



## Firearms Examination Test No. 17-526 Summary Report

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This test was sent to 437 participants. Each sample set consisted of three known expended cartridge cases (Item 1) test-fired from a suspect weapon and four questioned expended cartridge cases (Items 2-5). Participants were requested to examine these items and report their findings. Data were returned from 401 participants (92% response rate) and are compiled into the following tables

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

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

## **Manufacturer's Information**

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Each sample set contained five items: Item 1 consisted of three cartridge cases fired in the suspect's firearm. Items 2, 3, 4 and 5 each consisted of one cartridge case recovered from the scene. PMC® Bronze 50 9mm Luger 115 grain full metal jacket (FMJ) Centerfire ammunition was used for all five items. Participants were requested to determine which, if any, of the recovered questioned cartridge cases (Items 2-5) were fired from the same firearm as the known cartridge cases (Item 1).

The cartridge cases in Items 1 and 4 were fired in a Ruger SR9C 9mm handgun (Serial number 333-52813). Item 2 was fired in a Ruger P85 9mm handgun (Serial number 302-37403). Items 3 and 5 were fired in a Ruger SR9 9mm handgun (Serial number 330-36857).

ITEMS 1 and 4 (IDENTIFICATION): Multiple magazines were loaded with ammunition totaling 120 rounds in preparation for firing with the Ruger SR9C 9mm handgun. After the ammunition was expended, the cartridge cases 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 cartridge cases were selected and inscribed with a "1" (three cartridge cases) and "4" (one cartridge case), then sealed into their respective jewel boxes.

ITEM 2 (ELIMINATION): Multiple magazines were loaded with ammunition totaling 120 rounds in preparation for firing with the Ruger P85 9mm handgun. After the ammunition was expended, the cartridge cases 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 cartridge cases were selected and inscribed with a "2" (one cartridge case), then sealed into their respective jewel boxes.

ITEMS 3 and 5 (ELIMINATION): Multiple magazines were loaded with ammunition totaling 60-120 rounds in preparation for firing with the Ruger SR9 9mm handgun. After the ammunition was expended, the cartridge cases 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 cartridge cases were selected and inscribed with a "3" (one cartridge case) and "5" (one cartridge case), then sealed into their respective jewel boxes.

SAMPLE SET ASSEMBLY: For each sample set, Items 3 and 5 of the same elimination batch, Item 2, 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 cartridge cases from each batch were selected and intercompared to confirm that markings were consistent within each batch. Laboratories that conducted the predistribution examination of the completed sample sets reported the expected identifications.

## **Summary Comments**

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This test was designed to allow participants to assess their proficiency in a comparison of expended cartridge cases. Participants were provided with four questioned expended PMC® Bronze 50 9mm Luger 115 grain full metal jacket (FMJ) Centerfire cartridge cases (Items 2-5) which they were requested to compare with three known expended cartridge cases (Item 1) of the same manufacturer fired in the suspect's weapon, a Ruger SR9C 9mm handgun. For each sample set, the Item 4 cartridge case was fired in the same firearm as the Item 1 known cartridge cases. The Item 2 cartridge case was fired in a different firearm from that which discharged the Item 1 and Item 4 cartridge cases. Item 3 and Item 5 cartridge cases were fired in a different firearm from the one that discharged the Item 1 and Item 4 cartridge cases and the firearm that discharged the Item 2 cartridge case (Refer to Manufacturer's Information for preparation details.)

In Table 1 Response Summary, 399 of 401 (99%) responding participants identified Item 4 and either eliminated or were inconclusive for Items 2, 3 and 5 as having been fired from the same firearm as the Item 1 test-fired cartridge cases. One participant identified Items 4 and 5 and eliminated Items 2 and 3 as having been fired from the same firearm as the Item 1 test-fired cartridge cases. The remaining participant eliminated Items 2, 3, 4 and 5 as having been fired from the same firearm as the Item 1 test-fired cartridge cases.

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

## Examination Results

*Were any of the questioned expended cartridge cases (Items 2-5) discharged from the same firearm as the known expended cartridge cases (Item 1)?*

