4 was microscopically identified as having been fired in the same firearm that generated the test fires of Item 1. Items 2 and 5 were microscopically identified as having been fired from the same unknown firearm "A", a different unknown firearm than that which fired Item 3 or that which generated the test fires of Item 1. Item 3 was microscopically identified as having been fired in an unknown firearm "B", a different unknown firearm than that which fired Items 2 and 5 or that which generated the test fired of Item 1.
HPWX49	The fired cartridge case in Submission #1d was microscopically compared and identified as having been fired from the firearm that fired the cartridge cases in Submission #1a based on sufficient agreement in individual characteristics present to conclude an identification. The fired cartridge cases in Submissions #1b and #1e were microscopically compared and identified as having been fired from the same unknown firearm based on sufficient agreement in individual characteristics present to conclude an identification. They were eliminated as having been fired from the firearm that fired the cartridge cases in Submission #1a based on different class characteristics and sufficient difference in individual characteristics present. The fired cartridge

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	case in Submission #1c was compared to the fired cartridge cases in Submissions #1b and #1e were microscopically compared and eliminated as having been fired from the same unknown firearm based on different class characteristics and sufficient difference in individual characteristics present. It was also microscopically compared and was unable to be identified or eliminated as having been fired from the firearm that fired the cartridge cases in Submission #1a based on insufficient individual characteristics present.
HUTMM2	1. Exhibit 1.4 was fired from the firearm that fired Exhibit 1.1 based on sufficient agreement of individual characteristics. 2. Exhibits 1.2 and 1.5 were fired from the same unknown firearm based on sufficient agreement of individual characteristics. 3. Exhibit 1.3 was fired from a second unknown firearm based on sufficient disagreement of individual characteristics when compared to the other items of evidence.
HWF2BB	Item 1 was microscopically compared to Items 2-5. Item 1 and Item 4 are an Identification. Item 1 and Item 2 and 5 are an Elimination. Item 1 and Item 3 are Inconclusive.
HZF8W9	The test fired projectiles (item 1) were identified as having been fired from the same firearm as the second bullet from scene (item 4). Agreement of the characteristics is sufficient to determine that the two projectiles were fired from the same firearm. The bullet recovered from the victim (item 2) was identified as having been fired from the same firearm as the third bullet recovered from the scene (item 5). Agreement of the characteristics is sufficient to determine that the two projectiles were fired from the same firearm. The test fired projectiles (item 1) were excluded as having been fired from the same firearm as the bullet recovered from the victim (item 2) and the third bullet recovered from the scene (item 5). Differences were found in characteristics sufficient to eliminate the projectiles as having been fired from the same firearm. The test fired projectiles (item 1) could not be conclusively identified or excluded as having been fired from the same firearm as the first bullet recovered from the scene (item 3). However, it is inconsistent the projectiles were fired from the firearm. There was some agreement of discernible class characteristics and disagreement of some characteristics, but the disagreement was insufficient for exclusion.
JFNNEU	The fired bullets in item 1 were compared to the fired bullet, item 4, using a comparison microscope. In my opinion, that fired bullet was fired in the firearm the generated those test-fired bullets due to agreement of discernible class characteristics and sufficient agreement of individual characteristics. Items 2, 3, and 5, were eliminated from being fired in the firearm that generated the test-fired bullets in item 1 due to sufficient disagreement of class and individual characteristics.
JJNUTZ	1. Examination of Exhibit 1 revealed three fired 9mm Luger bullets labeled as known test fired standards from the suspect's firearm. 2. Examination of Exhibits 2, 3, 4, and 5 revealed each contains one fired bullet consistent with those loaded in 9mm Luger cartridges. 3. Microscopic comparison revealed Exhibit 4 was fired from the same firearm as Exhibit 1 due to sufficient agreement of individual characteristics. 4. Microscopic comparison revealed Exhibits 2 and 5 were fired from the same firearm due to sufficient agreement of individual characteristics; however, they were not fired from the same firearm as Exhibit 1 due to sufficient disagreement of individual characteristics. 5. Microscopic comparison revealed Exhibit 3 was not fired from the same firearm as Exhibit 1 nor the same firearm as Exhibits 2 and 5 due to sufficient disagreement of individual characteristics.
JKGMTP	The bullet projectiles marked E-1 to E-3 and E-6, corresponding to item 1, are 9mm caliber, with striations to the right (R-6) and were fired by the same firearm (Identification). [Examiner]. The bullet projectiles marked E-4 and E-7, corresponding to item 1, are 9mm caliber, with striations to the right (R-6) and were fired by the same firearm (Identification). [Examiner]. The

TABLE 2

WebCode	Conclusions
	bullet projectile marked E-5, corresponding to item 1, is a 9mm caliber, with striations to the right (R-6) and was fired from a firearm, it was not fired from the firearm that fired the projectiles bullets marked from E-1 to E-3, E-4, E-6 and E-7 (Identification). [Examiner].
JM8PYD	From an intra-comparison it was determined that there are 3 (three) firearms involved in shooting items 2 - 5 (bullets). They are separated into the following groups: Item 4 (bullet) was fired through the same firearm as item 1 (known standards). Items 2 and 5 (bullets) were fired through a second firearm. GRC available on request. Item 3 (bullet) was fired through a third firearm. GRC available on request.
JWXEDT	Bullet Analysis: Methodology: Physical (Visual Examination), Electronic Balance/Digital Caliper/Digital Micrometer, Microscopy (Comparison Microscope). Items 2, 3, 4, and 5 are 38 caliber class bullets based upon the diameter. Opinion/Interpretation: Items 2, 3, 4, and 5 are consistent with bullets loaded in 9mm Luger and .357 SIG caliber cartridges based upon the weight and style. Items 2 and 5, the bullets, exhibit characteristics found in (but not limited to) the following firearms: Beretta, CZ, Diamondback, FN/Browning, Keltec, Ruger, SigSauer, Springfield INC., Tanfoglio, and Taurus 9mm Luger caliber firearms. Item 3, the bullet, exhibits characteristics found in (but not limited to) the following firearms: Beretta, CZ, FN/Browning, Keltec, Ruger, SigSauer, Springfield INC., Tanfoglio, and Taurus 9mm Luger caliber firearms. Item 4, the bullet, was fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the bullets, based upon corresponding class and individual microscopic characteristics. Items 2 and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics. Item 3, the bullet, was not fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the bullets, nor the barrel of the same firearm as Items 2 and 5, the bullets, based upon different class characteristics. Items 2 and 5, the bullets, were not fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the bullets, based upon different individual microscopic characteristics.
JY2AWW	Bullet Analysis: Methodology: Physical (Visual Examination), Electronic Balance/Caliper/Digital Micrometer, Microscopy (Comparison Microscope). Items 2, 3, 4, and 5 are 38 caliber class bullets based upon the diameter. Opinion/Interpretation: Items 2, 3, 4, and 5 are consistent with bullets loaded in 9mm Luger, .357 SIG, .38 Special, and .357 Magnum caliber cartridges based upon the weight and style. Item 4, the bullet, was fired through the barrel of Item 1, the Beretta pistol, based upon corresponding class and individual microscopic characteristics. Items 2 and 5, the bullets, were fired in the same firearm based upon corresponding class and individual microscopic characteristics. Item 3, the bullet, was not fired through the barrel of Item 1, the Beretta pistol, nor fired in the same firearm as Items 2 and 5, the bullets, based upon different class characteristics. Items 2 and 5, the bullets, were not fired through the barrel of Item 1, the Beretta pistol, based upon different individual microscopic characteristics.
JY6MNY	The presence of three firearms is established. items 2 and 5 were fired by the same 9mm caliber firearm. item 3 was fired by a 9mm caliber gun. item 4 was fired by the secured firearm.
K4BMDU	As a result of my comparisons, I formed the following opinions: The exhibit fired bullet (Item 4) was discharged in the submitted Beretta pistol (Item 1), The exhibit fired bullets (Items 2, 3 & 5) were not discharged in the submitted Beretta pistol (Item 1), The exhibit fired bullets (Items 2 & 5) were both discharged from the same unknown firearm (Gun A), and The exhibit fired bullet (Item 3) was discharged in a second unknown firearm (Gun B).
K4UP64	3. On 2022-06-29 during the performance of my official duties I received an intact sealed evidence bag with number PA4001966594 marked inter alia CTS Proficiency Test 22-5261R from Case Administration of the Ballistics Section. I opened the bag and found the following:

TABLE 2

WebCode	Conclusions
	3.1: One (1) sealed evidence box marked “Sample Pack F1” containing the following: 3.1.1: One (1) sealed evidence box marked “Item 1” containing the following: 3.1.1.1: Three (3) 9mm calibre fired bullets marked by me “369804/22 1a”, “369804/22 1b” and “369804/22 1c” respectively. 3.1.2: One (1) sealed evidence box marked “Item 2” containing the following: 3.1.2.1: One (1) 9mm calibre fired bullet marked by me “369804/22 2”. 3.1.3: One (1) sealed evidence box marked “Item 3” containing the following: 3.1.3.1: One (1) 9mm calibre fired bullet marked by me “369804/22 3”. 3.1.4: One (1) sealed evidence box marked “Item 4” containing the following: 3.1.4.1: One (1) 9mm calibre fired bullet marked by me “369804/22 4”. 3.1.5: One (1) sealed evidence box marked “Item 5” containing the following: 3.1.5.1: One (1) 9mm calibre fired bullet marked by me “369804/22 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 3.1.1.1 and 3.1.4.1 were fired from a first (1st) firearm. 5.2: The bullets mentioned in paragraphs 3.1.2.1 and 3.1.5.1 were fired from a second (2nd) firearm. 5.3: The bullet mentioned in paragraph 3.1.3.1 was fired from a third (3rd) firearm.
KF4ZWZ	UPON ANALYZING THE BULLETS RECOVERED FROM THE SCENE AND THE BULLET RECOVERED FROM THE CORPSE, AND AFTER COMPARING THEM WITH THE WITNESS BULLETS OBTAINED FROM THE SEIZED WEAPON (ITEM 1), THE FOLLOWING WAS DETERMINED: ITEM 2: THE BULLET RECOVERED FROM THE VICTIM (QUESTIONED) DOES NOT CORRESPOND TO THE WEAPON RECOVERED FROM THE SUSPECT'S VEHICLE, THEREFORE IT IS DETERMINED AS: ELIMINATION. ITEM 3: THE FIRST BULLET RECOVERED FROM THE SCENE (QUESTIONED) SHOWS FIRING MARKS SIMILAR TO THE WITNESS BULLETS, BUT NOT SUFFICIENT, THEREFORE IT IS DETERMINED AS: INCONCLUSIVE. ITEM 4: THE SECOND BULLET RECOVERED FROM THE SCENE (QUESTIONED) PRESENTS A SUFFICIENT CORRELATION (IN TERMS OF ITS CLASS AND UNIQUE MARKS) WITH THE WITNESS BULLETS RECOVERED FROM THE SEIZED WEAPON, THEREFORE IT IS DETERMINED AS: IDENTIFICATION. ITEM 5: THE THIRD BULLET RECOVERED FROM THE SCENE (QUESTIONED) DOES NOT CORRESPOND TO THE WEAPON RECOVERED FROM THE SUSPECT'S VEHICLE, THEREFORE IT IS DETERMINED AS: ELIMINATION. ITEMS 2, 5 PRESENT A SUFFICIENT CORRELATION BETWEEN THEIR CLASS AND UNIQUE MARKS, DETERMINING THAT BOTH BULLETS COME FROM THE SAME FIREARM.
KF643V	[No Conclusions Reported.]
KJ3F6M	In my opinion there was significant agreement between the firing marks on item 1 and item 4. In my opinion item 4 was fired in the recovered firearm. In my opinion there were significant differences between the firing marks on items 2, 3, and 5 with those in item 1. In my opinion items 2, 3, 5 were not fired in the recovered firearm (gun 1).
KJJUCW	1: The bullet identified as evidence ITEM 2 recovered from the victim corresponds to the 9 MM LUGER caliber, it is concluded that there is no correspondence with ITEM 1 consisting of 3 bullets fired from the recovered firearm PIETRO BERETTA model 92F. 2: The bullet identified as evidence ITEM 3 recovered from the scene corresponds to the 9 MM LUGER caliber, it is concluded that there is no correspondence with ITEM 1 consisting of 3 bullets fired from the recovered firearm PIETRO BERETTA model 92F. 3: The bullet identified as evidence ITEM 4 recovered from the scene corresponds to the 9 MM LUGER caliber, it is concluded that there is concordance with ITEM 1 consisting of 3 bullets fired from the recovered firearm PIETRO

TABLE 2

WebCode	Conclusions
	BERETTA MODEL 92F. 4: The bullet identified as evidence ITEM 5 recovered from the scene corresponds to the 9 MM LUGER caliber, it is concluded that there is no correspondence with ITEM 1 consisting of 3 bullets fired from the recovered firearm PIETRO BERETTA model 92F.
KM6G6K	Item 4 and the test fired bullets from Item 1 were microscopically examined and compared. Based on observed agreement of class characteristics and sufficient agreement of individual characteristics, the bullet was identified as having been fired from Item 1, the Beretta pistol. Items 2 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 and 5 and the test fired bullets from Item 1 were microscopically examined and compared. Based on observed disagreement individual characteristics, the bullets were eliminated as having been fired from Item 1, the Beretta pistol. Items 2, 3, 5 were microscopically examined and compared. Agreement of class characteristics was observed. However, there is insufficient agreement or disagreement of individual characteristics to either identify or eliminate the Item 3 as having been fired from the same firearm that fired Items 2 and 5. Item 3 and the test fired bullets from Item 1 were microscopically examined and compared. Agreement of class characteristics was observed. However, there is insufficient agreement or disagreement of individual characteristics to either identify or eliminate the bullet as having been fired from Item 1, the Beretta pistol. Items 2 and 5 have physical and design characteristics consistent with being 9mm/.38/.357 caliber. A list of firearms that could have fired them is too large for inclusion in this report, but can be provided upon request. Item 3 has physical and design characteristics consistent with being 9mm/.38/.357 caliber. A list of firearms that could have fired it is too large for inclusion in this report, but can be provided upon request.
KMMA2N	A comparison examination was conducted to determine whether or not the fired bullets (Items 2-5) had been discharged in the firearm that produced the fired bullets (Item 1). Comparison between Item 1 and Item 2 showed agreement in the class characteristics (land and groove mark width, number and twist direction) but no agreement in the individual characteristics present within the land and groove marks of the fired bullets - Elimination. Comparison between Item 1 and Item 3 showed no agreement in the width of the land and groove marks present on the fired bullets - Elimination. Comparison between Item 1 and Item 4 showed agreement in the class characteristics (land and groove mark width, number and twist direction) and significant agreement in the individual characteristics present within the land and groove marks of the fired bullets - Identification. Comparison between Item 1 and Item 5 showed agreement in the class characteristics (land and groove mark width, number and twist direction) but no agreement in the individual characteristics present within the land and groove marks of the fired bullets - Elimination.
KN2URD	After microscopic comparison, it was determined that the bullets submitted under Item #1 and Item #4 were fired from the same firearm based on sufficient agreement of class and individual characteristics of the land impression marks. After microscopic comparison, it was determined that the bullets submitted under Item #1 were fired from a different firearm than the bullets submitted under Items# 2 and 5, based on differences of individual characteristics. After microscopic comparison, it was determined that the bullets submitted under Item #2 and Item #5 were fired from the same firearm based on sufficient agreement of class and individual characteristics of the land impression marks. After microscopic comparison, it was determined that the bullet submitted under Item #3 was fired from a different firearm than the bullets submitted under Items# 1, 2, 4, and 5, based on differences of class characteristics.
KPA6MV	2.1: Exhibit bullet received marked 338032/22 (4) (item 4) was fired from the same firearm as test bullets marked test 1, test 2 and test 3 (item 1). 2.2: Exhibit bullets received marked

TABLE 2

WebCode	Conclusions
	338032/22 (2),(3) and (5) are negative with the test bullets marked marked test 1, test 2 and test 3 (item 1). 2.3: Exhibit bullets received marked 338032/22 (2) item 2 and (5) item 5 were fired from the same firearm. 2.4: Exhibit bullets received marked 338032/22 (2) item 2 and (3) item 3 were fired from two different firearms.
KPUNHG	Test fired bullets from Item 1, were microscopically examined and compared with the recovered fired bullet, Item 4. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Item 4 is identified as having been fired in the same firearm as the test fired bullets from Item 1. The test fired bullets from Item 1, were microscopically examined and compared with the recovered fired bullets, Items 2, 3 and 5. There is observed agreement of some class characteristics. However, based on the observed disagreement of individual characteristics, Items 2, 3 and 5 were not identified as having been fired in the same firearm as the test fired bullets from Item 1.
KVYTYR	After microscopic examination of the test fired bullets and the fired bullets listed as Items 2, 3, 4 & 5 it was determined that: The fired bullet listed as Item 4 was fired from the recovered firearm. Fired bullets 2 & 5 were fired from the same, unknown firearm capable of chambering and firing 9mm Luger caliber ammunition, and not from the recovered firearm. Fired bullet 3 was fired from another unknown firearm capable of chambering and firing 9mm Luger caliber ammunition, and not from the recovered firearm or the firearm that bullets 2 & 5 were fired from.
KYZU3V	1. Examination of Exhibit 1 revealed it to contain three fired 9mm Luger bullets indicated as test fires from the recovered firearm. 2. Examination of Exhibits 2, 3, 4 and 5 revealed them to each contain one fired bullet, consistent with 9mm Luger. 3. Microscopic comparison of the bullets in Exhibits 1, 2, 3, 4 and 5 revealed the following. a. The bullet in Exhibit 4 was fired in the same firearm as the three bullets in Exhibit 1 due to a sufficient agreement of individual characteristics. b. The bullet in Exhibit 2 was fired in the same firearm as Exhibit 5 due to a sufficient agreement of individual characteristics. The bullets in Exhibits 2 and 5 were not fired in the same firearm as Exhibits 1 and 4 or Exhibit 3 due to a sufficient disagreement of individual characteristics. c. The bullet in Exhibit 3 was not fired in the same firearm as Exhibits 1 and 4 or Exhibits 2 and 5 due to a sufficient disagreement of individual characteristics.
L4PMUP	1.) The Land Engraved Areas on the surface of bullet items 1 were similar in widths and striation characteristics to those on bullet item 4. The striations in the land engraved areas aligned when the two items (Item 4 and One bullet from item 1) were placed end to end and superimposed on each other suggesting a possible common origin. 2.) Similar observations were made when items 5 and items 2 were compared against each other suggesting a common origin. The striation in their land engraved areas did not align with those on the LEAs of items suggesting an uncommon origin. 3.) The Land Engraved Areas on the surface of bullet item 3 had a smaller width than all the other test items. LEA width is a Class Characteristic and this therefore implies that the impressions on test Item 3 are of a different origin from those of test items 1, 2, 4 and 5.
L6JEL3	Bullets (Items 2, 3, 4 & 5) were determined to be characteristic of 9mm Luger caliber bullets fired from a firearm rifled with six groves, right hand twist, conventional rifling. Bullets (Items 2, 3, 4 & 5) were microscopically compared to test fired bullets (Item 01). Based on agreement of discernible class characteristics and sufficient corresponding individual markings observed, the bullets (Items 01 & 04) were identified as having been fired from same firearm. Because of differences observed in individual characteristics, the bullets (Items 2, 3 & 5) could not have been fired from the same firearm as the bullets (Item 01).
L7BEQE	Item 4 was identified as having been fired by the same firearm that fired Item 1. Th is