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
22RRXW	No	No	Yes	No	3D4ELM	No	No	Yes	No
237AYG	No	No	Yes	No	3FP7RX	No	No	Yes	No
26E8QC	No	No	Yes	No	3HVT63	No	No	Yes	No
29ED84	No	No	Yes	No	3KQ6B4	No	No	Yes	No
2BNDEV	No	No	Yes	No	3TGV PJ	No	No	Yes	No
2CQEY2	No	No	Yes	No	4339AZ	No	No	Yes	No
2CU3BD	No	No	Yes	No	44E7JC	No	No	Yes	No
2DNXRU	No	No	Yes	No	4ACU2B	No	No	Yes	No
2L2WED	No	No	Yes	No	4GYNAU	No	No	Yes	No
2RQFRU	No	No	Yes	No	4H9H49	No	No	Yes	No
2THC2V	No	No	Yes	No	4HQTJT	No	No	Yes	No
2W2DBA	No	No	Yes	No	4MM9DA	No	Inc	Yes	Inc
2Y9MGL	No	No	Yes	No	4NGYJN	No	No	Yes	No
32AY2T	No	No	Yes	No	4NHZ32	No	No	Yes	No
363DU8	No	No	Yes	No	4Q4HKM	No	No	Yes	Inc
36AD24	No	No	Yes	No	4UKZL4	No	No	Yes	No
376P84	No	No	Yes	No	4ULV7V	No	No	Yes	No
37HQKQ	No	No	Yes	No	4UZDWU	No	No	Yes	No
38WVJN	Inc	Inc	Yes	Inc	62HYRJ	No	No	Yes	No
3BE92Q	No	No	Yes	No	66MKJQ	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
67RGKK	No	No	Yes	No	7K8MM8	No	No	Yes	No
686X4D	No	No	Yes	No	7K8RUT	No	No	Yes	No
69GN6G	No	No	Yes	No	7L3BZ2	No	No	Yes	No
69LWJW	No	No	Yes	No	7L6VRA	No	No	Yes	No
6AGCWT	No	No	Yes	No	7L7VM4	No	No	Yes	No
6ERQFD	No	No	Yes	No	7P49GV	No	No	Yes	No
6HP36X	No	No	Yes	No	7TJWY7	No	No	Yes	No
6NWH4L	No	No	Yes	No	7XJVJX	No	No	Yes	No
6P42HA	No	No	Yes	No	7XXKJ4	No	No	Yes	No
6PNKP2	No	No	Yes	No	86CM6W	No	No	Yes	No
6Q36GQ	No	No	Yes	No	86WV9	No	No	Yes	No
6QW644	No	No	Yes	No	8F28WN	No	No	Yes	No
6RTF2R	No	No	Yes	No	8HJMT9	No	No	Yes	No
6T7XBP	No	Inc	Yes	Inc	8KLL2G	No	No	Yes	No
6TL9WB	No	No	Yes	No	8KMCEQ	No	No	Yes	No
6WRPFZ	No	No	Yes	No	8KMHCC	No	No	Yes	No
6X3HGU	No	No	Yes	No	8LDLYR	No	No	Yes	No
6YVKY3	No	No	Yes	No	8LF8YD	No	No	Yes	No
77TGDT	No	No	Yes	No	8M7HLZ	No	No	Yes	No
787WXL	No	No	Yes	No	8MBTQJ	No	No	Yes	No
7ARN4W	No	No	Yes	No	8MQC9V	No	No	Yes	No
7CH3C8	No	No	Yes	No	8MX9PM	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
8P22L7	No	No	Yes	No	A98YE2	No	No	Yes	No
8RQF4P	No	No	Yes	No	AC7EMP	No	No	Yes	No
8VB36P	No	No	Yes	No	AE7R22	No	No	Yes	No
9423Y8	No	No	Yes	No	AJNPVJ	No	No	Yes	No
99N6R7	No	No	Yes	No	ALWZRM	No	No	Yes	No
9AJHGJ	Inc	Inc	Yes	Inc	AMN4E3	No	No	Yes	No
9C7B68	No	No	Yes	No	ANFAM7	No	No	Yes	No
9D4HK7	No	No	Yes	No	AQ7AT4	No	No	Yes	No
9D76A7	No	No	Yes	No	AREGVW	No	No	Yes	No
9GLH38	No	No	Yes	No	AWFC7K	No	No	Yes	No
9K6K3K	No	No	Yes	No	AX2FEH	No	No	Yes	No