TABLE 2

WebCode	Conclusions
	identification is based on the agreement of c lass characteristics, and individual characteristics observed in the land engraved areas. Items 2 and 5 were identified as having been fired by the same unknown firearm. This identification is based on the agreement of c lass characteristics, and individual characteristics observed in the land engraved areas. Items 2 and 5 were eliminated as having been fired by the same firearm that fired Items 1 and 4. This elimination is based on the disagreement of individual characteristics observed in the land engraved areas. Item 3 was eliminated as having been fired by the same firearms that fired Items 1, 2, 4, and 5. This elimination is based on differences in class characteristics. The difference being the land engraved area width.
LAAT4G	see LIMS report. [LIMS Report not attached by participant].
LJ2ZCM	The item 4 questioned bullet was identified as having been fired from the same firearm as the known bullets (item 1). Because of differences in individual characteristics the items 2, 3 and 5 questioned bullets could not have been fired from the same firearm as the known bullets (item 1).
LKTBWN	The fired bullets, items 1.2, 1.3, and 1.5, were eliminated as having been fired in the Pietro Beretta pistol, item 1.1, based on a difference in class characteristics (widths of lands and grooves) and disagreement of individual characteristics in the land impressions. The fired bullet, item 1.3, was eliminated as having been fired in same firearm as the two (2) fired bullets, items 1.2 and 1.5, based on a difference in class characteristics (widths of lands and grooves) and disagreement of individual characteristics in the land impressions. The fired bullet, item 1.4, was identified as having been fired in the Pietro Beretta pistol, item 1.1. The two (2) fired bullets, items 1.2 and 1.5, were identified as having been fired in the same firearm. Note: Identifications are based on the agreement of all discernable class characteristics and agreement of corresponding individual microscopic markings.
LM37P8	The known three bullets Item 1 and the questioned bullet Item 4 have the same class characteristics and matching individual characteristics, so it is undoubtedly proved, that the bullet Item 4 were fired in the same firearm as the known bullets Item 1. The known bullets Item 1 and the questioned bullets Item 2 and Item 5 have the same class characteristic but different individual characteristics, so it is undoubtedly proved, that the bullets Item 2 and Item 5 were not fired in the same firearm as the known bullets Item 1. The questioned bullets Item 2 and the questioned bullet Item 5 have the same class characteristics and matching individual characteristics, so it is undoubtedly proved, that the bullet Item 2 and the bullet Item 5 were fired in the same firearm. The known bullets Item 1 and the questioned bullet Item 3 have different class characteristics, so it is undoubtedly proved, that the bullet Item 3 was not fired in the same firearm as the known bullets Item 1 and the questioned Item 4 and not fired in the same firearm as the questioned bullets Item 2 and Item 5.
LWNBYT	Results of Examinations: The Item 4 bullet was identified as having been fired from the barrel of the Item 1 firearm. A pattern examination of the Item 2 and Item 5 bullets and the Item 1 firearm were inconclusive due to insufficient quality and/or quantity of corresponding individual characteristics. The Item 2 and Item 5 bullets were identified as having been fired from the barrel of the same firearm. The Item 3 bullet was excluded as having been fired from the barrels of the Item 1 and Item 4, and Item 2 and Item 5 firearms due to differences in class characteristics.
LXKNLK	It is highly likely that item 4 was fired from the recovered Beretta pistol. Items 2, 3, and 5 could have been fired from the recovered Beretta pistol or any other gun with similar class characteristics.

TABLE 2

WebCode	Conclusions
M43HT3	As a result of physical examination and microscopic comparison of the submitted evidence and test firings from the submitted weapon, it is my opinion that: A: Item 1-4 WAS FIRED from the submitted weapon. B: Items 1-2 and 1-5 WERE BOTH FIRED from the same unknown weapon, capable of firing .38 caliber class ammunition and WERE NOT FIRED from the submitted weapon. C: Item 1-3 was fired from an unknown weapon, capable of firing .38 caliber class ammunition and WAS NOT FIRED from the submitted weapon, nor the weapon which produced Items 1-2 and 1-5.
M789XW	1. Exhibit 1 consists of three .38 caliber class fired projectiles, each normally loaded in a 9mm Luger cartridge. 2. Exhibits 2, 3, 4, and 5 each consist of one .38 caliber class fired projectile normally loaded in a 9mm Luger cartridge. 3. A microscopic comparison was performed on Exhibits 1, 2, 3, 4, and 5. The results are the following: a. Exhibits 1 and 4 were fired from the same firearm based on a sufficient agreement of individual characteristics. b. Exhibits 2 and 5 were fired from the same firearm based on sufficient agreement of individual characteristics. However, Exhibits 2 and 5 were not fired from the same firearm as Exhibits 1 and 4 based on a sufficient disagreement of individual characteristics. c. Exhibit 3 was not fired from the same firearm as Exhibits 1 and 4 nor the same firearm as Exhibits 2 and 5 based on a disagreement of class characteristics.
M84LKP	Exhibit 4 (spent projectile) was identified as having been fired in the same 9mm firearm as exhibit 1 (test fires). Exhibits 2 and 5 (spent projectiles) were identified as having been fired in a second 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis. Exhibit 3 (spent projectile) was identified as having been fired in a third 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis.
MB3Z9E	[No Conclusions Reported.]
MCFC96	Items #2 and #5 were microscopically examined and compared. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics , Items #2 and #5 are identified as having been fired from the same firearm. Item #4 was microscopically examined and compared to Item #1 (agency test fire). Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics , Item #4 is identified as having been fired from the same firearm as Item #1 (agency test fire). Items #2 and #5 were microscopically examined and compared to Item #1 (agency test fire). Based on the observed disagreement of individual characteristics, Items #2 and #5 are eliminated as having been fired from the same firearm as Item #1 (agency test fire). Item #3 was microscopically examined and compared to Item #1 (agency test fire). Based on the observed disagreement of class characteristics, Item #3 is eliminated as having been fired from the same firearm as Item #1 (agency test fire). Item #2 and Item #3 were microscopically examined and compared. Based on the observed disagreement of class characteristics, Item #2 and Item #3 are eliminated as having been fired from the same firearm. Items #2, #3 and #5 expended copper jacketed bullets were examined and found to be consistent with 9mm/38 caliber class. Items #2 and #5 showed consistent class characteristics. Item #2 was selected to be a suitable representation of the submitted projectiles and was used for a GRC Database search. A list of suspect weapons that could have fired Item #2 expended copper jacketed bullet is too long to report possible manufacturers, but can be furnished upon request *. A list of suspect weapons that could have fired the Item #3 expended copper jacketed bullet is too long to report possible manufacturers, but can be furnished upon request *. * Laboratory reference files are not absolute; there may be weapons manufactured that do not appear herein.

TABLE 2

WebCode	Conclusions
MDUWYU	Three bullets (Item 1) fired using the recovered firearm (known) were fired from the same firearm with (Item 4). Therefore Item 4 was fired from the Pietro Beretta Model 92F Handgun. I n other words (Item 1 positive with Item 4).
ME3CWE	Microscopic examination and comparison of item #1 with the expended bullet submitted as item #4 revealed sufficient agreement of individual characteristics to conclude that item #4 had been fired from item #1, the Beretta pistol. Microscopic examination and comparison of items #2 and #5 revealed sufficient agreement of individual characteristics to conclude that items #2, and #5 had been fired in the same unknown weapon, different from the Beretta pistol, (a second weapon). Microscopic examination and comparison of item #3 with the test expended bullets fired in item #1, and the other three (3) submitted expended bullets (items #2, #4, and #5) revealed sufficient disagreement of individual characteristics to conclude that it had not been fired in the Beretta pistol, or in items #2, #4, or #5, (a third weapon).
MEK3DY	Item 1 - Three (3) test fired bullets from Pietro Beretta model 92F handgun. Item 2 - One (1) fired bullet. Item 3 - One (1) fired bullet. Item 4 - One (1) fired bullet. Item 5 - One (1) fired bullet. The submitted specimen marked as Item 2 was examined and identified as one (1) fired bullet, consistent with 9mm Luger caliber, exhibiting six (6) land and groove impressions with a right twist. The submitted specimen marked as Item 3 was examined and identified as one (1) fired bullet, consistent with 9mm Luger caliber, exhibiting six (6) land and groove impressions with a right twist. The submitted specimen marked as Item 4 was examined and identified as one (1) fired 9mm Luger caliber bullet, exhibiting six (6) land and groove impressions with a right twist. The submitted specimen marked as Item 5 was examined and identified as one (1) fired bullet, consistent with 9mm Luger caliber, exhibiting six (6) land and groove impressions with a right twist. Items 2 through 5 were microscopically inter-compared and compared to test bullets, Item 1. As a result of microscopic comparison, Item 4 was identified as having been fired from the same firearm as the test bullets, Item 1. Items 2 and 5 were identified as having been fired in the same firearm and were eliminated as having been fired from the same firearm as Item 4 and test bullets, Item 1. Item 3 was eliminated as having been fired from the same firearm as Items 2 and 5 and was eliminated as having been fired from the same firearm as Item 4 and test bullets, Item 1. Firearms that produced similar rifling characteristics as those exhibited on Item 3 include, but are not limited to, 9mm Luger caliber firearms manufactured by Beretta, FMJ, Heckler & Koch, Keltec, Ruger, Springfield Inc., Tanfoglio, and Walther. Firearms that produce similar rifling characteristics as those exhibited on Items 2 and 5 include, but are not limited to, 9mm Luger caliber firearms manufactured by Beretta, Calico, FMJ, Heckler & Koch, Keltec, Ruger, Springfield Inc., Tanfoglio, and Walther.
MGWRNN	The Item 4 bullet is identified as having been fired in the same firearm that fired the Item 1 bullets. The Item 2 bullet is identified as having been fired in the same unknown firearm that fired the Item 5 bullet. The Item 2 and 5 bullets are eliminated as having been fired in the same firearm that fired the Item 1 and 4 bullets. The Item 3 bullet is eliminated as having been fired in the same unknown firearm that fired the Item 2 and 5 bullets. The Item 3 bullet is also eliminated as having been fired in the firearm that fired the Item 1 and 4 bullets.
MMDEHF	The Item 2 through Item 5 fired bullets were examined and each determined to be a 38 class (consistent with a 9mm) caliber full metal jacketed bullet that was fired from a barrel having conventional style rifling consisting of six lands and grooves with right twist. The Item 2, Item 4, and, Item 5 fired bullets were microscopically compared to the Item 1 test fired exemplars from the Pietro Beretta pistol based on the agreement of class characteristics. The Item 4 fired bullet was identified as having been fired by the Pietro Beretta pistol due to sufficient agreement of individual characteristics. Based on differences in individual characteristics, Item 2 and Item 5 were eliminated as being fired by the Pietro Beretta pistol. The Item 2 and Item 5 fired bullets

TABLE 2

WebCode	Conclusions
	were identified as having been fired by the same unknown firearm due to sufficient agreement of individual characteristics. Based on differences in class characteristics, the Item 3 fired bullet was eliminated as having been fired by the Pietro Berreta pistol and/or the same unknown firearm that the Item 2 and Item 5 fired bullets were fired from. Firearms rifled with similar class characteristics as the Item 2 and Item 3 fired bullets are too numerous to list. Any firearms recovered during the course of this investigation should be submitted, along with these items for comparison purposes. The significance of these identifications is made to the practical, not absolute, exclusion of all other firearms.
MQWCWH	1.) Examinations showed Item 4 was discharged from the same firearm as Item 1. 2.) Examinations showed Items 2, 3 and 5 were not discharged from the same firearm as Item 1.
MRUT2T	RESULTS: Items 1A – 1C, 4: The bullets were Identified to each other. The bullets were Eliminated to the Item 2, 3, and 5 bullets. Item 3: The bullet was Eliminated to the Item 2 and 5 bullets. The bullet displays rifling characteristics similar to firearms by Ruger, Taurus, and Walther among others. Items 2, 5: The bullets were Identified to each other. The bullets display rifling characteristics similar to firearms by Beretta, FN/Browning, and Ruger among others.
MZ6TXP	Comparisons performed between the test fired bullets (Item 1) and bullet (Item 4) resulted in an identification. The bullet (Item 4) has been identified as having been fired from the barrel of the listed firearm. Comparisons performed between the test fired bullets (Item 1) and bullets (Items 2, 3 & 5) resulted in an exclusion. The bullets (Items 2, 3 & 5) were NOT fired from the barrel of the listed firearm. Comparisons performed between bullet (Item 2) and bullet (Item 5) resulted in an identification. Comparisons performed between bullet (Item 2) and bullet (Item 3) resulted in an exclusion.
N3KVUK	I conducted a comparative microscopic examination between the three bullets (Item 1) and each of the single bullets in Items 2, 3, 4 and 5. I formed the following opinions based upon my examination: The barrel used to discharge the bullets Item 1 was also used to discharge the bullet Item 4. A second barrel was used to discharge both Items 2 and 5. A third barrel was used to discharge Item 3.
NCBCNV	1. Exhibit 1 contains three 9mm bullets that are test standards from a Beretta 92F pistol. 2. Exhibits 2, 3, 4 and 5 each contain one 9mm bullet, which were microscopically compared to the Exhibit 1 test standards. a. Microscopic comparison disclosed sufficient agreement of class and individual characteristics to conclude that Exhibit 1 and Exhibit 4 were fired in the same firearm. b. Microscopic comparison disclosed sufficient agreement of class and individual characteristics to conclude that Exhibit 2 and Exhibit 5 were fired in the same firearm. c. Microscopic comparison disclosed sufficient disagreement of individual characteristics to conclude that Exhibits 2 and 5 were not fired in the same firearm as the Exhibit 1 test standards. d. Microscopic comparison disclosed sufficient disagreement of class characteristics to conclude that Exhibit 3 was not fired in the same firearm as Exhibits 1, 2, 4 or 5.
NFP87D	Bullets Item 1, 2, 3, 4 and 5 were microscopically examined and compared. Based on class and individual characteristics, questioned bullet Item 4 is similar with fired bullets Item 1. Hence, bullet Item 4 was fired using Pietro Beretta Model 92F handgun. Bullets Item 2, 3 and 5 were dissimilar with fired bullets Item 1.
NL2TG6	Item 1, Item 4: One of the Item 1 representative test fires was Identified to Item 4. Item 2, Item 5: The bullets were Identified to each other. The bullets were Eliminated to Items 1, 3, and 4. Item 2 has design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. Item 3: The bullet was Eliminated to Items 1 and 4. Item 3 has design features consistent with bullets

TABLE 2

WebCode	Conclusions
	loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics.
NMBZLJ	1. A microscopic comparative examination of Bullet B-3 (Item#4) against Pistol P-1 (Item# 1), disclosed that Bullet B-3 was discharged from Pistol P-1. 2. A microscopic comparative examination of Bullet B-1 (Item#2) against Bullet B-4 (Item#5) disclosed that Bullet B-1 and Bullet B-4 were discharged in the same unknown firearm. Bullet B-1 and Bullet B-4 were not discharged from Pistol P-1, due to differences in class characteristics. A microscopic comparative examination of Bullet B-2 (Item#3) against Pistol P-1 (Item#1) and Bullet B-3 (Item#4), disclosed that these items have similar class characteristics, however there were insufficient individual corresponding microscopic markings to permit a positive identification (Inconclusive). Bullet B-2 was not discharged from the same firearm Bullet B-1 (Item#2) and Bullet B-4 (Item#5), due to differences in class characteristics.
NNK8MQ	2.1: The exhibit bullet marked Item 4 was fired from the seized firearm (Pietro Beretta model 92F). The bullet exhibit marked item 4 was fired from the same firearm with tests bullets marked items (2-5). 2.2: The exhibits bullets marked item 2 and item 5 were fired from the same firearm. 2.3: The exhibit bullet marked item 3 was not fired from the same firearm as bullets mentioned above in 2.1 and 2.2.
NTE48B	1: One of the recovered questioned bullets (Item 4) was identified to be fired in the same firearm as the known bullets (Item 1). 2: Three of the recovered questioned bullets (Item 2, 3, 5) were eliminated to be fired in the same firearm as the known bullets (Item 1). 3: Two of the recovered questioned bullets (Item 2, 5) were identified to be fired in the same firearm.
NU8YRY	Item 4 (one bullet) was identified* as having been fired by the same firearm as the bullets of Item 1 (three bullets said to be test fired from a Beretta Model 92F pistol). Item 2 (one bullet) and Item 5 (one bullet) were identified* as having been fired by the same firearm. Items 2, 5 and 3 (one bullet) were fired in a different firearm than the bullets of Item 1. Item 3 was fired in a different firearm than Item 2. *Source identification is reached when the discernable class and individual characteristics have corresponding detail and the examiner would not expect to see the same arrangement of details repeated in another source.
NVM2Y8	Agreement of class and sufficient agreement of individual characteristics confirmed the Item 1 bullets and Item 4 bullet were fired in the same firearm. Sufficient disagreement of individual characteristics confirmed the Item 1 bullets were fired from a different firearm than the Items 2, 3, and 5 bullets. Agreement of class characteristics indicated the Item 2 and Item 5 bullets could have been fired in the same firearm. Additional agreement was observed, but the firearm in question needs to be examined to determine the significance of the observed agreement.
NVQJ2C	There was sufficient agreement of class and individual characteristic marks to conclude that the fired bullet, Item 4, had been fired from the same firearm as the test fires, Item 1. The fired bullets, Items 2, 3 and 5 were not fired in the same firearm as the test fires, Item 1. The fired bullets, Items 2 & 5, were fired in one firearm.
NY84NR	Three bullets (Item 1) fired using the recovered firearm (known) were fired from the same firearm with (Item 4). Threfore Item 4 was fired from the PB Handgun. In other words Item 1 is positive with Item 4. Bullets recovered from the victim is positive with third bullet recovered from the scene. Therefore Item 5 and Item 2 were fired from the same firearm (2nd F/A). The first bullet recovered from the scene (Item 3) fired from 3rd firearm.
NYM9K6	The visual and/or microscopic analyses of the evidence listed on page 1 were initiated on May 31, 2022 and the results of the evaluations and comparisons are as follows: Based on agreement of discernible class characteristics and sufficient agreement of individual