9QQM2B	No	No	Yes	No	AXL4UR	No	No	Yes	No
9QUBDM	No	No	Yes	No	AYCCTV	No	No	Yes	No
9U84YL	No	No	Yes	No	AYEUZ7	No	No	Yes	No
9V2U6Z	No	No	Yes	No	AZU62K	No	Inc	Yes	Inc
9V68W3	No	No	Yes	No	B2H69E	Inc	Inc	Yes	Inc
9VM9VY	No	No	Yes	No	B46R23	No	No	Yes	No
9WYX3G	No	No	Yes	No	B4PED6	No	No	Yes	No
9XTQVF	No	No	Yes	No	B7DWGC	No	No	Yes	No
A46C8Q	No	No	Yes	No	BDP6WR	No	No	Yes	No
A7ZUNJ	No	No	Yes	No	BE6C7F	No	No	Yes	No
A8AVFK	No	No	Yes	No	BH6AVM	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
BHBLRJ	No	No	Yes	No	D8EQ4L	No	No	Yes	No
BJLH6B	No	No	Yes	No	DA7MX8	No	No	Yes	No
BJWN4X	No	No	Yes	No	DAQEVY	No	No	Yes	No
BV77RU	No	No	Yes	No	DCXJM2	No	No	Yes	No
BVD6GX	No	No	Yes	No	DG4JDX	No	No	Yes	No
BZBFG4	No	No	Yes	No	DKLCWD	No	No	Yes	No
C3PT2Q	No	No	Yes	No	DMQAYT	No	No	Yes	No
C46YR2	No	No	Yes	No	DV9JHM	No	No	Yes	No
CBJUNV	No	No	Yes	No	DYLBKA	No	No	Yes	No
CCCMJE	No	No	Yes	No	DZKG6A	No	Inc	Yes	Inc
CEFPZ3	No	No	Yes	No	E4C628	No	No	Yes	No
CGQH2W	No	No	Yes	No	E9U6GM	No	No	Yes	No
CHMPTP	No	No	Yes	No	EBCMCD	No	Inc	Yes	Inc
CJDXUD	No	No	Yes	No	ECRQ76	No	No	Yes	No
CKWPZG	No	No	Yes	No	EDLCYV	No	No	Yes	No
CMZE9R	No	No	Yes	No	EJR479	No	No	Yes	No
CP3BXL	No	Inc	Yes	Inc	ELU43Y	No	No	Yes	No
CQGZ2Y	No	No	Yes	No	EMM7MT	No	No	Yes	No
CUFF6F	No	No	Yes	No	EMQGRC	No	No	Yes	No
CXER6L	No	No	Yes	No	EPRPU2	No	No	Yes	No
D2V94H	No	Inc	Yes	Inc	ERLBMT	No	No	Yes	No
D7929P	No	No	Yes	No	EU4HZU	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
EVM9KZ	No	No	Yes	No	GE9L9N	No	No	Yes	No
EXBL4H	No	No	Yes	No	GJJXLF	No	Inc	Yes	Inc
EY3WNJ	No	No	Yes	Yes	GK9C4Y	No	No	Yes	No
EYMJCU	No	No	Yes	No	GN9KBU	No	No	Yes	No
EZVPJ3	No	No	Yes	No	GNQJHZ	No	No	Yes	No
F7FBXT	No	No	Yes	No	GNVQT9	No	No	Yes	No
F7ZRH2	No	No	Yes	No	GP9F3C	No	No	Yes	No
F96DW2	No	No	Yes	No	GQZJNR	No	No	Yes	No
F9N7ZK	No	No	Yes	No	GRXMMA	No	No	Yes	No
FB8C8U	No	No	Yes	No	GTAG4V	No	No	Yes	No
FBTXQC	No	No	Yes	No	H6CEGU	No	No	Yes	No
FCKYP9	No	No	Yes	No	H9F8BR	No	No	Yes	No
FJ38D6	No	No	Yes	No	HBXEPU	No	No	Yes	No
FJ6ZAR	No	No	Yes	No	HCFCDD	No	No	Yes	No
FNECP6	No	No	Yes	No	HGPJKJ	No	No	Yes	No
FU4U62	No	No	Yes	No	HJDX9T	No	No	Yes	No
G3ECEM	No	No	Yes	No	HMD7EN	No	No	Yes	No
G3TV6C	No	No	Yes	No	HNBAD7	No	No	Yes	No
G6KYRR	No	No	Yes	No	HNBH8B	No	Inc	Yes	Inc
G9D63M	No	No	No	No	HRD9PJ	No	No	Yes	No
GB72PW	No	No	Yes	No	HUUQPF	Inc	Inc	Yes	Inc
GB9EPC	No	No	Yes	No	HXG6HW	No	No	Yes	No



TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
HY4ZPW	No	No	Yes	No	KT2CHG	No	No	Yes	No
HZYLHN	No	No	Yes	No	KTAWJ	No	No	Yes	No
J2ULXE	No	No	Yes	No	KTUEX6	No	No	Yes	No
J9BZZJ	No	No	Yes	No	KVZ7LC	No	No	Yes	No
JBZ8C	No	No	Yes	No	L4D2VD	No	No	Yes	No
JDT7RR	No	No	Yes	No	L7JN7W	No	No	Yes	No
JHGU4P	No	No	Yes	No	LERA3D	No	No	Yes	No
JJTR9U	No	No	Yes	No	LF8GHT	No	No	Yes	No
JKLMV3	No	No	Yes	No	LHDZJA	No	No	Yes	No
JLHTKA	No	No	Yes	No	LKHTD9	No	No	Yes	No
JMTMAH	No	No	Yes	No	LLQRLV	No	No	Yes	No
JP7G6A	No	No	Yes	No	LYFT23	Inc	Inc	Yes	Inc
JUDU2M	No	No	Yes	No	LYGLZB	No	No	Yes	No
JUUWM2	No	No	Yes	No	LZ8UYD	No	No	Yes	No
JYN34C	No	No	Yes	No	M23P7M	No	No	Yes	No
JYYZ4M	No	No	Yes	No	M3VLTV	No	No	Yes	No
K2UMRD	No	No	Yes	No	M4CNPW	No	No	Yes	No
K72G3Z	No	No	Yes	No	M7U4LG	No	No	Yes	No
K9QTXY	No	No	Yes	No	MB8V2A	No	No	Yes	No
KGXF6E	No	No	Yes	No	MDV9KT	No	No	Yes	No
KJNJXL	No	No	Yes	No	ME4L4F	No	No	Yes	No
KMGAKD	No	No	Yes	No	MGX6C9	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
MLW8QA	No	No	Yes	No	PMVFEH	No	No	Yes	No
MNVQKV	No	No	Yes	No	PNLQ6B	No	No	Yes	No
MVAMZ3	Inc	Inc	Yes	Inc	PQB4YF	No	No	Yes	No
MVBFXA	No	No	Yes	No	PRA8TQ	No	No	Yes	No
MVE3D3	No	No	Yes	No	PW39RJ	No	No	Yes	No
MYUDNL	No	No	Yes	No	Q2CNYM	No	No	Yes	No
N4K82D	No	No	Yes	No	Q4XF3C	No	No	Yes	No
NACCUG	No	No	Yes	No	Q7W39L	No	No	Yes	No
NEKXKY	No	No	Yes	No	QA6784	No	No	Yes	No
NGNUNZ	No	No	Yes	No	QC9WF4	No	No	Yes	No
NJH8Y8	No	No	Yes	No	QLC2DM	No	No	Yes	No
NL6ZMV	No	No	Yes	No	QMQL9H	No	No	Yes	No
NMDBGD	No	No	Yes	No	QNLXEJ	No	Inc	Yes	Inc
NRCG8H	No	No	Yes	No	QTFUY4	No	No	Yes	No
NUDELQ	No	No	Yes	No	QVH2XL	No	No	Yes	No
NVCNN9	No	No	Yes	No	QX7DWR	No	No	Yes	No
NYA9B6	No	No	Yes	No	QX9ZCK	No	No	Yes	No
NYPFQV	No	No	Yes	No	QY84A2	No	No	Yes	No
P6GXTD	No	No	Yes	No	QYLUT7	No	No	Yes	No
PAPFPK	No	No	Yes	No	R2PPBM	No	No	Yes	No
PLDP6Y	No	No	Yes	No	R3F2VE	No	No	Yes	No
PMBVTK	No	Inc	Yes	Inc	R48WNP	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
RD33EA	No	No	Yes	No	U6XY8A	No	No	Yes	No
RECWAA	No	No	Yes	No	U8KDWK	No	No	Yes	No
RHFVEZ	No	No	Yes	No	UCTWVC	No	No	Yes	No
RKHJN8	No	No	Yes	No	UE6HZ7	No	No	Yes	No
RM66VZ	No	No	Yes	No	UEZGJD	No	No	Yes	No
RUMQN6	No	No	Yes	No	UFFGWZ	No	No	Yes	No
T23U9C	No	No	Yes	No	UHMPFT	No	No	Yes	No
T2GA7L	No	No	Yes	No	UJHA3R	No	No	Yes	No
T4LYBF	No	No	Yes	No	UL2N7T	No	No	Yes	No
T86TVV	No	No	Yes	No	UNCGA8	No	No	Yes	No
T8R9UX	No	No	Yes	No	UV874Q	No	No	Yes	No
T9HCN6	No	No	Yes	No	UZ4TXE	No	No	Yes	No
T9JCGD	No	No	Yes	No	V4KJT2	No	No	Yes	No
T9L2NV	No	No	Yes	No	V6EFVF	No	No	Yes	No
TB2HVE	No	No	Yes	No	V6PC88	No	No	Yes	No
TFQPU4	No	No	Yes	No	V797ZV	No	No	Yes	No
TJMHH8	No	No	Yes	No	V8GBL7	No	No	Yes	No
TQ24QB	No	No	Yes	No	VA7MB4	No	No	Yes	No
TQL3LN	No	No	Yes	No	VGHVMD	No	No	Yes	No
TQXXV9	No	No	Yes	No	VHF7K2	No	No	Yes	No
TQZDE2	No	No	Yes	No	VJVFUJ	No	No	Yes	No
TTFC3	No	No	Yes	No	VQFA47	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
VR6MGH	No	No	Yes	No	WV4MUK	No	No	Yes	No
VRCPF3	No	No	Yes	No	WVG2F9	No	No	Yes	No
WVUVJ	No	No	Yes	No	WVJQHK	No	No	Yes	No
VXBC3W	No	No	Yes	No	WXA2KY	No	No	Yes	No
VZZPLE	No	No	Yes	No	WXNJ CJ	No	No	Yes	No
W24ZUN	No	No	Yes	No	X2BFW	No	No	Yes	No
W2R23Z	No	No	Yes	No	X4D6AW	No	No	Yes	No
W4Z3DY	No	No	Yes	No	X6MGL8	No	No	Yes	No
W97UAP	No	No	Yes	No	X73JTF	No	No	Yes	No
WAGZ46	No	No	Yes	No	X99WKF	No	No	Yes	No
WBD BEZ	No	No	Yes	No	XDZBYN	No	No	Yes	No
WBHKKE	No	No	Yes	No	XGV38K	No	No	Yes	No
WCCBQT	No	No	Yes	No	XHRMRY	No	No	Yes	No
WEVKG7	No	No	Yes	No	XJKJ97	No	No	Yes	No
WGJY4V	No	No	Yes	No	XNKCKP	No	No	Yes	No
WK7LNV	No	No	Yes	No	XREGAM	No	No	Yes	No
WLHB7L	No	No	Yes	No	XXMQMB	No	No	Yes	No
WMMUX3	No	No	Yes	No	Y2VLD6	No	No	Yes	No
WMVXN2	No	No	Yes	No	Y6YB28	No	No	Yes	No
WPCDKL	No	No	Yes	No	Y9GHE9	No	No	Yes	No
WTZLFG	No	No	Yes	No	YGVCNA	No	No	Yes	No
WU86WP	No	No	Yes	No	YNG6ZA	No	No	Yes	No