TABLE 2

WebCode	Conclusions
	characteristics, the 9mm Luger bullets QB1 (Item 2) and QB4 (Item 5) were identified as having been fired with the same unknown firearm (Unknown Firearm 1). Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, the 9mm Luger bullet QB3 (Item 4) was identified as having been fired with K1 (Item 1). Based on disagreement of class and/or individual characteristics the bullet QB2 (Item 3) was eliminated as having been fired with K1 (Item 1) or with Unknown Firearm 1. QB2 (Item 3) has marks of value and is suitable for comparison purposes.
P3K4KJ	Items 001-02 through 001-05 questioned bullets were microscopically compared with each other and with the test fired bullets from 001-01 with the following results: 001-04 was identified as having been fired through the barrel of the known firearm. 001-02 and 001-05 were identified as having been fired through the barrel of the same firearm, and they were eliminated as having been fired through the barrel of the known firearm. 001-03 was eliminated as having been fired through the barrel of the known firearm, and it was eliminated as having been fired through the barrel of the same firearm as 001-02 and 001-05.
P4XLNC	Item 4 was fired in the same firearm as the item 1 test fires. Items 2 and 5 were fired in a second firearm. Items 2 and 5 are consistent with bullets from ammunition designated 9mm Luger. A list of makes of firearms that may have fired these items includes, but is not limited to: Beretta, CZ, Colt, Diamondback, FMJ, FN/Browning, Heckler and Koch, Kahr Arms, Keltec, Norinco, Ruger, Springfield, SWD, Tanfoglio, Taurus and Walther. Item 3 was fired in a third firearm. Item 3 is consistent with a bullet from ammunition designated 9mm Luger. A list of makes of firearms that may have fired this item includes, but is not limited to: Beretta, CZ, Colt, FMJ, FN/Browning, Heckler and Koch, Kahr Arms, Keltec, Norinco, Ruger, Springfield, SWD, Tanfoglio, Taurus and Walther.
P6LCKM	Exhibit 4 (spent projectile) was identified as having been fired in the same firearm as exhibit 1. Exhibit 2 (spent projectile) and exhibit 5 (spent projectile) were identified as having been fired in a second 9mm firearm. These projectiles were not fired in the same firearm as exhibits 1 and 4, based on differences in individual characteristics. The specific brand of the suspect weapon is unknown at this time. Exhibit 3 (spent projectile) was fired in a third 9mm firearm. This projectile was not fired in the same firearm as exhibits 1 and 4, or the same firearm as exhibits 2 and 5 (spent projectiles), based on differences in class characteristics. The specific brand of the suspect weapon is unknown at this time.
PAYZAD	Beretta pistol discharged Item#4. Beretta pistol didn't discharge item #2,#3 & #5. Item #2 & #5 were discharge from the same pistol (C1). C1 pistol didn't discharge item #3.
PF4ZFL	Items 1 and 4 (fired bullets) were each fired in the same firearm. Items 2 and 5 (fired bullets) were each fired in the same firearm; however, they were not fired from the firearm which fired items 1 and 4. Item 3 (fired bullet) was not fired from the firearm which fired items 1 and 4 or the firearm which fired items 2 and 5. Identification is the strongest level of positive association.
PF8HHR	1. Examination of Exhibit 1 revealed three (3) fired 9mm caliber brass FMJ bullets test fired from the suspect's firearm displaying six land and groove impression with a right hand twist. 2. Examination of Exhibits 2 through 5 revealed each contains one (1) fired 9mm caliber brass FMJ bullet displaying six land and groove impression with a right hand twist. 3. Microscopic comparison revealed Exhibit 4 was fired from the same firearm as Exhibit 1 based on sufficient agreement of individual characteristics. 4. Microscopic comparison revealed Exhibit 2 was fired from the same firearm as Exhibit 5 based on sufficient agreement of individual characteristics. 5. Microscopic comparison revealed Exhibit 1 and 4 were not fired from the same firearm as Exhibit 2 and 5 based on sufficient disagreement of individual characteristics. 6. Microscopic comparison revealed Exhibit 3 was not fired from the same firearm as Exhibits 1 and 4 or

TABLE 2

WebCode	Conclusions
	Exhibits 2 and 5 based on disagreement of class characteristics. TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm/tool which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm/tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm/tool surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm/tool are not to the absolute exclusion of all other firearms/tools because it is not feasible to examine all possible firearms/tools. However, observing this amount of agreement from a different source is considered extremely remote.
PM4DFP	The Item 4 bullet was fired from the Item 1 pistol. The Items 2 and 5 bullets were fired from the same unknown firearm and the Item 3 bullet was fired from a different unknown firearm.
PNKA8P	EXAMINATIONS AND CONCLUSIONS: Per the case agent, the bullets in Item 1 were test-fired in a Pietro Beretta Model 92F, 9mm Luger caliber pistol. Only the test-fired bullets and not the pistol were submitted for examination. Item 4: Microscopic comparison of the bullet, Item 4, to a test-fired bullet from the Beretta pistol, Item 1, revealed that they have the same class of rifling and sufficient corresponding individual marks to conclude that Item 4 was fired in the Beretta pistol. Item 2 and Item 5 - Unknown Firearm #1: Microscopic comparison of these bullets revealed that they have the same class of rifling and sufficient corresponding individual marks to conclude that Item 2 and Item 5 were fired in the same unknown firearm. Microscopic comparison of these bullets to a test-fired bullet from the Beretta pistol, Item 1, revealed that they have similar class of rifling marks, but significant disagreement in individual marks to conclude that Item 2 and Item 5 were not fired in the Beretta pistol. Item 3– Unknown Firearm #2: Microscopic comparison of this fired bullet to a test-fired bullet from the Beretta pistol, Item 1, revealed significant differences in the class of rifling marks. This fired bullet was eliminated as having been fired in the Beretta pistol. Microscopic comparison of this fired bullet to Item 2 and Item 5, revealed significant differences in the class of rifling marks. This fired bullet was eliminated as having been fired in Unknown Firearm #1. In summary, there are three firearms represented by Items 2 through 5. Item 4 was fired in the Beretta pistol. Items 2, 3, and 5 were eliminated as having been fired in the Beretta pistol.
PQ92YL	The bullets in Item #1 were microscopically inter-compared and used for comparison purposes. The item #1 and #4 bullets were fired from the same firearm. The item #2 and #5 bullets were fired from a second firearm. The item #3 bullet was fired from a third firearm.
PYXRG8	MICROSCOPIC EXAMINATION: THE ABOVE LISTED EVIDENCE WAS EXAMINED AND COMPARED TO EACH OTHER WITH THE FOLLOWING RESULTS: IDENTIFICATION: ITEMS #1 & 4 WERE MICROSCOPICALLY EXAMINED AND COMPARED. BASED ON THE OBSERVED AGREEMENT OF THEIR CLASS CHARACTERISTICS AND SUFFICIENT AGREEMENT OF THEIR INDIVIDUAL CHARACTERISTICS, ITEMS #1 & 4 ARE BOTH IDENTIFIED AS HAVING BEEN FIRED FROM THE SAME FIREARM, THE 9MM LUG CAL BERETTA PISTOL. IDENTIFICATION: ITEMS #2 & 5 WERE MICROSCOPICALLY EXAMINED AND COMPARED. BASED ON THE OBSERVED AGREEMENT OF THEIR CLASS CHARACTERISTICS AND SUFFICIENT AGREEMENT OF THEIR INDIVIDUAL CHARACTERISTICS, ITEMS #2 & 5 ARE BOTH IDENTIFIED AS HAVING BEEN FIRED FROM THE SAME FIREARM. ELIMINATION: ITEMS #1 & 4 WERE MICROSCOPICALLY EXAMINED AND COMPARED TO ITEMS #2, 3 & 5. BASED ON THE OBSERVED DISAGREEMENT OF INDIVIDUAL CHARACTERISTICS, ITEMS #1 & 4 ARE ELIMINATED AS HAVING BEEN FIRED BY THE SAME FIREARM AS ITEMS #2, 3 & 5. ELIMINATION: ITEMS #2 & 5 WERE MICROSCOPICALLY EXAMINED AND COMPARED TO ITEMS #1, 3 & 4 BASED ON THE

TABLE 2

WebCode	Conclusions
	OBSERVED DISAGREEMENT OF INDIVIDUAL CHARACTERISTICS, ITEMS #2 & 5 ARE ELIMINATED AS HAVING BEEN FIRED BY THE SAME FIREARM AS ITEM #1, 3, & 4. ELIMINATION: ITEM #3 WAS MICROSCOPICALLY EXAMINED AND COMPARED TO ITEMS #1, 2, 4 & 5. BASED ON THE OBSERVED DISAGREEMENT OF INDIVIDUAL CHARACTERISTICS, ITEM #3 IS ELIMINATED AS HAVING BEEN FIRED BY THE SAME FIREARM AS ITEM #1, 2, 4 & 5.
Q46NFD	1. Examinations showed Item 4 was discharged from the same firearm as Item 1. 2. Examinations showed Items 2, 3, and 5 were not discharged from the same firearm as Item 1.
QCPFC8	I microscopically compared Items 1A, 2, 3, 4, and 5 to each other. I identified Item 4 as being fired in Item 1 based on sufficient agreement of individual characteristics within the land impressions. I identified Items 2 and 5 as being fired in a second firearm based on sufficient agreement of individual characteristics within the land impressions. Item 3 can be eliminated as being fired in the same firearm as Items 2 and 5 and from being fired in Item 1 based on significant disagreement of individual characteristics within the land and groove impressions. Item 3 was fired in a third firearm.
QM3V2R	The item 4 bullet is identified as having been fired in the same firearm as items 1A, 1B, and 1C. The item 2, 3, and 5 bullets are eliminated as having been fired in the same firearm as items 1A, 1B, and 1C. The item 2 and 5 bullets are identified as having been fired in the same unknown firearm. The item 3 bullet is eliminated as having been fired in the same firearm as items 2 and 5. It was fired in a second unknown firearm.
QVFR2R	The bullets in Items 1 through 5 were compared microscopically with each other. The bullets in Items 1 and 4 were identified as having been fired from a single firearm. The bullets Items 2 and 5 were identified as having been fired from a single (second) firearm. The bullet Item 3 was not fired from the same firearm as Items 1 and 4 nor was it fired from the same firearm as Items 2 and 5. All of the bullets submitted in Items 1 through 5 bear rifling engravings of 6 grooves, right twist with dimensions known to be used by numerous manufacturers of 9mm Luger caliber firearms. Any firearm of a compatible caliber that becomes suspect should be submitted to this laboratory for examination.
R6HEDC	Item 4 was fired in the same firearm as the item 1 test fires. Items 2 and 5 were fired in a second firearm. Items 2 and 5 are consistent with bullets from ammunition designated 9mm Luger. A list of makes of firearms that may have fired these items is not provided due to its extensive length. Item 3 was fired in a third firearm. Item 3 is consistent with a bullet from ammunition designated 9mm Luger. A list of makes of firearms that may have fired this item is not provided due to its extensive length.
R7RG4G	Before examination the bullets recovered after a homicide in a warehouse were marked TG1 (Item 2), TG2 (Item 3), TG3 (Item 4) and TG4 (Item 5). The bullets test fired from the suspect´s handgun were marked VG1, VG2 and VG3. These bullets were compared using a Leica FSC comparison Microscope. In addition, the ammunition parts were scanned and compared with the laser-based BalScan system. 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. Based on the observed similarities in the individual characteristics of TG3 (Item 4) compared to VG1, VG2 and VG3, it is concluded that this bullet was fired from the suspect's firearm. The other bullets did not come from the gun seized from the suspect.
R86Z4Q	On examination, I found: a. the characteristic marks on questioned bullet recovered from scene (Item 4) to be similar to the characteristic marks on known fired bullets (item 1). b. the characteristic marks on questioned bullets recovered from scene (Item 2, 3 and 5) to be

TABLE 2

WebCode	Conclusions
	dissimilar to the characteristic marks on known fired bullets (item 1). Therefore, I am of the opinion that: a. the questioned bullet recovered from scene (Item 4) was fired from the same firearm as the known fired bullets (item 1). b. the questioned bullets recovered from scene (Item 2, 3 and 5) were not fired from the same firearm as the known fired bullets (item 1).
RAUCYQ	The bullet marked as number 4 is identified with the known bullets fired from the known Pietro Beretta firearm. Bullets number 2, 3 and 5 are eliminated with the known bullets of the firearm.
RCGTC6	The Item 1.1 bullets were used as known test fires for comparison to Items 1.2 through 1.5. Items 1.2 and 1.5 were microscopically compared to the Item 1.1 bullets. The comparison revealed that the Items 1.2 and 1.5 bullets had the same class characteristics as the Item 1.1 bullets. However, Items 1.2 and 1.5 and the Item 1.1 bullets had significant differences their individual characteristics. Items 1.2 and 1.5 were eliminated as having been discharged from the same firearm that discharged the Item 1.1 bullets. Item 1.3 was microscopically compared to the Item 1.1 bullets. The comparison revealed that the Item 1.3 bullet and the Item 1.1 bullets had different class characteristics. Item 1.3 was eliminated as having been discharged from the same firearm that discharged the Item 1.1 bullets. Item 1.4 was microscopically compared to the Item 1.1 bullets. The comparison revealed that the Item 1.4 bullet and the Item 1.1 bullets had the same class characteristics and corresponding individual characteristics. Item 1.4 was identified as having been discharged by the same firearm that discharged the Item 1.1 bullets.
RE8XYC	The bullets in Item 1 (A, B, C) were visually inspected. The bullets Items 2 and 5 were Identified to each other. They were Eliminated from Items 1(A, B, C), 3, and 4. They are 38 caliber class (38, 357, 9mm). There are numerous manufacturers of firearms with similar rifling characteristics. The bullet Item 3 was Eliminated from Items 1(A, B, C), 2, 4, and 5. It is 38 caliber class (38/357/9mm). There are numerous manufacturers of firearms with similar rifling characteristics. The bullet Item 4 was Identified to the bullet Item 1(B).
RNFR3P	Item 1 positive with Item 4. Item 2 positive with Item 5. Item 3 negative with Item 1, 2 , 4 and 5.
RPQQYJ	1: Item 4: Second bullet recovered from the scene was firing by the recovered firearm (a Pietro Beretta Model 92F handgun) 2: Item 2: Bullet recovered from the victim, Item 3: First bullet recovered from the scene and Item 5: Third bullet recovered from the scene was firing by another guns.
RQXZ3A	The Items 01-02 and 01-05 bullets were unable to be identified or eliminated as having been fired from the same firearm as the Items 01-01 and 01-04 bullets due to a lack of reproducible marks. The Items 01-02 and 01-05 bullets were identified as having been fired from the same unknown firearm. The Item 01-03 bullet was eliminated as having been fired from the same firearm(s) as the Items 01-01, 01-02, 01-04, and 01-05 bullets. The Item 01-03 bullet was fired from an unknown 38 caliber class firearm with six conventionally rifled lands and grooves with a right hand twist. A caliber within the 38 caliber class includes, but is not limited to, 9mm Luger. Possible manufacturers of the firearm that could have fired this bullet include, but are not limited to, FN/Browning, Ruger, Springfield Armory, Tanfoglio, Taurus, and Walther. The Item 01-04 bullet was identified as having been fired from the same firearm as the Item 01-01 bullets.
RVCNM8	3 firearms on the scene. Item 1 matches Item 4 (1st firearm). Item 2 matches Item 5 (2nd firearm). Item 3 from the 3rd firearm.
RW6J4N	Bullet Analysis: Methodology: Physical (Visual Examination), Electronic Balance/Digital Caliper/Digital Micrometer, Microscopy (Comparison Microscope). Items 2, 3, 4 and 5 are 38

TABLE 2

WebCode	Conclusions
	caliber class bullets based upon the diameter. Item 4, the bullet, was fired through the barrel of the same firearm as Items 1A, 1B and 1C, the test fires, based upon corresponding class and individual microscopic characteristics. Items 2 and 5, the bullets, were fired through the barrel of the same firearm based upon corresponding class and individual microscopic characteristics. Items 2 and 5, the bullets, were not fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the test fires, based upon different individual microscopic characteristics. Item 3, the bullet, was not fired through the barrel of the same firearm as Items 1A, 1B, and 1C, the test fires, based upon different class characteristics. Item 3, the bullet, was not fired through the barrel of the same firearm as Items 2 and 5, the bullets, based upon different class and individual microscopic characteristics. Opinion/Interpretation: Items 2, 3, 4 and 5 are consistent with bullets loaded in 9mm Luger, .357 SIG, .357 Magnum, and .38 Special caliber cartridges based upon the weight and style.
RZ8D7Y	Bullets P3/4- Item 4 and PA1 1/3- item 1. They were fired by a Pietro Beretta model 92F pistol, caliber nine millimeters, with a six (6) right-rotation rifling bore. Bullets named P1/4 item 2 and P4/4 - item 5. They were fired by the same 9-millimeter Luger pistol-type firearm with six (6) right-rotation rifling, diferent from the one that fired the P3/4 projectile - item 4. Bullet named P2/4 - item 3 caliber nine-millimeter Luger, is not identified with any bullets of the other items. Bullets items one (1) to five (5). They were fired from three (3) 9-millimeter Luger pistol-type firearms with six (6) right-rotation rifling.
T2GMWB	Item (#2, #3, #4, #5) were microscopicially examined to each other. Based on these comparative examinations and observed class and individual characteristics. It was determined that ; item #2, #3, #5, were not discharged from the same firearm as the known expended cartridge case (item #1).
T4MCWY	Examinations showed Item 1 and Item 4 were discharged from the same firearm. Examinations showed Item 2 and Item 5 were discharged from the same unknown firearm. Examinations showed Item 3 was not discharged from the same firearms as Items 1,2,4,5.
T6CEW9	Items 1A1 through 1A3 (1) and 1D (4) (fired bullets) are identified as having been fired from the same firearm. Items 1B (2) and 1E (5) (fired bullets) are identified as having been fired from the same firearm. Item 1C (3) (fired bullet) is eliminated as having been fired from the same firearm(s) as Items 1A1 through 1A3 (1), 1B (2), 1D (4), and 1E (5) (fired bullets). There are differences in class characteristics (land and groove width). Items 1A1 through 1A3 (1) and 1D (4) (fired bullets) are inconclusive as having been fired in the same firearm as Items 1B (2) and 1E (5) (fired bullets). These items share agreement of class characteristics, but disagreement of the individual characteristics observed in the land impressed areas. Items 1A1 through 1A3, 1B, 1C, 1D, and 1E are consistent with being .38/9mm caliber class fired metal jacketed bullets displaying conventional rifling specifications of six lands and grooves with a right twist.
T7NDWW	As a result of physical and microscopic examination of the submitted evidence, it is my opinion that: A: The projectile mentioned in item 1-4 above was fired from the Beretta pistol that created item 1-1 test fires. B: The projectiles mentioned in items 1-2 and 1-5 above were fired from the same unknown weapon capable of chambering and firing .38 caliber class ammunition. Not the same weapon that created 1-1, 1-3, or 1-4 due to a disagreement of individual microscopic markings. C: The projectile mentioned in item 1-3 above was fired from an unknown weapon capable of chambering and firing .38 caliber class ammunition, not the same weapon(s) that fired items 1-1, 1-2, 1-4, or 1-5, due to a disagreement of individual microscopic markings.
T8FC2A	Item 4 was fired in the same firearm as the item 1 test fires. Items 2 and 5 were fired in a second firearm. Items 2 and 5 are consistent with bullets from ammunition designated 9mm

TABLE 2

WebCode	Conclusions
	Luger. A list of makes of firearms that may have fired these items is not provided due to its extensive length. Item 3 was fired in a third firearm. Item 3 is consistent with a bullet from ammunition designated 9mm Luger. A list of makes of firearms that may have fired this item is not provided due to its extensive length.
T9F3PP	Comparative examinations of Item 4 (bullet recovered from the scene) against Item 1 (three bullets fired using the recovered firearm) showed the presence of matching features. This indicates that Item 1 and Item 4 were fired from the same firearm. Comparative examinations of Items 2, 3 and 5 (three bullets recovered from the victim and the scene) against Item 1 showed the presence of different features. This indicates that Items 2, 3 and 5 were fired from a firearm different than that used to fire Item 1.
TAPK99	The fired bullet of item #4 was microscopically identified as having been fired from the suspect firearm. The fired bullets of items #2 and #5 were microscopically identified as having been fired in an unknown firearm. The fired bullet of item #3 was eliminated from having been fired from the suspect firearm, as well as from the unknown firearm that fired items #2 and #5, due to significant differences in individual characteristics. This bullet was determined to have been fired from a second unknown firearm. The fired bullets of items #2, #3, and #5 were consistent with .38 caliber bullets most commonly loaded into 9mm Luger, 38 Special, and 357 Magnum caliber cartridges.
TD9HMB	Visual and microscopic examination of the metal jacketed bullet (Item 4) revealed it is consistent with a 38 caliber bullet having six land and groove impressions with right twist. Microscopic comparison of the metal jacketed bullet (Item 4) revealed sufficient agreement of individual characteristics to conclude that it was fired through the barrel of the same firearm as the test-fired bullets (Items 1, 1A, and 1B). Visual and microscopic examination of the metal jacketed bullets (Items 2, 3, and 5) revealed they are consistent with a 38 caliber bullet having six land and groove impressions with right twist. Common firearms with the same general rifling characteristics as the metal jacketed bullets (Items 2, 3, and 5) are too numerous to list. All 38 caliber firearms encountered during the course of this investigation should be submitted to the [Laboratory] for examination. Microscopic examination and comparison of the metal jacketed bullets (Items 2, 3, and 5) failed to reveal sufficient quantity and quality of individual characteristics to determine whether or not they were fired through the barrel of the same firearm or through the barrel of the firearm that fired Items 1, 1A, 1B, and 4.
TEGTJE	In my opinion, the exhibit 9mm/.38/.357 calibre fired bullet bears sufficient agreement in class and individual characteristics to the test fires to form the conclusion that the exhibit was discharged from the test 9mm Parabellum calibre BERETTA 92F self-loading pistol
TFFNDJ	Item 004 was microscopically compared to Item 001 and could neither be identified nor eliminated as having been fired from the same firearm barrel due to the correspondence of all discernible class characteristics and sufficient agreement of potential individual characteristics ; however, without a firearm to evaluate, the presence of subclass characteristics cannot be eliminated. Item 002 and Item 005 were microscopically compared to each other and could neither be identified nor eliminated as having been fired from the same unknown firearm barrel due to the correspondence of all discernible class characteristics and sufficient agreement of potential individual characteristics ; however, without a firearm to evaluate, the presence of subclass characteristics cannot be eliminated. Item 002 and Item 005 were microscopically compared to Item 001 and Item 004. Item 002 and Item 005 could neither be identified nor eliminated as having been fired from the same firearm barrel(s) as Item 001 and Item 004 due to the correspondence of all discernible class characteristics and some disagreement of potential individual characteristics, but insufficient for an elimination. Item 002 and Item 005

TABLE 2

WebCode	Conclusions
	are 38 caliber-class copper-jacketed bullets fired from a firearm(s) with a conventional rifling pattern of six lands and grooves with a right twist. The size, weight, and configuration of Item 002 and Item 005 are most consistent with bullets typically used in 9mm Luger caliber ammunition. The class characteristics of Item 002 and Item 005 were searched through a General Rifling Characteristics (GRC) database to generate a list of firearms that could have fired these items. The generated list was too extensive to be of any investigative value. A complete list of the search results will be maintained in the case record. This list is not meant to be all-inclusive, but rather an investigative aid. Any suspect firearm(s) of the appropriate caliber-class should be submitted for comparison. Item 003 was microscopically compared to Item 001 and Item 004, as well as Item 002 and Item 005. Item 003 could neither be identified nor eliminated as having been fired from the same firearm barrel(s) as Item 001 and Item 004 or from the same firearm barrel(s) as Item 002 and Item 005 due to the correspondence of discernible class characteristics and some disagreement of potential individual characteristics, but insufficient for an elimination. Item 003 is a 38 caliber-class copper-jacketed bullet fired from a firearm with a conventional rifling pattern of six lands and grooves with a right twist. The size, weight, and configuration of Item 003 are most consistent with bullets typically used in 9mm Luger caliber ammunition. The class characteristics of Item 003 were searched through a General Rifling Characteristics (GRC) database to generate a list of firearms that could have fired Item 003. The generated list was too extensive to be of any investigative value. A complete list of the search results will be maintained in the case record . This list is not meant to be all-inclusive, but rather an investigative aid. Any suspect firearm(s) of the appropriate caliber-class should be submitted for comparison.
TJZHAJ	Exhibit 4 (spent projectile) was identified as having been fired in the same 9mm firearm that fired exhibit 1. Exhibits 2 and 5 (spent projectiles) were identified as having been fired in a second 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis. Exhibits 2 and 5 were not fired in the same firearm as exhibits 1 and 4 based on differences in individual characteristics. Exhibit 3 (spent projectile) was fired in a third 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis. Exhibit 3 was not fired in the same firearm as exhibits 1 and 4 or the same firearm as exhibits 2 and 5 based on differences in individual characteristics.
TL4DR2	The bullet in Item 4 was discharged from the same barrel which discharged the bullets in Item 1. This identification is based on an agreement of both class and individual characteristics. The bullets in Items 2, 3, 5 were not discharged from the same barrel which discharged the bullets in Item 1. These exclusions are based on differences of class characteristics. When inter-compared, the bullets in Items 2 and 5 were found upon microscopic comparison to have been discharged from the same unknown barrel. This identification was based on an agreement of both class and individual characteristics.
TTLMFX	Item 001-04 was identified as having been fired from the Pietro Beretta Model 92F, 9mm Luger caliber pistol that fired Item 001-01 based on the agreement of class characteristics and individual characteristics observed in the land impressions. Items 001-02 and 001-05 were identified as having been fired from the same unknown firearm based on the agreement of class characteristics and individual characteristics observed in the land impressions. Item 001-03 was eliminated as having been fired by the Pietro Beretta Model 92F, 9mm Luger caliber pistol that fired Items 001-01 and 001-04 based on differences in class characteristics. The difference being the land impression widths. Item 001-03 was eliminated as having been fired by the same unknown firearm that fired Items 001-02 and 001-05 based on differences in class characteristics. The difference being the land impression widths.

TABLE 2

WebCode	Conclusions
TV8LEE	SUMMARY OF RESULTS AND INTERPRETATIONS: ITEM 1.1 - 1.5: The expended bullets were originally components of seven (7) 9mm class caliber cartridges that had been fired in a barrel with six (6) lands and grooves of conventional style rifling with a right hand twist. A Microscopic examination and comparison revealed the following: Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, known test fire Items 1.1 and Item 1.4 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, Items 1.2 and 1.5 are identified as having been fired from a second unknown firearm. Item 1.3 is eliminated as having been fired from the same firearms as Items 1.1, 1.2, 1.4 and 1.5, based on the observed disagreement of class and individual characteristics. Item 1.3 was fired from a third unknown firearm.
TXRKHB	Item 001-04 was fired in the same firearm as Item 001-01 (identification). This is also the opinion of Firearms Examiner. Item 001-02 was fired in the same firearm as Item 001-05 (identification). This is also the opinion of Firearms Examiner. Items 001-02 and 001-05 were not fired in the same firearm as Items 001-01 and 001-04 (elimination). This is also the opinion of Firearms Examiner. Item 001-03 was not fired in the same firearms as Items 001-01 and 001-04 or Items 001-02 and 001-05 (elimination). This is also the opinion of Firearms Examiner.
TY8NNB	Items: Description/Visual Examination: Item 1: Three (3) reported test fired bullets. Items 2 thru 5: Four (4) fired 9mm caliber full metal jacket bullets with six (6) lands and grooves right-hand twist rifling impression. Microscopic Comparison Conclusions: Identification: Based upon the reproducibility of class characteristics and microscopic individual characteristics, the following identifications were made: Item 4 fired thru the same firearm barrel as Item 1. Items 2 & 5 fired thru the same firearm barrel. Elimination: Based upon the difference in individual characteristics, the following eliminations were made: Items 2 & 5 not fired thru the same firearm barrel as Item 1. Based upon the difference in class characteristics, the following eliminations were made: Item 3 not fired thru the same firearm barrel as Item 1 or thru the same firearm barrel as Items 2 & 5.
TYT982	Visual and microscopic analyses of the evidence bullets Item 2 through Item 5 and the test fired bullets Item 1 from the Beretta 92F 9mm Luger pistol K1 were initiated on July 19, 2022 and the results of the examinations, comparisons, and evaluations are as follows: Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, the evidence bullet Item 4 was identified as having been fired with K1. Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, the evidence bullets Item 2 and Item 5 were identified as having been fired with the same unknown firearm (Firearm A). Based on significant disagreement of individual characteristics, Item 2 and Item 5 were eliminated as having been fired with K1. Based on disagreement of class characteristics, Item 3 was eliminated as having been fired with K1. Based on significant disagreement of individual characteristics, Item 3 was eliminated as having been fired with the same unknown firearm as Item 2 and Item 5. Item 3 was fired with a second unknown firearm (Firearm B). Item 3 has marks of value and is suitable for future microscopic comparisons. Should any other suspect firearm(s) be recovered, submit and reference the above CC#. Sufficient agreement is related to the significant duplication of random toolmarks as evidenced 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.
U3Q4CL	1. Items 1 and 4 were fired from the same known firearm (the recovered firearm by agency). 2.

TABLE 2

WebCode	Conclusions
	Items 2, 3 and 5 were not fired from the firearm that fired Items 1 and 4. 3. Items 2 and 5 were fired from the same unknown firearm. 4. Item 3 was not fired from the firearm that fired Items 2 and 5.
U8GLK7	The following item contained sufficient microscopic individual characteristics and was identified as having been fired in Item 1 (9mm Luger caliber, Beretta, model 92F, semiautomatic pistol): Item 4: (1) 9mm Luger caliber fired bullet. The following item contained different class characteristics than Item 1 (9mm Luger caliber, Beretta, model 92F, semiautomatic pistol) and was eliminated as having been fired in this firearm: Item 3: (1) 9mm Luger caliber fired bullet. The following items contained different individual characteristics than Item 1 (9mm Luger caliber, Beretta, model 92F, semiautomatic pistol) and were eliminated as having been fired in this firearm: Item 2: (1) 9mm Luger caliber fired bullet. Item 5: (1) 9mm Luger caliber fired bullet.
UBGPHK	PROJECTILES: Items 1A and 4: The bullets were Identified to each other. The bullets were Eliminated to the Items 2 and 5 bullets. The bullets were Eliminated to the Item 3 bullet, based on a difference in class characteristics. Items 2 and 5: The bullets were Identified to each other. The bullets were Eliminated to the Item 3 bullet, based on a difference in class characteristics. The bullets have design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. Item 3: The bullet has design features consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics.
UCU7QR	The submitted specimens marked as Items 2, 3, and 5 were examined and identified as three (3) fired bullets consistent with being 9mm Luger caliber exhibiting six (6) land and groove impressions with a right twist. The submitted specimen marked as Item 4 was examined and identified as one (1) fired 9mm Luger caliber bullet exhibiting six (6) land and groove impressions with a right twist. Items 2 -5 were microscopically inter-compared and compared to Item 1 sample bullets. As a result of microscopic comparison it was concluded that Item 4 was identified as having been fired from the same firearm that fired Item 1 sample bullets. It was also concluded that Items 2 and 5 were identified as having been fired from the same unknown firearm. Items 2 and 5 were eliminated as having been fired from the same firearm that fired Item 1 sample bullets based on significant disagreement of individual characteristics. Item 3 was eliminated as having been fired from the same firearm that fired Item 1 sample bullets and was eliminated as having been fired from the same firearm that fired Items 2 and 5 due to significant disagreement of discernible class characteristics. Firearms that produce similar rifling characteristics as those observed on Item 2 include but are not limited to: 9mm Luger caliber firearms manufactured by Beretta, CZ, FEG, FN/Browning, Heckler & Koch, Keltec, Norinco, Ruger, Sig Sauer, Taurus, and Walther. Firearms that produce similar rifling characteristics as those observed on Item 3 include but are not limited to: 9mm Luger caliber firearms manufactured by Belgium, Beretta, FN/ Browning, Heckler & Koch, Keltec, Luger, Polymer 80, Radom, Ruger, Sig Sauer, Springfield, Tanfoglio, Taurus, and Walther.
UJUN9P	With regard to the micro-comparative study, it was determined that: 1. The index marked as one 1 and the index marked as four 4s were fired by the Pietro Beretta Model 92F pistol, without serial number or registration. 2. The clue marked as two 2's and the clue marked as five 5's were fired by the same unknown firearm. 3. The clue marked three 3 was shot by an unknown firearm.
UK6JUG	The examination of the recovered (questioned) bullets under a comparison microscope, allows us to conclude that the bullet from the item 4 was fired form the seized Pietro Beretta model 92F. The examination also showed that items 2 and 5 were fired from a second firearm, and

TABLE 2

WebCode	Conclusions
	the item 3 from a third one.
ULKULU	A: The projectile mentioned in item 1-4 above was fired from the same weapon used to fire Item 1-1 (A, B, & C) test fires (9mm Luger caliber, Beretta, Model 92F, Semi-Auto Pistol) . B: The projectiles mentioned in items 1-2 and 1-5 above were fired from the same unknown weapon capable of chambering and firing .38 caliber class ammunition. NOT the same weapon that created 1-1, 1-3, or 1-4 due to a disagreement of individual microscopic markings. C: The projectile mentioned in item 1-3 above was fired from an unknown weapon capable of chambering and firing .38 caliber class ammunition, NOT the same weapon(s) that fired items 1-1, 1-2, 1-4, or 1-5, due to a disagreement of individual microscopic markings.
UMCUQ8	Item 4 (a bullet recovered from the scene) was microscopically compared to Item 1 (the test fired bullets). Item 4 was identified as having been fired in the recovered firearm based on sufficient agreement of individual characteristics in the rifling marks. Item 3 (a bullet recovered from the scene) was microscopically compared to Item 1. Item 3 was eliminated as having been fired in the recovered firearm based on a difference in class characteristics. Items 2 and 5 (bullets recovered from the victim and scene, respectively) were microscopically compared to Item 1. Items 2 and 5 were eliminated as having been fired in the recovered firearm based on sufficient disagreement of the individual characteristics in the rifling marks. Items 2 and 5 were microscopically compared and identified as having been fired in the same firearm based on a sufficient agreement of individual characteristics in the rifling marks. Item 3 was microscopically compared to Item 5. Item 3 was eliminated as having been fired in the firearm that fired Item 5 (and Item 2) due to a difference in class characteristics.
UMUYZH	Exhibit 4 (spent projectile) was identified as being fired in the same firearm as exhibit 1 (recovered firearm). Exhibits 2 and 5 (spent projectiles) were fired in a second 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis. Exhibits 2 and 5 were not fired in the same firearm as exhibits 1 and 4 based on differences in individual characteristics. Exhibit 3 (spent projectile) was fired in a third 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis. Exhibit 3 was not fired in the same firearm as exhibits 1 and 4 or the same firearm as exhibits 2 and 5 based on differences in class characteristics.
UN9G3N	Two fired bullets (Items 002 and 005) were microscopically compared to each other and to the submitted test-fired bullets (Item 001) labeled as from a Pietro Beretta Model 92F handgun. Items 002 and 005 were identified as having been fired in the same firearm. However, they were eliminated from having been fired by the same firearm as Item 001. One fired bullet (Item 004) was microscopically compared to the submitted test-fired bullets (Item 001) labeled as from a Pietro Beretta Model 92F handgun. These items were identified as having been fired in the same firearm. One fired bullet (Item 003) was compared to another submitted bullet (Item 005). This bullet (Item 003) was eliminated from having been fired by the same firearm as Items 002 and 005. This fired bullet (Item 003) was also compared to Item 004 and the test-fired bullets (Item 001) labeled as from a Pietro Beretta Model 92F handgun. This bullet (Item 003) has similar class characteristics to Items 004 and 001. However, insufficient individual characteristics were observed to support either an identification or an elimination. Therefore, the result of the comparison is inconclusive.
UQB6M8	The size, weight and configuration of Items 2 through 5 are most consistent with bullets typically found loaded in 9mm Luger and 357 SIG cartridges. Item 4 was identified to Item 1. This identification is based on the agreement of class characteristics, and individual characteristics observed in the land engraved areas. Item 2 was identified as having been fired