TABLE 1

WebCode	Item 2	Item 3	Item 4	Item 5	WebCode	Item 2	Item 3	Item 4	Item 5
YP8DZC	No	No	Yes	No					
Z2DXR4	No	No	Yes	No					
Z7REFZ	No	No	Yes	No					
ZD7JVD	No	No	Yes	No					
ZGU24Q	No	No	Yes	No					
ZKPKFW	No	No	Yes	No					
ZNAHZ8	No	No	Yes	No					
ZV9AWG	No	No	Yes	No					
ZW26KB	No	No	Yes	No					

<b>Response Summary</b>					<b>Participants: 401</b>
<i>Were any of the questioned expended cartridge cases (Items 2-5) discharged from the same firearm as the known expended cartridge cases (Item 1)?</i>					
		<u>Item 2</u>	<u>Item 3</u>	<u>Item 4</u>	<u>Item 5</u>
<b>Responses</b>	Yes	<b>0 (0.0%)</b>	<b>0 (0.0%)</b>	<b>400 (99.8%)</b>	<b>1 (0.2%)</b>
	No	<b>395 (98.5%)</b>	<b>384 (95.8%)</b>	<b>1 (0.2%)</b>	<b>382 (95.3%)</b>
	Inc	<b>6 (1.5%)</b>	<b>17 (4.2%)</b>	<b>0 (0.0%)</b>	<b>18 (4.5%)</b>

# Conclusions

TABLE 2

WebCode	Conclusions
22RRXW	1. Examination of Exhibit 1 disclosed it to be three fired 9mm Luger caliber cartridge cases, bearing the PMC brand headstamp. Exhibit 1 was test fired from the suspect's 9mm Luger caliber Ruger, model SR9C semiautomatic handgun for microscopic comparison. 2. Examination of Exhibits 2 through 5 disclosed them to be four fired 9mm Luger caliber cartridge cases, bearing the PMC brand headstamp. 3. Exhibits 1 through 5 were microscopically compared to one another. As a result of microscopic comparison, it was concluded that Exhibits 1 and 4 were fired in the same firearm. 3a. Exhibits 3 and 5 were identified as having been fired from the same firearm; however, were eliminated as having been fired from the same firearm as Exhibit 1. 3b. Due to differences in class and individual characteristics, Exhibit 2 was eliminated as having been fired in the same firearms as Exhibits 1, 3, 4, and 5.
237AYG	The cartridge case Item 2 was not fired in the same firearm as the cartridge case Item 1A (test). The cartridge case Item 2 was not fired in the same firearm as the cartridge case Item 5. The cartridge cases, Items 3 and 5, were microscopically identified as having been fired in the same firearm. The cartridge case Item 4 was microscopically identified as having been fired in the same firearm as the cartridge case Item 1A (test). The cartridge case Item 5 was not fired in the same firearm as the cartridge case Item 1A (test).
26E8QC	The cartridge case in Item 4 was fired in the same gun that fired the cartridge cases in Item 1. The cartridge cases in Items 2, 3 and 5 were not fired in the gun that fired the cartridge cases in Item 1.
29ED84	Item 4 was fired in the same firearm as the item 1 test fires. Items 3 and 5 were fired in a second firearm. Item 2 was fired in a third firearm.
2BNDEV	The Item 1 and 4 cartridge cases were identified, within the limits of practical certainty <sup>1</sup> , as having been fired in the same firearm. The Item 3 and 5 cartridge cases were identified, within the limits of practical certainty <sup>1</sup> , as having been fired in the same firearm. The Item 2, 3 and 5 cartridge cases were not fired in the same firearm that generated the Item 1 cartridge cases. The Item 2 cartridge case was not fired in the same firearm as Items 3 and 5. Three (3) firearms are represented by the submitted items.
2CQEY2	A microscopic comparative examination of Items 1 through Item 5 disclosed that Item 4 was fired in the Item 1 pistol. Item 2 was not fired in the Item 1 pistol, nor was it fired in the same firearm as Items 3 and 5. Items 3 and 5 were fired in the same unknown firearm.
2CU3BD	Due to agreement of class and individual characteristics seen in firing pin and aperture sheermarks between test-fired cartridges cases, Item 1, and recovered cartridge case, Item 4, it is the opinion of this examiner that Item 4 was fired in the recovered Ruger SR9C handgun. Items 2, 3 and 5 were eliminated from being fired in the recovered firearm due to differences in class characteristics and individual characteristics seen. In addition due to agreement of class and individual characteristics in firing pin and aperture sheermarks, it is the opinion of this examiner that Items 3 and 5 were fired in the same firearm.
2DNXRU	Items 001-02 through 001-05 are PMC brand 9mm Luger caliber fired cartridge cases. I microscopically compared these items and I observed agreement of all discernable class characteristics with sufficient agreement of individual characteristics to conclude that Items 001-03 and 001-05 were fired by a single firearm. I observed significant differences between the other cartridge cases and concluded Item 001-02 was fired by a second firearm and Item 001-04 was fired by a third firearm. I microscopically compared one of the test fires reportedly test fired in the Ruger pistol to Item 001-04. I observed agreement of all discernable class