TABLE 2

WebCode	Conclusions
	by the same unknown firearm as Item 5. This identification is based on the agreement of class characteristics, and individual characteristics observed in the land engraved areas. Items 2 and 5 were eliminated to Items 1 and 4. These eliminations are based on the disagreement of individual characteristics observed in the land engraved areas. Item 3 was eliminated to Items 1, 2, 4 and 5. This elimination is based on differences in class characteristics. The difference being the land and groove widths. The list of firearms with similar general rifling characteristics that could have fired Item 3 was too inclusive to be of any investigative value. The complete list of possible firearms that could possibly have fired Item 3 will be maintained in the case file.
UUBEXA	PROJECTILES: Items 1 and 4: The bullet Item 4 was Identified as having been fired from the same recovered firearm that produced the Item 1 test fires. Items 2 and 5: The bullets Items 2 and 5 were Identified as having been fired from the same firearm. However, these bullets were Eliminated from the bullets Items 3 and 4 and from the test fires from the recovered firearm Item 1. Based on their design features, the bullets Items 2 and 5 are 38 caliber class (38/357/9mm) and are consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. Therefore, any suspect firearm should be submitted to this laboratory for examination. Item 3: The bullet Item 3 was Eliminated from the bullets Items 2, 4, and 5 and from the test fires from the recovered firearm Item 1. Based on its design features, the bullet Item 3 is 38 caliber class (38/357/9mm) and is consistent with bullets loaded in 9mm Luger caliber cartridges. There are numerous manufacturers of firearms with similar rifling characteristics. Therefore, any suspect firearm should be submitted to this laboratory for examination.
UWJPKP	1. Examination revealed the bullets in Exhibits 1 to 5 are 9mm Luger displaying 6 land and groove engraved areas with a right-hand twist. 2. Microscopic comparison concluded Exhibits 1 and 4 were fired from the same firearm due to an agreement of class characteristics and a sufficient agreement of individual characteristics observed. 3. Microscopic comparison concluded Exhibits 2 and 5 were fired from the same firearm due to an agreement of class characteristics and a sufficient agreement of individual characteristics observed. 4. Microscopic comparison concluded Exhibits 1 and 4, 2 and 5, and 3 were not fired from the same firearm due to an agreement of class characteristics and a sufficient disagreement of individual characteristics. Observing this amount of disagreement from the same source is considered extremely remote.
VCNGZZ	Items 2-5 were examined and found to be 9mm 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 and 5 were not fired from the same firearm as Item 1 based on significant differences of individual characteristics. Items 2 and 5 were microscopically compared and were found to have been fired from the same firearm based on the sufficient agreement of individual characteristics. A list of possible firearms that could have fired Items 2 and 5 is too lengthy for this report. Item 3 was not from the same firearm as Items 1, 2, or 5 based on different class characteristics. A list of possible firearms that could have fired Item 3 is too lengthy for this report. Item 4 was fired from the same firearm as Item 1 based on the sufficient agreement of individual characteristics. The above analysis began on 06/15/2022.
VDEKLF	Items: Description/Visual Examination: Item 1: Three (3) fired 9mm caliber full metal jacket bullets with six (6) lands and grooves right hand twist rifling impression reportedly recovered from Pietro Beretta Model 92F handgun. Items 2 thru 5: Four (4) fired 9mm caliber full metal jacket bullets with six (6) lands and grooves right hand twist rifling impression. Microscopic Comparison Conclusions: Identification: Based upon the reproducibility of class characteristics and microscopic individual characteristics, the following identifications were made: Item 4- (1)

TABLE 2

WebCode	Conclusions
	fired projectile, Fired thru the same barrel as Item 1. Items 2 & 5- (2) fired projectiles, Fired thru the same firearm barrel. Elimination: Based upon the difference in individual characteristics, the following eliminations were made: Item 3- (1) fired projectile. Not fired thru the same barrel as Item 1. Not fired thru the same barrel as Items 2 & 5.
VF932A	#1.1 - #1.5: These bullets were compared microscopically with each other. There is agreement in all discernible class characteristics. Items #1.1 and #1.4: These bullets have sufficient agreement in corresponding individual characteristics for identification. Item #1.4 was fired by the firearm that fired Item #1.1. Items #1.1 and #1.4 have sufficient disagreement in individual characteristics with fired bullets, Items #1.2, #1.3, and #1.5. These three (3) bullets are eliminated from being fired by the firearm that discharged Items #1.1 and #1.4. Items #1.2 and #1.5: These bullets have sufficient agreement in corresponding individual characteristics for identification. Items #1.2 and #1.5 were fired by the same firearm though a different firearm than Item #1.1. Items #1.2 and #1.5 have sufficient disagreement in individual characteristics with the fired bullet, Item #1.3. Item #1.3 is eliminated from being fired by the firearm that discharged Items #1.2 and #1.5.
VFMRVZ	Item 1.1 consists of three fired bullets stated to have been fired by a Pietro Beretta brand 9mm Luger pistol, model 92F. Items 1.2, 1.3, 1.4 and 1.5 are consistent with four fired 9mm caliber bullets having six land and groove impressions with a right twist. They were microscopically compared to each other and to the bullets from Item 1.1 and the results are as follows: Based on agreement of all discernible class characteristics and corresponding individual detail in the land impressions, Item 1.4 was identified as having been fired by the same firearm that fired the bullets from Item 1.1. Based on agreement of all discernible class characteristics and corresponding individual detail in the land impressions, Items 1.2 and 1.5 were identified as having been fired by the same firearm. Based on a disagreement of individual detail in the land impressions, Items 1.2 and 1.5 were eliminated as having been fired by the same firearm that fired Items 1.1, 1.3 and 1.4. Based on agreement of all discernable class characteristics and disagreement of individual characteristics, but insufficient for an elimination, Item 1.3 can neither be identified nor eliminated as having fired Items 1.1 and 1.4. Comment: The Identification of cartridge case(s) and/or bullet(s) is made to the practical, not absolute, exclusion of all other firearms. It is not possible to examine all firearms which is a prerequisite for absolute certainty. Sufficient agreement for an identification exists between firearm produced toolmarks when the likelihood another firearm could have fired the cartridge case(s) and/or bullet(s) is so remote as to be considered a practical impossibility.
VMM8JL	1 vs. 4: Microscopic comparisons were conducted between the bullet (Item 4) and the test fired bullets (Item 1). The bullet (Item 4) was identified as having been fired from the same firearm as the test fired bullets (Item 1). The identification was based on the agreement of all discernible class characteristics and sufficient agreement of individual markings present on the bullets. 1 vs. 2,3,5: Microscopic comparisons were conducted between the bullets (Items 2, 3 and 5) and the test fired bullets (Item 1). There exists a disagreement of the discernible class characteristics and individual markings to eliminate the bullets (Items 2, 3 and 5) as having been fired from the same firearm as the test fired bullets (Item 1). 2,5: Microscopic comparisons were conducted between the bullet (Item 2) and the bullet (Item 5). The bullets were identified as having been fired from the same unknown firearm. The identification was based on the agreement of all discernible class characteristics and sufficient agreement of individual markings present on the bullets.
VN2E7N	Comparison microscope examinations were conducted on the evidence listed above. The findings of this examiner are the following: 1: Exhibits 2 and 5 were fired by an unknown 9mm caliber firearm based on sufficient agreement of individual characteristics observed within the

TABLE 2

WebCode	Conclusions
	LIMP indexed with a mark. 2: Exhibit 3 was fired by a second unknown 9mm caliber firearm based on differences of class characteristics (width of LIMP) observed in Exhibits 1, 2, 4, and 5. 3: Exhibit 4 was fired by Exhibit 1 based on sufficient agreement of individual characteristics observed within the LIMP indexed with a mark. 4: For a complete list of possible suspect weapons (Exhibits 2, 3, and 5), please contact the Crime Laboratory's Firearm and Tool Mark Unit. 5: Exhibits 2 through 5 are fired bullets consistent with .38 class projectiles normally loaded in 9mm caliber cartridge.
VU6JR9	Items 1 and 4 were Identified as having been fired from the same firearm. Items 2 and 5 were Identified as having been fired from the same firearm. They were Eliminated with respect to having been fired from the same firearm as Items 1 and 4. The bullets are 38 caliber class (38/357/9mm) based on their design features. There are numerous manufacturers of firearms with similar rifling characteristics. Item 3 was Eliminated with respect to having been fired from the same firearms as Items 1 and 4 or 2 and 5. The bullet is 38 caliber class (38/357/9mm) based on its design features. There are numerous manufacturers of firearms with similar rifling characteristics.
VX7NBT	Item 4 was identified as having been fired by the same firearm that fired Item 1 based on the agreement of class and individual characteristics. Items 2 and 5 were identified as having been fired by the same firearm based on the agreement of class and individual characteristics. Items 2 and 5 could not have been fired by the firearm that fired Item 1 based on differences in class characteristics. Item 3 could not have been fired by the firearm that fired Item 1 or the firearm that fired Items 2 and 5 based on differences in class characteristics.
VXPA4J	The Item 4 bullet was identified, within the limits of practical certainty*, as having been fired by the 9mm Luger calibre, Pietro Beretta model 92F, semi-automatic pistol that generated the Item 1 test fired bullets. The Item 2 and 5 bullets were identified, within the limits of practical certainty*, as having been fired by the same firearm, but not by the 9mm Luger calibre, Pietro Beretta model 92F, semi-automatic pistol that generated the Item 1 test fired bullets. The Item 3 bullet was not fired by the same firearms that fired the Item 1, 2, 4 and 5 bullets. A minimum of three (3) firearm barrels/firearms are represented by the submitted bullets.
W4UG9E	Item 4 was shot in the seized firearm (Beretta 92F, firearm A). Item 2 and item 5 were shot in the same firearm (firearm B). Item 3 was shot in a third firearm (firearm C).
W6KMMJ	2.1: Item 4 was fired from the same firearm as item 1 (known Firearm). 2.2: Items 2,3 and 5 were not fired from the (Pietro Berretta Model 92F). 2.3: The scenario might have consisted of three firearms.
WAKXJJ	2.1: The bullet marked item 4 was fired from the same firearm as item 1 (known firearm) 2.2: The items 2 and 5 were fired from the same firearm. 2.3: Item 3 was fired from a different firearm.
WDEZ87	Item 4 was fired in the same firearm as the item 1 test fires. Items 2 and 5 were fired in a second firearm. Items 2 and 5 are consistent with a bullet from ammunition designated 9mm Luger. A list of makes of firearms that may have fired these items is not provided due to its extensive length. Item 3 was fired in a third firearm. Item 3 is consistent with bullets from ammunition designated 9mm Luger. A list of makes of firearms that may have fired this item is not provided due to its extensive length.
WEC8NB	Microscopic comparison was made between items 2 though item 5 with the following results: Item 2 and item 5 were fired from the same (first) firearm. Item 3 was fired from a (second) firearm. Item 4 was fired from a (third) firearm. Item 4 was microscopically compared to the test standards from the above submitted 9mm Caliber Beretta model 92F, and determined to

TABLE 2

WebCode	Conclusions
	have been fired from the firearm.
WFLAEF	Item 4, a single fired jacketed lead bullet, was identified as having been fired from the same firearm as the Item 1 specimens, based on the agreement of individual and all class characteristics. Item 1 is reported to be test fired specimens from a Beretta Model 92F. Item 2 and Item 5 were eliminated as having been fired in same firearm as the Item 1 specimens based on differences in the individual characteristics. Items 2 and 5 were identified as having been fired in the same unknown firearm based on the agreement of individual and all class characteristics. Item 3 was eliminated as having been fired in the same firearm as the Item 1 specimens based on differences in class characteristics, specifically observable differences in the land and groove dimensions.
WGW2LC	All of the four questioned FB's and tests the exhibit known firearm displayed discernible class characteristics. Two of the questioned FB's (Items 2 & 5) displayed sufficient agreement (strong) in a combination of individual/random striae showing that they were fired in the same firearm - Identification. Questioned FB (Item 4) showed sufficient agreement (as above) with the known FB (Item 1). showing that they were discharged in the same firearm - Identification (different firearm to that which fired FB's (Items 2 & 5). Questioned FB (Item 3) & known FB (Item 1) displayed significant disagreement in individual striae detail showing that this questioned FB was not fired in the exhibit known firearm (Item 1) or the firearm that discharged Items 2 & 5 - Elimination.
WH79HD	The Item 1, 2, 3, 4, and 5 bullets, each consistent in design with a caliber 9mm Luger full-metal jacketed bullet, were examined microscopically and found to be representative of three (3) different firearms because of differences in class and/or individual characteristics as follows: The Item 1 and Item 4 bullets were identified as having been fired from the same firearm. The Item 2 and Item 5 bullets were identified as having been fired from the same firearm. The Item 3 bullet exhibits markings that may be suitable for identification with the firearm from which it was fired.
WQP8JJ	Item 1, 4: The bullet was microscopically identified as having been fired from the Item 1 pistol. Item 2,5: The bullets were microscopically identified as having been fired from the same unknown firearm. The bullets were not fired from the Item 1 pistol. The bullets were determined to be of 9mm caliber displaying rifling characteristics of six lands and grooves, right twist. Manufacturers of firearms with similar rifling characteristics is extensive; a list can be provided upon request. Item 3: The bullet was not fired from the Item 1 pistol, nor the same unknown firearm as Item 2 and Item 5. The bullet was determined to be of 9mm caliber displaying rifling characteristics of six lands and grooves, right twist. Manufacturers of firearms with similar rifling characteristics is extensive; a list can be provided upon request.
X3XMNE	Item #2 and Item #5 were fired from the same firearm, Not Item #1 due to difference in individual characteristics. Item#4 was identified as being fired from Item #1. Item #3 was eliminated as being fired in the same firearms as Item's #2 & #5. Item #3 was when compared to Item #1 was inconclusive.
XBQV8K	The hypothesis that the bullet 4 is fired by the recovered firearm (known – bullets 1) is very strongly supported. The hypothesis that the bullets 2 and 5 are fired by a second firearm is very strongly supported. The hypothesis that the bullet 3 is fired by a third firearm is very strongly supported.
XD88ZV	2022 CTS Forensic Testing Program Test No. 22-5261 Firearms Examination [Examiner]. NOTES: Date Worked 7/14/22. All unknown items were evaluated for suitability prior to comparison to the known item(s). Test Bullet 1, Item 1 was compared microscopically to Items

TABLE 2

WebCode	Conclusions
	2, 3, 4 and 5. Item 4 was found to have a sufficient agreement between striations to Item 1; therefore, Item 4 was fired from the recovered firearm. Items 2, 3 and 5 were found to have a disagreement of individual characteristics to Item 1; therefore, Items 2, 3 and 5 were fired from a different firearm than the recovered firearm. Items 2, 3 and 5 were compared microscopically to each other. Items 2 and 5 were found to have a sufficient agreement between striations; therefore, Items 2 and 5 were fired from the same firearm. Item 3 was found to have a disagreement of individual characteristics to Items 2 and 5; therefore, Item 3 was fired from a different firearm than Items 2 and 5. Items 2, 3, 4 and 5 will be forwarded to the Property Custody Division. Equipment Used: Leeds LCF3 Comparison Microscope Serial # 485128. REPORT: Items 2, 3, 4, 5: A microscopic comparison was conducted between Test Bullet 1, Item 1 that was fired from the recovered firearm and Items 2, 3, 4 and 5. The examinations determined Item 4 was fired from the recovered firearm, due to a sufficient agreement between striations. The examinations determined Items 2, 3 and 5 were not fired from the recovered firearm, due to a disagreement of individual characteristics. A microscopic comparison was conducted between Items 2, 3, and 5. The examinations determined Items 2 and 5 were fired from the same firearm, due to a sufficient agreement between striations. The examinations determined Item 3 was not fired from the same firearm as Items 2 and 5, due to a disagreement of individual characteristics. Disposition: The above listed evidence will be forwarded to the Property Custody Division.
XHQ369	In my opinion, a microscopical comparison of firing marks has shown there is sufficient agreement of class and individual characteristic markings to conclusively determine that the bullet contained in item 4 was fired from the same firearm which generated the test-fired bullets in item 1. 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 contained in items 2, 3 & 5 were not fired from the same firearm which generated the test-fired bullets in item 1.
XJJVZR	Items 1 and 4 were identified as having been fired in the same firearm based on agreement in class and individual characteristics. Items 2 and 5 were identified as having been fired in the same firearm based on agreement in class and individual characteristics. Items 2 and 5 were excluded as having been fired in the same firearm as Items 1 and 4 due differences in individual characteristics. Item 3 was excluded as having been fired in the same firearm(s) that fired Items 1, 2, 4 and 5 based on differences in class characteristics. Items 2, 3 and 5 are 9mm/38 caliber class bullets fired in firearms having six lands and grooves with a right twist. Firearms having similar general rifling characteristics are numerous.
XKBYM8	Item 001-04 was fired from the same firearm as Item 001-01 (identification). Items 001-02 and 001-05 were fired from the same firearm (identification). Items 001-02 and 001-05 were not fired from the same firearm as Items 001-01 and 001-04 (elimination). Item 001-03 was not fired from the same firearm as Items 001-01 and 001-04 or Items 001-02 and 001-05 (elimination).
XP4B7A	Firearm traces on bullet marked as Item 4 matches with firearm traces on a bullets fired from recovered gun Beretta 92F with the highest matching rate - bullet Item 4 was fired from a recovered gun Beretta 92 F. Firearm traces on bullet marked as Item 2 matches with firearm traces on bullet marked as Item 5 with the highest matching rate - bullet Item 2 and bullet Item 5 were fired from the same firearm, but not from the recovered Beretta 92 F. Firearm traces on bullet marked as Item 3 didn't match with none of the firearm traces on investigated bullets (item1, 2, 4 and 5) - bullet Item 3 was not fired from recovered Beretta 92F neither from firearm wich bulllets item 2 and 5 were fired from.

TABLE 2

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XW78AF	The test fired bullets from the Beretta pistol (Item 1) and the fired bullets (Items 2-5) were examined and microscopically compared. The following was determined: 1. The fired bullets listed as Items 2-5 are .38/9mm caliber class bullets. 2. The fired bullet listed as Item 4 was fired from the Beretta pistol. 3. The fired bullets listed as Item 2, Item 3, and Item 5 were not fired from the Beretta pistol. The fired bullets (Items 2, 3 and 5) were then microscopically compared to each other. The following was determined: 1. The fired bullets listed as Items 2 and 5 were fired from the same unknown firearm capable of discharging .38/9mm caliber class ammunition. 2. The fired bullet listed as Item 3 was fired from an unknown firearm capable of discharging .38/9mm caliber class ammunition; however, it is not the same firearm as Items 2 and 5.
XZMTT3	Item 4 is identified as having been fired by the same firearm as items 1A, 1B, and 1C (reported test shots from a 9mm Luger caliber, Beretta, model 92F pistol). Items 2 and 5 are identified as having been fired by the same firearm. Items 2 and 5 are inconclusive as having been fired by the same firearm as items 1A, 1B, and 1C. These items share agreement of class characteristics, but disagreement of the individual characteristics observed in the land impressions. Differences in individual characteristics would suggest a different firearm fired items 2 and 5. Item 3 is inconclusive as having been fired by the same firearm as items 1A, 1B, and 1C. These items share agreement of class characteristics with similarities of the individual characteristics observed in the land impressions, but dissimilarities also observed in the land impressions. Item 3 is inconclusive as having been fired by the same firearm as items 2 and 5. These items share agreement of class characteristics, but disagreement of the individual characteristics observed in the land impressions. Differences in individual characteristics would suggest a different firearm fired item 3. Items 2, 3, and 5 are consistent with being .38 class fired metal jacketed bullets displaying conventional rifling specifications of six lands and grooves with a right twist. Physical characteristics and rifling specifications of these items are consistent with bullets fired by .38 Special, .357 Magnum, .357 SIG, and 9mm Luger caliber firearms produced by numerous manufacturers. However, no suspected firearm should be overlooked.
Y2XRVB	Three different firearms (described as A, B, and C, below, were determined to be involved based on the expended bullets submitted. Firearm A: Beretta Model 92 (Item 1 test fires) fired Item 4. Firearm B: Fired Item 2 (autopsy bullet) and Item 5. Firearm C: Fired Item 3. Additional crime scene information and/or submission of expended cartridge cases may assist in further identification of Firearms B and C.
Y3N3L4	Lab Items #1 (three 9mm test-fired projectiles), #2-5 (~9mm / .38 / .357 FMJ fired projectiles) were examined and microscopically compared between 07/08/2022 and 07/15/2022. Based on agreement of all discernable class characteristics and sufficient agreement of individual characteristics, Lab Item #4 (one 9mm FMJ fired projectile) was positively identified as having been fired in the same firearm as Lab Item #1 (three test-fired projectiles). Based on agreement of all discernable class characteristics and sufficient agreement of individual characteristics, Lab Item #2 (~9mm / .38 / .357 FMJ fired projectile) was positively identified as having been fired in the same firearm as Lab Item #5 (~9mm / .38 / .357 FMJ fired projectile). Based on disagreement of class characteristics, Lab Item #3 (~9mm / .38 / .357 FMJ fired projectile) was eliminated as having been fired in the same firearm as Lab Items #1 (three test fired projectiles), #2, #4 and 5 (~9mm / .38 / .357 FMJ fired projectiles). Based on disagreement of individual characteristics, Lab Items #2 and 5 (~9mm / .38 / .357 FMJ fired projectiles) were eliminated as having been fired in the same firearm as Lab Items #1 (test-fired projectiles) and #4 (~9mm FMJ fired projectile).
Y788ZT	Microscopic comparison of the submitted evidence revealed the following results: Exhibit 4 was

TABLE 2

WebCode	Conclusions
	identified1 as fired from the same firearm as Exhibit 1. Exhibits 2 and 5 were identified1 as fired from the same firearm; they were excluded from the firearm that fired Exhibit 1. Exhibit 3 was excluded from the firearm that fired Exhibit 1 and the firearm that fired Exhibits 2 and 5. 1 Identification: Agreement of all discernible class characteristics and sufficient agreement of a combination of individual characteristics where the extent of agreement exceeds that which can occur in the comparison of toolmarks made by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool.
YA32V9	As a result of me examination and microscopic comparisons I formed the following opinions: The projectile within item 4 was fired in the exhibit Beretta Model 92F pistol. The projectiles within items 2, 3 and 5 were not fired in the exhibit Beretta Model 92F pistol. The projectiles within items 2 and 5 were fired through the same barrel.
YA8EMC	Results of Examinations: Items 1 through 5 are 9mm/.38 caliber jacketed bullets. The Item 1 and Item 4 bullets were identified as having been fired from the same barrel. The Item 2 and Item 5 bullets were identified as having been fired from the same barrel. A pattern examination of the Item 2 and 5 bullets and the Item 1 bullets was inconclusive due to insufficient quality and/or quantity of corresponding individual characteristics. The Item 3 bullet was excluded as having been fired from the same barrel as Items 1, 2, 4 and 5 due to a difference in class characteristics.
YB26J6	Results of Physical/Microscopic Examination: Item 4 (fired bullet) is identified as having been fired from Item 1a (recovered firearm). Item 2 and Item 5 are identified as having been fired from the same firearm. Item 3 (fired bullet) is inconclusive as having been fired from the same firearm as Items: 2, 4, 5 (fired bullets) or from Item 1a (recovered firearm). Item 3 shares agreement of class characteristics but lack consistent and reproducible individual characteristics. Items 2 and 5 (fired bullets) are inconclusive as having been fired from the same firearm as Item 3, Item 4 (fired bullets) or from Item 1a (recovered firearm). The disagreement observed suggests these items were fired from a different firearm. Submissions of those firearms is necessary for further examination. Items 2, 3 and 5 are consistent with being a .38 caliber class fired metal jacketed bullet displaying conventional rifling specifications of 6 lands and grooves with a right twist
YB3WPD	Examinations showed Item 4 was discharged from the same firearm as Item 1. Examinations showed Items 2 and 5 were not discharged from the same firearm as Item 1 due to differences in class characteristics. Examinations showed Items 2 and 5 were discharged from the same unknown firearm. Examinations showed Item 3 was not discharged from the same firearm as Items 1, 2 or 5 due to differences in class characteristics.
YEMQLD	Exhibit 4 (spent projectile) was identified as having been fired in the same 9mm firearm as exhibit 1. Exhibits 2 and 5 (spent projectiles) were identified as having been fired in a second 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapons should be submitted to the laboratory for analysis. Exhibits 2 and 5 were not fired in the same firearm as exhibits 1 and 4 based on differences in individual characteristics. Exhibit 3 (spent projectile) was identified as having been fired in a third 9mm firearm. Suspect weapons are unknown at this time; however, any suspect weapons should be submitted to the laboratory for analysis. Exhibit 3 was not fired in the same firearm as exhibits 1 and 4, or the same firearm as exhibits 2 and 5 based on differences in class characteristics.
YFEPZC	I examined item 1, the test-fired bullets from the recovered firearm. I found the marks to be reproducible and sufficient for identification. I microscopically compared item 1 to items 2, 3, 4, and 5. I found disagreement in the class characteristics of item 3 and the test-fired bullets. For items 2 and 5, I noted significant disagreement in the individual characteristics in the land

TABLE 2

WebCode	Conclusions
	impressions. I concluded that these three bullets were not fired in the recovered firearm. For item 4, I noted that the class characteristics agreed and found sufficient agreement for identification in the individual characteristics in the land impressions. I concluded that item 4 was fired in the recovered firearm.
YG9NXB	Item #1 and Item #4 were microscopically compared to each other and were identified as having been fired in the same firearm. Item #2 and Item #5 were microscopically compared to each other and were identified as having been fired in the same firearm. Item #3 was microscopically compared to Item #2 and Item #5 and an elimination was made. Item #3 was eliminated as having been fired in the same firearm as Item #2 and #5 due to different individual characteristics. Item #3 was microscopically compared to Item #1 and Item #4 and an elimination was made. Item #3 was eliminated as having been fired in the same firearm as Item #1 and Item #4 due to different individual and/or class characteristics (Item #3 displays inconsistent LAG dimensions which may be due to different class characteristics; however, the possibility of shallow rifling and/or slippage cannot be ruled out).
YH48ZC	The item 4 bullet is identified as having been fired in the same firearm that fired the item 1A, 1B and 1C bullets. The item 2, 3 and 5 bullets are eliminated as having been fired in the same firearm that fired the item 1A, 1B and 1C bullets. The item 2 bullet and the item 5 bullet are identified as having been fired in a second unknown firearm. The item 3 bullet is eliminated as having been fired in the same unknown firearm that fired the item 2 and 5 bullets.
YMGWGZ	It was established that four of the (4) questioned bullets described in ITEM 2, 3, 4 and 5, the only one that was fired by the firearm seized from the suspect, pistol type, brand Pietro Beretta caliber 9X19 millimeters, was the one described in ITEM 4, which presented identifying characteristics that allowed establishing its single origin.
YNBKZV	Visual and microscopic analyses of the evidence bullets and test fires from K1 were performed starting July 12, 2022, and the results of the comparisons and evaluations are as follows: Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, bullet QB3 was identified as having been fired with K1. Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, bullets QB1 and QB4 were identified as having been fired with the same unknown firearm (Firearm A). Based on disagreement of class and/or individual characteristics, bullet QB2 was eliminated as having been fired with K1 or Firearm A, and was fired with a second unknown firearm (Firearm B). Should any other suspect firearm(s) be recovered, please submit and reference the above CC#. “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 evidenced by a pattern or combination of patterns of surface contours. The above listed evidence will be retained in the FAU FER/FEV.
YPMCWJ	Based on microscopic comparisons, the following conclusions were reached, in the opinion of the laboratory: Items 1-2-1 and 1-5-1 bullets were identified as having been fired by the same unknown firearm. These items were eliminated as having been fired by the same firearm that fired item 1-1-1 "test fired" bullets. Item 1-3-1 bullet was not identified or eliminated as having been fired by the same firearm that fired item 1-1-1 "test fired" bullets. This item was eliminated as having been fired by the same unknown firearm that fired items 1-2-1 and 1-5-1 bullets. Item 1-4-1 bullet was identified as having been fired by the same firearm that fired item 1-1-1 "test fired" bullets.
YRAXJE	The test-fired bullets, CTS item 1, were compared to the questioned bullets, CTS items 2 through 5, using a comparison microscope. Based on these comparisons, it is my opinion that

TABLE 2

WebCode	Conclusions
	CTS item 4 was fired in the same firearm that produced the test-fired bullets due to agreement of all discernible class characteristics and sufficient agreement of individual characteristics. It is also my opinion that CTS item 3 was not fired in the same firearm that produced the test-fired bullets based on differences in class characteristics. Additionally, it is my opinion that CTS items 2 and 5 were not fired in the same firearm that produced the test-fired bullets. There was agreement of all discernible class characteristics; however, there was significant disagreement of individual characteristics.
YUGC88	The item 4 and item 1 bullets were identified to a common source. The common source is most likely the firearm used to generate the item 1 bullets, but may be the same tooling used to manufacture a limited number of firearms, including the firearm used to generate item1. The items 2 and 5 bullets were identified to a common source. The common source is most likely a single firearm but may be the same tooling used to manufacture a limited number of firearms. Comparison of the items 2 and 5 bullets to the item 1 bullets was inconclusive. While the firearm-related class characteristics were the same, disagreement of individualizing characteristics were observed. However, the disagreement of individualizing characteristics was insufficient to allow elimination. The items 2 and 5 bullets are unlikely to have been fired from the firearm used to generate the item 1 bullets. Based on differences in class characteristics, the item 3 bullet could not have been fired from the firearms used to generate the items 1, 2, 4, and 5 bullets.
YUKWYG	Items 1A, 1B, 1C and 4: Item 4 was Identified to Items 1A, 1B, 1C. Items 2 and 5: Item 2 was Identified to Item 5. Items 2 and 5 were Eliminated to Items 1A, 1B, 1C, 3 and 4. Items 2 and 5 have design features consistent with bullets loaded in 9mm Luger caliber cartridges and display rifling characteristics similar to firearms by FN/Browning, Ruger, Tanfoglio and Walther, among others. Item 3: Item 3 was Eliminated to Items 1A, 1B, 1C, 2, 4 and 5. Item 3 has design features consistent with bullets loaded in 9mm Luger caliber cartridges and displays rifling characteristics similar to firearms by FN/Browning, Luger, Ruger, Tanfoglio, Taurus, and Walther, among others.
YVNQDD	The three projectiles identified as item 1, together with the projectiles identified as item 4, have the same class and identity characteristics; which allows us to conclude that they correspond to the real caliber 9 mm, and they were fired by a first firearm. The projectile identified as item 2, and the projectile identified as item 5, have the same class and identity characteristics; so it is concluded that they correspond to the real caliber 9 mm and were fired by a second firearm. The projectile identified as item 3, presents identity characteristics that are different from those observed in the projectiles described above; which allows us to conclude that it was fired by a third firearm
YYAD72	The item 4 was fired in the pistol Pietro Beretta 92F. The item 3 was not fired in this handgun. The item 2 and item 5 was fired in the same handgun. The item 3 was not fired in this handgun.
YYRKCH	Items #1-1 and 1-4 were microscopically compared to one another and found to have areas of corresponding individual characteristics. The four bullets were identified as having been fired in the same firearm. Items #1-2 and #1-5 were microscopically compared to one another and found to have areas of corresponding individual characteristics. The two bullets were identified as having been fired in the same firearm. Items #1-2 and #1-5 were microscopically compared to items #1-1 and #1-4 and found to have similar class characteristics; however, based on disagreement of individual characteristics, the two bullets were eliminated as having been fired in the same firearm as the four bullets. Item #1-3 was microscopically compared to items #1-1, #1-2, #1-4, and #1-5 and found to have different class characteristics. The

TABLE 2

WebCode	Conclusions
	bullet was eliminated as having been fired in the same firearm as the other two groups of bullets.
YZ34H8	Acording to the comparison of the elements we have the following conclusions: A: ITEM 4 bullet has been shoot with the weapon as ITEM 1 bullet (recovered firearm Pietro Beretta Model 92F). B: ITEM 2 bullet has been shoot with the same weapon as ITEM 5. C: ITEM 3 has been shoot with a diferent weapon than shoot ITEM 1, 2, 4 i 5.
Z2RWPA	Items 2 and 5 have been fired from the same weapon. Item 4 most likely was fired from the suspect's weapon. Items 2, 3 and 5 have not been fired from the suspect's weapon.
Z6T6TK	1. Examination of Exhibit 1 revealed three 9mm bullets labeled as test standards from the recovered 9mm Luger Beretta 92F pistol. 2. Examination of Exhibits 2 through 5 revealed four 9mm bullets. 3. Microscopic comparison revealed Exhibit 1 and Exhibit 4 were fired from the same firearm based on sufficient agreement of individual characteristics. 4. Microscopic comparison revealed Exhibit 2 and Exhibit 5 were fired from the same firearm based on sufficient agreement of individual characteristics; however, they were not fired from the same firearm as Exhibits 1 and 4 based on sufficient disagreement of individual characteristics. 5. Microscopic comparison revealed that Exhibit 3 was not fired in the same firearm as Exhibits 1 and 4 or Exhibits 2 and 5 based on disagreement of class characteristics.
Z8FJHU	Item #1 (Agency Test Fire) was microscopically examined and compared to Item #4. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Item #1 (Agency Test Fire) is identified as having been fired from the same firearm as Item #4. Item #1 (Agency Test Fire) was microscopically examined and compared to Items #2 and #5. Based on the observed disagreement of individual characteristics, Item #1 (Agency Test Fire) is eliminated as having been fired from the same firearm as Items #2 and #5. Item #1 (Agency Test Fire) was microscopically examined and compared to Item #3. Based on the observed disagreement of class and individual characteristics, Item #1 (Agency Test Fire) is eliminated as having been fired from the same firearm as Item #3. Item #2 was microscopically examined and compared to Item #5. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Item #2 is identified as having been fired from the same firearm as Item #5. Item #2 was microscopically examined and compared to Item #3. Based on the observed disagreement of individual characteristics, Item #2 is eliminated as having been fired from the same firearm as Item #3. Items #2, #3, #4, and #5 expended copper jacketed bullets were examined and found to be consistent with 9mm/ 38 caliber class. A list of suspect weapons that could have fired Item #2 expended copper jacketed bullet is too long to report possible manufacturers, but can be furnished upon request *. A list of suspect weapons that could have fired Item #3 expended copper jacketed bullet is too long to report possible manufacturers, but can be furnished upon request *. * Laboratory reference files are not absolute; there may be weapons manufactured that do not appear herein. The evidence will be returned to the submitter.
Z8XQJ7	The Item #4 bullet was fired from the Item #1 Beretta pistol. The Item #2 bullet and Item #5 bullet were fired from the same unknown firearm (not the Item #1 Beretta pistol). The Item #3 bullet was fired from an unknown firearm, that is not the Item #1 Beretta pistol and not the same firearm that fired the Item #2 and #5 bullets.
ZBXW3H	Item #4 was fired in the known Pietro Beretta Model 92F handgun. Item #2 and Item #5 were fired in the same unknown "X" handgun, but not in the known Pietro Beretta Model 92F handgun. Item #3 was fired in the unknown "Y" handgun, but not in the known Pietro Beretta Model 92F handgun and in the unknown "X" handgun.