TABLE 2

WebCode	Conclusions
	characteristics with sufficient agreement of individual characteristics to conclude that they were fired by the same firearm. Therefore, Item 001-04 was fired by the same firearm that was reportedly used to produce the test fires.
2L2WED	The cartridge case marked as "Item 4: third expended cartridge case recovered from parking lot (questioned)", was fired by the Ruger SR9C 9mm Auto handgun seized from the suspect.
2RQFRU	The fired cartridge cases in Items 1 and 4 were identified as having been fired in the same firearm. The fired cartridge cases in Items 3 and 5 were identified as having been fired in the same firearm; however, a different firearm than the one that fired the cartridge cases in Items 1 and 4. The fired cartridge case in Item 2 was excluded as having been fired in either of the firearms that fired the cartridge cases in Items 1, 3, 4, and 5.
2THC2V	Three weapons are involved in the same crime scene. The macroscopic study reveals that: The cartridge case labeled as item 4 was discharged from the suspect's weapon (Ruger SR9C). The cartridge cases labeled as items 3 and 5 was discharged from the same unknown weapon. The cartridge case labeled as item 2 doesn't match any item (questioned or known).
2W2DBA	Item 4 was fired in the same firearm as Items 1A, 1B, & 1C. Items 3 & 5 were fired in the same firearm. However, Items 3 & 5 were not fired in the same firearm as Items 1A, 1B, & 1C. Item 2 was not fired in the same firearm as Items 3 & 5, nor in the same firearm as Items 1A, 1B, & 1C.
2Y9MGL	Microscopic comparisons of the one (1) fired 9mm Luger cartridge case, item #4, with the test cartridge cases reported as having been fired by the Ruger pistol, item #1, revealed matching class and individual characteristics (breech face and firing pin impressions). This finding confirms that the one (1) fired 9mm Luger cartridge case, item #4, had been fired by the Ruger pistol, item #1. Microscopic comparisons of the remaining three (3) fired 9mm Luger cartridge cases, items #2, #3 and #5, to the test cartridge cases reported as having been fired by the Ruger pistol, submitted as item #1, revealed the following: different class and individual characteristics (breech face and firing pin impressions) to the one (1) fired 9mm Luger cartridge case, item #2. different individual characteristics (breech face impressions) to the two (2) fired 9mm Luger cartridge cases, items #3 and #5. These findings confirm that the three (3) fired 9mm Luger cartridge cases, items #2, #3 and #5, had not been fired by the Ruger pistol, item #1. Additional microscopic comparisons of the two (2) fired 9mm Luger cartridge cases, items #3 and #5, to each other revealed that they had matching class and individual characteristics (breech face impressions). This finding confirms that the two (2) fired 9mm Luger cartridge cases, items #3 and #5, had been fired by the same firearm. Further microscopic comparisons of the one (1) fired 9mm Luger cartridge case, item #2, to the two (2) fired 9mm Luger cartridge cases, items #3 and #5, revealed different class and individual characteristics (breech face and firing pin impressions). This finding confirms that the one (1) fired 9mm Luger cartridge case, item #2, had not been fired by the same firearm that fired the two (2) fired 9mm Luger cartridge cases, items #3 and #5.
32AY2T	The conclusions in this section are the opinions of Firearms Examiner [name]. When a conclusion is verified, it is also the opinion of the verifier. Item 4 was fired in the same firearm as Item 1 (identification). This conclusion was verified by Firearms Examiner [name]. Items 3 and 5 were fired in the same firearm (identification). This conclusion was verified by Firearms Examiner [name]. Items 3 and 5 were not fired in the same firearm as Item 1 (elimination). This conclusion was verified by Firearms Examiner [name]. Item 2 was not fired in the same firearm as Item 1 (elimination). This conclusion was verified by Firearms Examiner [name]. Item 2 was not fired in the same firearm as Items 3 and 5 (elimination). This conclusion was verified by Firearms Examiner [name]. For additional clarification regarding conclusion statements, please