TABLE 2

WebCode	Conclusions
ZCQWYT	Items 2, 3, 4, 5: A microscopic comparison was conducted between Test bullet # A, Item 1, that was fired from the recovered firearm and Items 2, 3, 4 and 5. The examinations determined that Item 4 was fired from the recovered firearm, due to a sufficient agreement between striations. The examinations determined that Items 2, 3 and 5 were not fired from the recovered firearm due to a disagreement of individual characteristics. A microscopic comparison was conducted between Items 2, 3 and 5. The examinations determined that Items 2 and 5 were fired from the same firearm due to a sufficient agreement between striations. The examinations determined Item 3 was fired from a different firearm than Items 2 and 5 due to a disagreement of individual characteristics. Disposition: The above listed evidence will be forwarded to the Property Custody Section. All firearm comparison examinations were conducted using the AFTE's (Association of Firearm & Tool Mark Examiners) Theory of Identification. Identifications are the opinion of a qualified examiner that two tool marks were made by the same tool based on sufficient agreement of individual characteristics. The agreement of individual characteristics is of a quantity and quality that the likelihood another (different) tool could have made the mark is so remote as to be considered a practical impossibility. All exclusions and inconclusive findings were based upon exemplars available at the time of the examinations. [Examiner].
ZFUN9U	The visual and microscopic analyses of the evidence bullets QB1 through QB4 and the test fired bullets from K1 were performed starting July 6, 2022. The results of the comparison and evaluations are as follows: Based on agreement of discernible class characteristics and sufficient agreement of individual characteristics, QB3 was identified as having been fired with K1. Based on disagreement of class characteristics, QB2 was eliminated as having been fired with K1 or the same unknown firearm(s) as QB1 and QB4. QB2 has marks of value and is suitable for future microscopic comparison. QB1 and QB4 have agreement of class characteristics and agreement of microscopic markings; however, the possible influence of subclass characteristics cannot be determined. QB1 and QB4 can therefore not be identified as having been fired with the same unknown firearm. QB1 and QB4 have marks of value and are suitable for future microscopic comparison. Should any additional suspect firearm(s) be recovered, please submit and reference the above CC#. The listed evidence will be retained in the Firearm Analysis Unit's Firearms Evidence Vault. Sufficient agreement is related to the significant duplication of random toolmarks as evidenced 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.
ZG8246	Item #4 has been compared microscopically with tests fired in Item #1. Based on agreement of all discernible class characteristics and a sufficient agreement of corresponding individual characteristics Item #4 has been identified as having been fired from the same firearm as Item #1.
ZG9R67	The Item 4 bullet was fired in the same firearm as the known bullets (Item 1).
ZHH3W4	Based on the agreement of individual characteristics and all discernible class characteristics, it was determined that the second bullet recovered from the scene (Ex.4) was fired in the Beretta pistol (Ex.1). (Identification). Based on the agreement of individual characteristics and all discernible class characteristics, it was determined that the bullet recovered from the victim (Ex.2) was fired in the same gun as the third bullet recovered from the scene (Ex.5). (Identification). Based on significant disagreement of discernible class characteristics, it was determined that the first bullet recovered from the scene (Ex.3) could not have been fired in the Beretta pistol (Ex.1). (Elimination). Based on the agreement of all discernible class

TABLE 2

WebCode	Conclusions
	characteristics and the disagreement of individual characteristics, but insufficient for an elimination, it could not be determined whether or not the first bullet recovered from the scene (Ex.3) or the test fired bullets (Ex.1) were fired in the same gun as the bullet recovered from the victim (Ex.2). (Inconclusive). Based on the agreement of all discernible class characteristics and the disagreement of individual characteristics, but insufficient for an elimination, it could not be determined whether or not the first bullet recovered from the scene (Ex.3) was fired in the same gun as the third bullet recovered from the scene(Ex.5). (Inconclusive).
ZKMPA9	The one fired bullet, item 4, was determined to have been fired from the Beretta pistol, item 1. The three fired bullets, items 2, 3, and 5, were each eliminated as having been fired in the Beretta pistol, item 1.
ZLGDT4	Microscopic examination and comparison of the bullet (item # 4) with the known bullets (item # 1) reveals sufficient microscopic striae evidence to conclude that the bullet (item # 4) was fired from the known firearm (item # 1). Microscopic examination and comparison of the bullets (items # 2 and 5) with the known bullets (item # 1) reveals sufficient microscopic striae evidence to conclude that the bullets (items # 2 and 5) were not fired from the known firearm (item # 1). Additionally, these two evidence bullets (items # 2 and 5) reveal sufficient microscopic striae evidence to conclude that they were fired from the same firearm (but not Item # 1). Microscopic examination and comparison of the bullet (item # 3) with the known bullets (item # 1) reveals insufficient microscopic striae evidence to either include or to exclude the bullet (item # 4) as being fired from the known firearm (item # 1). Thus, the bullet (item $ 3) is inconclusive when compared to the bullets (item # 1).
ZQR8Z9	The fired bullets (Items 1B & 4) were microscopically examined and compared. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, the bullet (Item 4) is identified as having been fired from the same firearm as the bullet (Item 1B). The fired bullet (Item 1B) and the fired bullets (Items 2 & 5) were microscopically examined and compared. Based on the observed disagreement of their individual characteristics, the bullets (Items 2 & 5) are eliminated as having been fired from the same firearm as the bullet (Item 1B). The fired bullets (Items 1B & 3) were microscopically examined and compared. Based on the observed disagreement of their class characteristics, the bullet (Item 3) is eliminated as having been fired from the same firearm as the bullet (Item 1B). The fired bullets (Items 2 & 5) were microscopically examined and compared. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, the bullets are identified as having been fired from the same firearm.
ZY7BWM	The Beretta 92F hanfdgun seized from the trunk of the suspect's vehicule fired the second bullet recoverd from the scene (Item 4). The bullet recovered from the victim (Item 2) and the third bullet recoverd from the scene (Item 5) have been fired by a same weapon, different from the previous one. Finaly, the first bullet recovered from the scene has been fired by a third weapon, differenrt from the other two. In conclusion, 3 weapons were involved in the scene: The Beretta 92F seize from the trunk fired the bullet Item 4. A second weapon fired the bullets Item 2 and Item 5. A third weapon fired the bullet Item 3.

Additional Comments

TABLE 3

WebCode	Additional Comments
272GF3	Similarities have been observed between the marks in the bullets Items 2 and 5. This observation lead to an additional examination between the marks in Item 2 and 5. The findings of this examination were viewed under the following two hypotheses: H3: The questioned bullets are fired by one firearm. H4: The questioned bullets are fired by two firearms of the same calibre 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. Item 3 is fired by a third firearm.
2JTY4U	Should any additional firearms be recovered, submit, and refer to the above CC#. The above listed evidence will be retained within the Firearms Analysis Unit's evidence room. “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 evidenced by a pattern or combination of patterns of surface contours.
2N2RPC	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.
3H86HA	My conclusions were based on the assumption that the possibility of subclass influence was eliminated by the makers of this proficiency.
49JEMW	Small difference in land and groove widths on Item 1C (Item 3) compared to Items 1A1, 1A2, and 1A3 (Item 1), however was not a large enough difference to eliminated. A small amount of agreement was observed between Items 1B (Item 2) and 1E (Item 5) to Items 1A1, 1A2, and 1A3.
4BMF9Z	Items 002 and 005 exhibited potential subclass carryover in the land impressions; however I was able to find some areas that appeared to be individual.
4XWGL4	The exhibit fired bullets (Items 2 & 5) had been discharged by another firearm. (GUN 2). The exhibit fired bullet (Item 3) had been discharged from a separate firearm. (GUN 3).
62XZ4W	The bullet corresponding to item 001, marked E-1, E-2, E-3, E-4, E-5, E-6 and E-7, were received packed in white rectangular boxes divided into “Items” 1 (E-1 to E-3), 2 (E-4), 3 (E-5), 4 (E-6) and 5 (E-7) respectively. [Examiner].
683HUW	Although Items 1 and 3 share general rifling characteristics of six land and groove impressions with a right twist, differences in their impression widths were noted.
6A98TZ	The projectiles in Items 2 and 5 were compared to each other and could be identified as having been fired in the same gun.
6FWRXZ	Items 2 and 5 were fired in the same gun, based on agreement observed in individual characteristics.

TABLE 3

WebCode	Additional Comments
6G9J4A	Methods: Pattern Examination: Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are reviewed and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion: Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observeddifference(s) inclass characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification: Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive (No Conclusion): Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Pattern Examination: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variation in substrate, changes in tool working surfaces from wear, corrosion, and damage, or the employment of unusual tool/work piece orientations, it may not be possible for an Examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes.
6N79KD	The striations within reference land engraved areas on items 2 & 5 when juxta-positioned on a comparison macroscope were observed and found to be of the same width and well aligned. Similar observations were made when these items (2 & 5) were rotated in the same direction during examination of other impressed marks suggesting a possible common origin.
6YQH8L	The method of testing for ammunition components (that have results that fall into the range of conclusions defined below) included physical examination and microscopic comparison. Elimination results that are reported as based on a difference in class characteristics include only physical examination. Identified: Agreement of all discernible class characteristics and sufficient agreement of individual characteristics where the extent of agreement leads to the

TABLE 3

WebCode	Additional Comments
	conclusion that the items were fired in/from the same firearm. Inconclusive (+): Agreement of all discernible class characteristics and some agreement of individual characteristics but insufficient for an identification. Inconclusive: Agreement of all discernible class characteristics without significant agreement or disagreement of individual characteristics; therefore, the items could neither be identified nor eliminated as having been fired in/from the same firearm. Inconclusive (-): Agreement of all discernible class characteristics and some disagreement of individual characteristics, but insufficient for an elimination. Eliminated: Significant disagreement of discernible class characteristics and/or individual characteristics leading to the conclusion that the items were not fired in/from the same firearm. The submitted items will be transferred to the Evidence Section for return to your agency.
7383U2	Cannot eliminate subclass for the comparison of Items 2 & 5 or for Item 4 vs 1. There were observable differences in general rifling characteristics when comparing Items 2 & 5 vs Items 1, 3 and 4. There was also significant difference in appearance of possible subclass detail between Items 2 & 5 vs Items 1, 3 & 4.
73BMLB	The method of testing for ammunition components (that have results that fall into the range of conclusions defined below) included physical examination and microscopic comparison. Elimination results that are reported as based on a difference in class characteristics include only physical examination. Identified: Agreement of all discernible class characteristics and sufficient agreement of individual characteristics where the extent of agreement leads to the conclusion that the items were fired in/from the same firearm. Inconclusive (+): Agreement of all discernible class characteristics and some agreement of individual characteristics but insufficient for an identification. Inconclusive: Agreement of all discernible class characteristics without significant agreement or disagreement of individual characteristics; therefore, the items could neither be identified nor eliminated as having been fired in/from the same firearm. Inconclusive (-): Agreement of all discernible class characteristics and some disagreement of individual characteristics, but insufficient for an elimination. Eliminated: Significant disagreement of discernible class characteristics and/or individual characteristics leading to the conclusion that the items were not fired in/from the same firearm.
78ETW8	FOR ITEM 3 COMPARISON: Very little agreement in individual detail in land impressions. However, not enough observed differences to eliminate. Due to a lack of agreement of individual characteristics, the submitted bullet (item 3) was most likely not fired from the same firearm that fired item 1. INCONCLUSIVE
7JNHMW	The original examiner did not think there was sufficient evidence to eliminate Agency Exhibit 3 from the submitted test fires. The reviewer of the case felt that there was. The result on the report was changed to read inconclusive due to lack of examiners consensus.
7QTCP6	REMARKS: The method of testing for ammunition components (that have results that fall into the range of conclusions defined below) included physical examination and microscopic comparison. Elimination results that are reported as based on a difference in class characteristics include only physical examination. Identified: Agreement of all discernible class characteristics and sufficient agreement of individual characteristics where the extent of agreement leads to the conclusion that the items were fired in/from the same firearm. Inconclusive (+): Agreement of all discernible class characteristics and some agreement of individual characteristics but insufficient for an identification. Inconclusive: Agreement of all discernible class characteristics without significant agreement or disagreement of individual characteristics; therefore, the items could neither be identified nor eliminated as having been fired in/from the same firearm. Inconclusive (-): Agreement of all discernable class

TABLE 3

WebCode	Additional Comments
	characteristics and some disagreement of individual characteristics, but insufficient for an elimination. Eliminated: Significant disagreement of discernable class characteristics and/or individual characteristics leading to the conclusion that the items were not fired in/from the same firearm. The submitted items will be transferred to the Evidence Section for return to your agency. Questions regarding this report should be addressed to: [Examiner].
83NNRW	Item 3 was not well at all. not enough individual characteristics to eliminated. However, the slight difference in the LW/GW helped slightly but would be difficult for a newbie to rationalize the elimination.
89PZVU	Also, a comparison of Items 2 and 5 was performed. Based on the agreement of individual characteristics and all discernible class characteristics, it was determined that the projectiles from Items 2 and 5 were fired in the same firearm. (Identification)
8R4EB4	This can give us an idea that more than one firearm of the same calibre was used in the given scenario.
8VGCHQ	According to the findings, it can be inferred that three (3) firearms were used in the commission of the act, caliber 9x19 mm Luger / Parabellum, with six (6) solid barrels with a direction of rotation right.
9QKUZ6	Microscopic comparisons, between Items 1 and 3, were inconclusive leaning toward exclusion. The discernible class characteristics were similar; albeit with slight variability observed when comparing the rifling widths. There was some disagreement of individual characteristics observed; however, reproducibility could not be assessed with respect to Item 3. As a result, a more definitive conclusion could not be rendered at this time.
AGVJ8N	It is possible that three different firearms were used in the events.
AMXPLR	For the purposes of CTS protocol, this proficiency was received with the seal broken, into the [Laboratory] prior to examination of proficiency Test No. 22-5261. This was noted by the Heads of Sections and permission was given to proceed accordingly.
AYT2Y6	Methods: Pattern Examination: Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are reviewed and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion: Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observed difference(s) in class characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification: Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's

TABLE 3

WebCode	Additional Comments
	opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive (No Conclusion): Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Pattern Examination: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variation in substrate, changes in tool working surfaces from wear, corrosion, and damage, or the employment of unusual tool/work piece orientations, it may not be possible for an Examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes.
BCWM2U	Factors behind the inconclusive- There were observed discrepancies within individual characteristics between Item 002 (Q1)/Item 005 (Q4) AND Item 003 (Q2)/Item 004 (Q3)- however, class characteristics were noted to be consistent. It is unknown to the examiner whether alterations and/or suppressors were added onto the barrel to make more gross marks along the L/G impressions of Item 002 (Q1) and Item 005 (Q4). However, it can be determined Item 002 (Q1) and Item 005 (Q4) were fired through the same barrel.
BPKUMP	Agency policy prohibits eliminating on individual characteristics.
C42292	Identifications were made under the following assumptions: (1) the bullets recovered from the scene and victim were left at or near the same time as part of the same incident. (2) the recovered bullets (Items 2 - 5) and Item 1 are from the same type/brand of ammunition as described in the scenario to reduce the degree the bullet jacketing material affects the marks deposited on a fired bullet. (3) subclass influence was considered and eliminated prior to submission of the evidence. If these assumptions could not be made, my conclusions may have been different. As long as bullet comparison tests are going to be constructed in this way, I feel that information regarding barrel evaluations (e.g. the risk of subclass influence has been considered and eliminated, subclass has been evaluated and not eliminated, etc). Since we are not able to perform this examination and form a conclusion, it forces us as examiners to make assumptions that we may not make in casework. Providing this information would help ensure the test case approach was performed most like casework. It may also improve the consistency of reporting results amongst laboratories.
C4WNMQ	Item 3 has some minor difference noted in land impression width/groove impression width (0.005 or less) compared to Items 1 and 4. The striated marks present in the limps of Items 1, 3, and 4 are short and fine and unevenly spaced. Unknown if ammunition type is different between Items 1, 3, and 4. No individual similarities noted or significant differences noted between Item 3 to Items 1 and 4. Laboratory policy advises that eliminations based on individual characteristics are not routinely encountered and generally involve exceptional

TABLE 3

WebCode	Additional Comments
	circumstances that need to be considered on a case-by-case basis. Items 2 and 5 exhibit possible subclass-not used for ID, however used for elimination.
C738LL	Taking into account the result of the comparative study, carried out on both the indubitable evidence (item 1) and the doubtful evidence (items 2, 3, 4 and 5), it is concluded that there are three different firearms.
C9QLAW	Item 2 and 5 were fired from the same firearm
CV8Y66	Item 1 and Item 4 shared the same class characteristics and also there was enough agreement of individual characteristis between them.
D8BQYN	The comparison of Items 1 and 4 to Items 2 and 5 showed disagreement in reproducible patterns of individual characteristics; however, degree of differences was insufficient for elimination. In an effort to treat proficiency tests in a manner consistent with forensic casework, the listed conclusion was inconclusive.
DLCDCC	The bullets marked with items 2 and 5 were fired from the same firearm and the bullet marked with item 3 was fired from a different gun.
E88HA2	Comparison between land impressions of Item 2 and Item 5 showed several similarities.
EJ67NP	The bullets (Items 01-02 and 01-05) were fired from a single firearm. The bullets (Items 01-02 and 01-05) were neither identified nor eliminated as having been fired from the Beretta pistol or from the same firearm that fired the bullet (Item 01-03) due to the agreement of class characteristics and disagreement of individual characteristics, but insufficient for an elimination. The bullet (Item 01-03) was neither identified nor eliminated as having been fired from the Beretta pistol due to the agreement of class characteristics and disagreement of individual characteristics, but insufficient for an elimination.
FP73KU	Laboratory policy does not allow for eliminations based on individual characteristics.
G4M9FU	The method of testing for ammunition components (that have results that fall into the range of conclusions defined below) included physical examination and microscopic comparison. Elimination results are reported as based on a difference in class characteristics include only physical examination. Identified: Agreement of all discernible class characteristics and sufficient agreement of individual characteristics where the extent of agreement leads to the conclusion that the items were fired in/from the same firearm. Inconclusive (+): Agreement of all discernible class characteristics and some agreement of individual characteristics but insufficient for and identification. Inconclusive: Agreement of all discernible class characteristics without significant agreement or disagreement of individual characteristics; therefore, the items could neither be identified nor eliminated as having been fired in/from the same firearm. Inconclusive (-): Agreement of all discernible class characteristics and some disagreement of individual characteristics, but insufficient for an elimination. Eliminated: Significant disagreement of discernible class characteristics and/or individual characteristics leading to the conclusion that the items were not fired in/from the same firearm. Questions regarding this report should be addressed to: [Examiner].
GUT8TN	Items 2 and 5 had heavy parallel striae visible that runs the length of the LEAs. This lead me to believe that there was possible subclass in the LEAs. I stayed away from areas that I though were potential subclass.