TABLE 2

WebCode	Conclusions
	<p>contact the Firearms Section or go to [website]. Item 2 and Items 3 and 5 could have been fired in two 9mm Luger firearms of the following manufacture: [List of firearm manufacturers]. Manufacturers lists are investigative tools and are not intended to be all-inclusive. Any suspect firearms should be submitted for comparison.</p>
363DU8	<p>3. On 2017-06-23 during the performance of my official duties I received a sealed evidence bag with number PA4001476923 marked "295346/17, 17-526" from Case Administration of the Ballistics Section, containing the following: 3.1 Four (4) 9mm Parabellum calibre fired exhibit cartridge cases marked "2" to "5" individually. 3.2 Three (3) 9mm Parabellum calibre fired test cartridge cases each marked "1". 4. The intention and scope of this forensic examination comprise the following: 4.1 The identification and examination of fired cartridge cases. 4.2 Microscopic individualization of fired cartridge cases. 5. I examined the fired cartridge cases mentioned in paragraphs 3.1 and 3.2 and compared the individual and class characteristic markings transferred to them during the firing process using a comparison microscope and found: 5.1 The cartridge case marked "4" was fired in the same firearm that fired the test cartridge cases mentioned in paragraph 3.2. 5.2 The cartridge cases marked "3" and "5" respectively were fired in a second (2nd) firearm. 5.3 The cartridge case marked "2" was fired in a third (3rd) firearm.</p>
36AD24	<p>A microscopic examination and comparison of the evidence described above revealed the following: Cartridge case (4) and test fire cartridge case (1.1, 1.2, 1.3) are all identified as having been fired from the above firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge cases (3, 5) are identified as having been fired from a second firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge case (2) is identified as having been fired from a third firearm as compared to cartridge case (4), test fire cartridge cases (1.1, 1.2, 1.3) and cartridge cases (3, 5) based on the observed disagreement of class and individual characteristics.</p>
376P84	<p>Item 4 was fired in the same firearm as the item 1 test fires. Items 3 and 5 were fired in a second firearm. Item 2 was fired in a third firearm.</p>
37HQKQ	<p>The test fired cartridge case (Item 1A) from the recovered Ruger pistol and the fired cartridge case (Item 4) recovered from the parking lot were microscopically examined and compared. Based on the agreement of their class characteristics and sufficient agreement of their individual characteristics, the case (Item 4) is identified as having been fired in the recovered Ruger pistol. The fired cartridge case (Item 3) recovered from the parking lot and the fired cartridge case (Item 5) recovered from the grass area near the parking lot were microscopically examined and compared. Based on the agreement of their class characteristics and sufficient agreement of their individual characteristics, the cases are identified as having been fired in the same firearm. The test fired cartridge case (Item 1A) from the recovered Ruger pistol and the fired cartridge cases (Items 2, 3, &amp; 5) were microscopically examined and compared. Based on the observed disagreement of both class and individual characteristics, the cases are eliminated as having been fired in the recovered Ruger pistol. The fired cartridge case (Item 2) from the parking lot and the fired cartridge cases (Items 3 &amp; 5) were microscopically examined and compared. Based on the observed disagreement of both class and individual characteristics, the case (Item 2) is eliminated as having been fired in the same firearm as the cases (Items 3 &amp; 5).</p>
38WVJN	<p>Items 1A, 1B, 1C and 4 (Group 1) are identified as having been fired from the same firearm. Items 3 and 5 (Group 2) are identified as having been fired from the same firearm. Groups 1, 2 and item 2 are not identified or eliminated (inconclusive) as having been fired from the same firearm. The individual characteristics present did not display agreement. Differences in</p>



TABLE 2

WebCode	Conclusions
	individual characteristics would suggest that Groups 1, 2 and item 2 were fired from different firearms. Items 1C, 2 and 5 were entered into the National Integrated Ballistic Information Network (NIBIN) database and the submitting agency will be notified of any potential leads.
3BE92Q	Exhibits 1 through 5 are fired 9mm Luger caliber, centerfire cartridge cases marketed by PMC that bear marks of value for comparison. Microscopic comparisons among the Exhibit 1 through 5 cartridge cases determined that: Exhibits 3 and 5 were identified as having been fired in the same firearm. Exhibits 3 and 5 were excluded as having been fired in the firearm that fired the Exhibit 1 cartridge cases due to differences in class characteristics. Exhibit 4 was identified as having been fired in the same firearm that fired the Exhibit 1 cartridge cases. Exhibit 2 was excluded as having been fired in the firearms that fired Exhibits 1 and 4, and Exhibits 3 and 5 due to differences in class characteristics.
3D4ELM	[No Conclusions Reported.]
3FP7RX	Exhibits #1-T1 through #1-T3 were microscopically inter-compared. Exhibit #1-T2 was used for comparison purposes. The Exhibit #1-T2 and #4 cartridge cases were fired in the same firearm. The Exhibit #2 cartridge case was fired in a second firearm. The Exhibit #3 and #5 cartridge cases were fired in a third firearm.
3HVT63	Items 1 through 5 are 9mm Luger (9x19mm) cartridge cases bearing the headstamp of PMC. Item 1 and Item 4 were identified as having been fired in the same firearm. Item 3 and Item 5 were identified as having been fired in the same firearm. Due to a difference in class characteristics (firing pin aperture and breech face), Item 3 and Item 5 were not fired in the same firearm as Item 1 and Item 4. Due to a difference in class characteristics in the firing pin impression (concentric circles vs smooth) the Item 2 cartridge case was not fired in the same firearm as the Item 1 and Item 4 cartridge cases or the Item 3 and Item 5 cartridge cases.
3KQ6B4	Item 4, a fired cartridge case collected at the scene, was identified as having been fired in the suspect's firearm, A Ruger SR9C 9mm Luger caliber pistol. Items 2, 3, and 5 (fired cartridge cases collected at the scene) were eliminated as having been fired in the suspect's firearm. Items 3 and 5 were identified as having been fired in the same firearm, but not the suspect's firearm.
3TGVPJ	Items 001-003-001, 001-004-001, and 001-005-001 are three fired 9mm Luger caliber fired cartridge cases. They were microscopically compared to one of the test fired cartridge cases submitted as item 001-001-001. Item 001-004-001 was identified as having been fired by the same firearm that fired item 001-001-001 based on similarities observed between the patterns of microscopic markings on item 001-004-001 and the test fired cartridge case to which it was compared. Items 001-003-001 and 001-005-001 were eliminated as having been fired by the same firearm that fired item 001-001-001 based on differences observed between the patterns of microscopic markings on items 001-003-001, 001-005-001, and the test fired cartridge case to which they were compared. Items 001-003-001 and 001-005-001 were identified as having been fired by the same unknown firearm based on similarities observed between the patterns of microscopic markings on the two items. Item 001-002-001 is a 9mm Luger caliber fired cartridge case. Item 001-002-001 was eliminated as having been fired by the same firearm that fired items 001-001-001 and 001-004-001 or the same firearm that fired items 001-003-001 and 001-005-001. The elimination conclusions are based on differences in class characteristics.
4339AZ	Item 1 - Three spent 9 mm caliber "PMC" cartridge cases reportedly discharged by the suspect's weapon. The above cartridge cases were microscopically compared to the Items 2-5 cartridge cases. Item 2 - One spent 9 mm caliber "PMC" cartridge case. The cartridge case was