TABLE 3

WebCode	Additional Comments
HGLFXJ	The identifications of the bullets with the firearms 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.
HPWX49	1a (item 1), 1b (item 2), 1c (item 3), 1d (item 4), 1e (item 5).
HWF2BB	The inconclusive result is due to lack of information as far as class and individual characteristics present on the Item.
HZF8W9	Lack of additional sample(s) to show the reproducibility of the marks observed on Item 4 precluded the exclusion of Item 4 as having been fired from the same gun as the test fires Item 1.
JFNNEU	Items 2 and 5 were compared to each other using a comparison microscope. In my opinion, both bullets were fired in the same firearm, due to agreement of discernible class characteristics and sufficient agreement of individual characteristics. Item 2 and 3 were compared to each other using a comparison microscope. In my opinion, the bullets were eliminated from being fired in the same firearm, due to sufficient disagreement of class and individual characteristics. As such, as part of the incident, there were a total three firearms including the firearm that was recovered.
JJNUTZ	TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm are not to the absolute exclusion of all other firearms because it is not feasible to examine all possible firearms. However, observing this amount of agreement from a different source is considered extremely remote.
JKGMTP	Identification: Based on the agreement of the individual characteristics observed through the microscopic comparison examination. [Examiner].
KJ3F6M	In my opinion there was significant agreement between the firing marks on items 2 and 5. In my opinion items 2 and 5 were fired in the same gun (gun 2).
KJJUCW	The ITEMs marked as ITEM 2 and ITEM 5, it is concluded that there is a correspondence between them and that they were fired by the same firearm. Therefore, ITEM 1 consisting of 3 bullets fired from the recovered firearm PIETRO BERETTA model 92F is excluded.
KM6G6K	No indication Item 3 was fired in Item 1 or the firearm that fired Items 2 and 5. Some disagreement observed in the land and groove impression widths as well as the individual characteristics however insufficient for elimination. It should be noted that this lab does not routinely eliminate based on individual characteristics especially when the firearm is not available for examination. Item 2 and 5 were eliminated as having been fired in the same firearm that fired Items 1 and 4 based on reproducing differences in individual characteristics (observed in Item 2 and all three submitted test fires of Item 1 as well as Items 2 and 5). Items

TABLE 3

WebCode	Additional Comments
	2 and 5 show possible subclass in the heavy stria found in the limps. These marks were not used for identification purposes.
KMMA2N	Comparison between Item 2 and Item 5 showed agreement in the class characteristics (land and groove mark width, number and twist direction) and significant agreement in the individual characteristics present within the land and groove marks of the fired bullets - Identification.
KYZU3V	TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm are not to the absolute exclusion of all other firearms because it is not feasible to examine all possible firearms. However, observing this amount of agreement from a different source is considered extremely remote.
LWNBYT	Methods: Pattern Examination: Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are reviewed and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion: Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observeddifference(s) inclass characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification: Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive (No Conclusion): Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Pattern Examination: Firearms/Toolmark Identification is an empirical science that relies on objective

TABLE 3

WebCode	Additional Comments
	measurements and a subjective comparison of microscopic marks of value. Due to variation in substrate, changes in tool working surfaces from wear, corrosion, and damage, or the employment of unusual tool/work piece orientations, it may not be possible for an Examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes.
LXKNLK	The strength of the "highly likely" conclusion was influenced by the fact that the recovered Beretta pistol was not available for a direct sub-class evaluation. Items 2, 3, and 5 shared similar class characteristics to the test-fired bullets. However, no significant amount of microscopic similarities were observed between them and the test-fired bullets.
MDUWYU	The fired bullets on Item 1 were identified to one another(known). During the comparison of the Item 1 (known) and Item 4 (questioned) there was enough agreement of individual characteristics to make identification, also shared class characteristics with each other. During the comparison of the Item 2 and Item 3 there was disagreement of the induvidual characteristics. Item 5 was eliminated from Item 2-3 and also from fired bullets on Item 1 , based on differences or disgreement of class characteristics.
NCBCNV	TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm/tool which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm/tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm/tool surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm/tool are not to the absolute exclusion of all other firearms/tools because it is not feasible to examine all possible firearms/tools. However, observing this amount of agreement from a different source is considered extremely remote.
NMBZLJ	Question: I thought all Beretta barrels manufactured with broach rifling, consistent with items #2 and #5.
NVM2Y8	Assumed no subclass potential for Item 1.
NYM9K6	Should suspect firearms be recovered please submit and reference the above CC#. Sufficient agreement is related to the significant duplication of random toolmarks as evidenced 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.
PAYZAD	C1- unknown pistol no 1
R7RG4G	The bullets TG 1 (Item 2) and TG 4 (Item 5) were fired from the same gun, but not from the gun that was seized!
R86Z4Q	Questioned bullet recovered from scene Item 2 and 4 were fired from the same firearm
RAUCYQ	Bullets number 2 and 5 are IDENTIFIED as fired in the same firearm Bullet number 3 is ELIMINATED with bullets 2 and 5.

TABLE 3

WebCode	Additional Comments
RNFR3P	In conclusion according to the microscopic results it is evident that there were 3 firearms used on the scene even though only 1 firearm was recovered.
RPQQYJ	1- Item 2: Bullet recovered from the victim, and Item 5: Third bullet recovered from the scene was firing by same guns.
RQXZ3A	Items 01-02 and 01-05 were microscopically compared to Items 01-01 and 01-04. Differences in individual characteristics were observed; however, the differences were not sufficiently unique to eliminate. Due to a lack of agreement or disagreement of individual characteristics, Items 01-02 and 01-05 were unable to be identified or eliminated as having been fired from the same firearm as Items 01-01 and 01-04. Item 01-03 was microscopically compared to Items 01-01, 01-02, and 01-05. Due to differences in land and groove width, Item 01-03 was eliminated as having been fired from the same firearm(s) as Items 01-01, 01-02, and 01-05. Item 01-04 was previously identified as having been fired from the same firearm as Item 01-01; therefore, Item 01-03 was also eliminated as having been fired from the same firearm as Item 01-04.
T6CEW9	Items 1A1 through 1A3 (1) and 1D (4) (fired bullets) are inconclusive as having been fired in the same firearm as Items 1B (2) and 1E (5) (fired bullets). These items share agreement of class characteristics, but disagreement of the individual characteristics observed in the land impressed areas. Items 1B (2) and 1E (5) are identified as having been fired from the same firearm via sufficient agreement in multiple LIMPs and slippage. Striations in LIMPs run along whole impression - possible subclass, would need firearm to evaluate. However, identification also made on slippage - individual.
TAPK99	Item #3 exhibited wider LEA widths than the other items, with the exception of one of the three test-fires, which exhibited some LEA widths slightly larger than the other bullets but still more narrow than that of item #2. Erring on the side of caution, this prevented eliminating item #3 from the other bullets based on class characteristics (rifling widths).
TD9HMB	I observed some agreement between Item 2 and Items 1, 1A, 1B, and 4, but the agreement was limited and in isolated striae between different land impression pairs and at different phases, suggesting any agreement I found was most likely coincidental. I was unable to find any significant agreement between Item 2 and Items 1, 1A, 1B, and 4 in the land impressions to index the bullets. I observed some agreement between Item 5 and Items 1, 1A, 1B, and 4, but the agreement was limited and in isolated striae between different land impression pairs and at different phases, suggesting any agreement I found was most likely coincidental. I was unable to find any significant agreement between Item 5 and Items 1, 1A, 1B, and 4 in the land impressions to index the bullets. Item 3 has faint marks in the land impressions with most of the marks being found near the edges of the land impressions, similar to how the test-fires (Items 1, 1A, 1B) and Item 4 look. However, I was unable to find significant agreement to even index Item 3 to the other mentioned bullets. There was an isolated striae that agreed here and there, but nothing that appeared more than coincidental. It was not as noticeable with the naked eye, but once on the comparison microscope, I noticed a slight difference in land impression/groove impression widths (difference of less than 0.010", on average between ~0.005" and 0.007") and there appeared to be more slippage in the land impressions compared to Items 1, 1A, 1B, and 4 (though there were also some slippage marks present on these items as well). However, I would not consider these differences significant enough to eliminate, especially since there is only one bullet that looks like Item 3. It is quite possible to have a difference of 0.005" when measuring land impression/groove

TABLE 3

WebCode	Additional Comments
	impression widths just on one bullet and the difference in amount of slippage could possibly be due differences in ammunition material depending on manufacturer. I was unable to find any significant agreement between Item 3 and Items 2 and 5 in the land impressions to even index the bullets, and mostly observed disagreement due to the difference in how the striations in the land impressions marked (faint and mostly fine vs. well-defined and mostly coarse). I observed a similar slight difference in land impression/groove impression widths between Item 3 and Items 2 and 5 as I did with the other bullets mentioned above, but again, the difference was very small (less than 0.010") with the land impression widths being slightly more similar this time. Therefore, the difference is not enough to eliminate. Items 2 and 5 had marks that appeared coarse and continuous. Continuous marks running from the base of the bullet to the ogive have the possibility of being subclass, and without a firearm to compare to and evaluate the barrel for subclass, the possibility of the land impression marks being subclass characteristics cannot be eliminated. Therefore, though I found strong agreement in all the land impression pairs between the two bullets, most of the agreement was found in the continuous striae, which I cannot determine whether they are individual or subclass, resulting in an inconclusive. If a firearm was submitted that I could evaluate/eliminate the potential for subclass in the barrel and I am able to identify these questioned bullets to, my conclusion may be different.
U3Q4CL	Based on microscopic comparisons of the projectiles, indicated there were three firearms.
U8GLK7	The following items exhibited the same class characteristics and contained sufficient microscopic individual characteristics and were identified as having been fired in the same unknown firearm: Item 2: (1) 9mm Luger caliber fired bullet Item 5: (1) 9mm Luger caliber fired bullet The following item contained different class characteristics and was eliminated as having been fired in the same unknown firearm as item 2 and item 5: Item 3: (1) 9mm Luger caliber fired bullet
UJUN9P	Análisis microcomparativo: 1. Item 1 vs Item 2 = Elimination. 2. Item 1 vs Item 3 = Elimination. 3. Item 1 vs Item 4 Identification. 4. Item 1 vs Item 5 = Elimination. 5. Item 2 vs Item 3 = Elimination. 6. Item 2 vs Item 4 = Elimination. 7. Item 2 vs Item 5 = Identification. 8. Item 3 vs Item 4 = Elimination. 9. Item 3 vs Item 5 = Elimination. 10. Item 4 vs Item 5 = Elimination.
UMCUQ8	The identifications of the bullets with the firearms 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.
VXPA4J	LIMITATIONS: *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.
WAKXJJ	The scene might have had 3 firearms used on the day of the scenario.

TABLE 3

WebCode	Additional Comments
WGW2LC	Three different firearms identified. The firearm that discharged the questioned FB that was recovered from the victim (Item 2) is still outstanding. Start kicking the doors in of the POI's associates!
YA8EMC	Methods: Pattern Examination: Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are reviewed and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion: Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observed difference(s) in class characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification: Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive (No Conclusion): Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Pattern Examination: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variation in substrate, changes in tool working surfaces from wear, corrosion, and damage, or the employment of unusual tool/work piece orientations, it may not be possible for an Examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes.
YB26J6	Conclusion Scale for Microscopic Comparisons: The following descriptions are meant to provide context to the levels of opinions reached in this report. Identification: This is the strongest statement of association that can be expressed. An identification is made to a degree of practical certainty when there is agreement of all discernible class characteristics and sufficient agreement of the individual characteristics of toolmarks. When sufficient agreement exists, in part, this means the likelihood of another tool producing the same marks is so remote it is considered a practical impossibility. Elimination: This is the strongest

TABLE 3

WebCode	Additional Comments
	statement of non-association that can be expressed. An elimination is made when it is physically impossible (i.e., there is a clear, demonstrable incompatibility in class characteristics) for the items to have been marked by the same tool/fired in the same firearm. Inconclusive: An inconclusive is made when one of the following situations is true. Agreement of all discernible class characteristics and some agreement of individual characteristics, but insufficient for identification. Agreement of all discernible class characteristics without agreement or disagreement of individual characteristics due to an absence, insufficiency, or lack of reproducibility. Agreement of all discernible class characteristics and disagreement of individual characteristics. Unsuitable: An item is considered unsuitable for comparison when it does not bear any class, subclass, and/or individual toolmarks of value for microscopic comparison.
YB3WPD	Note: Beretta firearms are known to have broach rifled barrels which is consistent with the markings on Items 2 and 5 and not Items 1 and 4.
YG9NXB	Item #3 exhibits different individual characteristics than those observed on Item #1 and Item #4. Additionally, Item #3 displays some LEA and GEA that are consistent with the LAG dimensions observed on Item #1 and Item #4. However, at least two (2) LEA and GEA observed on Item #3 appear to have different dimensions than those observed on Item #1 and Item #4, which may be due differing class characteristics, or shallow rifling and/or slippage. Therefore, Item #3 was eliminated from Item #1 and Item #4 due to different individual and/or class characteristics.
YPMCWJ	Item 1-3-1 bullet was not identified or eliminated as having been fired by the same firearm that fired item 1-1-1 "test fired" bullets. This inconclusive conclusion was based on insufficient similarities and insufficient dissimilarities observed in the patterns of microscopic markings between the items.
YRAXJE	CTS items 2 and 5 appear to have been fired in the same firearm.
YUGC88	With no firearm to examine for subclass the Question 2 written conclusions are based on examination of the bullets alone in a manner consistent with actual casework. Question 1 was answered to best meet the needs of the CTS exam; these results are not as conservative as what would be reported in actual casework. The disagreement of individualizing characteristics alone was insufficient to allow elimination of the item 1 source firearm as having fired the items 2 and 5 bullets.
Z6T6TK	TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm or tool, which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm or tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm or tool surfaces. These random imperfections or irregularities can be either produced incidental to manufacture or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm or tool are not to the absolute exclusion of all other firearms or tools, because it is not feasible to examine all firearms or tools in the world. However, observing this amount of agreement between different sources is considered extremely remote.
ZG8246	Items #2, 3 and 5 have been eliminated as to being fired from Item #1. Items # 2 and #5 have been compared microscopically with each other. Based on agreement of all discernible class characteristics and a sufficient agreement of corresponding individual characteristics

TABLE 3

WebCode	Additional Comments
	they have been identified as to being fired from the same firearm. Item #3 has been eliminated based on class characteristics from being fired from the same firearms as Items 1, 2, 4 and 5.
ZG9R67	Item 2, 5 bullets were fired in the same firearm which is different from the seized handgun.
ZHH3W4	Inconclusive results in this test are based on the agreement of all discernible class characteristics and the disagreement of individual characteristics, but insufficient for an elimination. Laboratory policy dictates this test be treated like normal casework.
ZKMPA9	Items 2 and 5 were fired from the same unknown firearm.

-End of Report-
(Appendix may follow)

Collaborative Testing Services ~ Forensic Testing Program

Test No. 22-5261: Firearms Examination

DATA MUST BE SUBMITTED BY **Aug. 8, 2022, 11:59 p.m.** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A WebCode: TN7GEH

The Accreditation Release section can be accessed by using the "Continue to Final Submission" button above. This information can be entered at any time prior to submitting to CTS.

Scenario:
Police are investigating a homicide in an abandoned city building. One victim was fatally shot and the bullet was recovered by the medical examiner. Investigators also recovered three expended bullets from the scene. A suspect was apprehended the following day and a Pietro Beretta Model 92F handgun was seized from the trunk of his vehicle. Three rounds of Federal American Eagle 9mm Luger 124 grain FMJ ammunition (consistent with the bullets found at the 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 small labeled 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 the victim (questioned).
Item 3: First bullet recovered from the scene (questioned).
Item 4: Second bullet recovered from the scene (questioned).
Item 5: Third bullet recovered from 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 ○	No ○	Inconclusive* ○
Item 3	Yes ○	No ○	Inconclusive* ○
Item 4	Yes ○	No ○	Inconclusive* ○
Item 5	Yes ○	No ○	Inconclusive* ○

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

Please note: *Any additional formatting applied in the free form space below will not transfer to the Summary Report and may cause your information to be illegible. This includes additional spacing and returns that present your responses in lists and tabular formats.*

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

3.) Additional Comments

RELEASE OF DATA TO ACCREDITATION BODIES

The Accreditation Release is accessed by pressing the "Continue to Final Submission" button online and can be completed at any time prior to submission to CTS.

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and/or 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 below must be completed.)
○ This participant's data is **not** intended for submission to ASCLD/LAB, ANAB, and/or A2LA.

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

Authorized Contact Person and Title

Laboratory Name

Location (City/State)