TABLE 2

WebCode	Conclusions
	<p>compared to the Items 1, 3, 4, and 5 cartridge cases. The cartridge cases were eliminated as having been discharged by the same firearm based on differences in class and/or individual characteristics observed during the microscopic comparison. Item 3 - One spent 9 mm caliber "PMC" cartridge case. Item 5 - One spent 9 mm caliber "PMC" cartridge case. The cartridge cases matched each other and were discharged by the same firearm. The identifications were based on the agreement of individual characteristics observed during a microscopic comparison. The cartridge cases were also compared to the Items 1, 2, and 4 cartridge cases. The cartridge cases were eliminated as having been discharged by the same firearm based on differences in class and/or individual characteristics observed during the microscopic comparison. Item 4 - One spent 9 mm caliber "PMC" cartridge case. The cartridge case matched the Item 1 test cartridge cases and was discharged by the same firearm. The identification was based on the agreement of individual characteristics observed during a microscopic comparison.</p>
44E7JC	<p>After microscopic comparison of Item 1 (Test fires from suspect's weapon) and the fired cartridge cases (Items 2, 3, 4 &amp; 5) it was determined that: A: Item 4 (fired cartridge case) was fired in the suspect's weapon. B: Item 2 (fired cartridge case) was not fired in the suspect's weapon, but was fired in an unknown weapon capable of chambering and firing 9mm Luger caliber ammunition. C: Items 3 &amp; 5 (fired cartridge cases) were not fired in the suspect's weapon, but were both fired in the same unknown weapon capable of chambering and firing 9mm Luger caliber ammunition. Items 3 &amp; 5 were fired in a different unknown weapon than the unknown weapon that fired Item 2.</p>
4ACU2B	<p>Item 4 was compared to cartridge cases (item 1) test fired in the suspect's Ruger model SR9C pistol. Based on matching class characteristics and individualizing detail, I determined that the item 4 and item 1 cartridge cases could be identified to a common source. While identification-quality correspondence exists between the items, subclass potential could not be eliminated because no firearm was available for examination. The common source is most likely the suspect's firearm, but the common source may be the same tooling used to produce a limited number of firearms, including the suspect's firearm. Based on differences in firearm-related class characteristics, item 2 was fired in a different firearm than that used to generate items 1, 3, 4, and 5. Items 3 and 5 were each compared to cartridge cases (item 1) test fired in the suspect's Ruger model SR9C pistol. Based on differences in class characteristics and individualizing detail, I determined the suspect's pistol was not the source of the items 3 and 5 cartridge cases. Items 3 and 5 were compared to each other. Based on matching class characteristics and individualizing detail, I determined that the item 3 and item 5 cartridge cases could be identified to a common source. While identification-quality correspondence exists between the items, subclass potential could not be eliminated because no firearm was available for examination. The common source is most likely a single firearm, but the common source may be the same tooling used to produce a limited number of firearms. Based on the conclusions above, the cartridge cases collected from the scene most likely represent the use of three different firearms.</p>
4GYNAU	<p>Item 4 was fired in the same firearm as Item 1 (identification). This conclusion was verified by Firearms Examiner [name]. Items 3 and 5 were not fired in the same firearm as Items 1 and 4 (elimination). This conclusion was verified by Firearms Examiner [name]. Item 2 was not fired in the same firearm as Items 1 and 4 or Items 3 and 5 (elimination). This conclusion was verified by Firearms Examiner [name].</p>
4H9H49	<p>The Item 4 cartridge case was identified as having been fired in the same firearm as the Item 1C cartridge case. The Items 3 and 5 cartridge cases were identified as having been fired in the same unknown firearm. The Item 2 cartridge case was not fired in the same firearm as the</p>

TABLE 2

WebCode	Conclusions
	Item 1 (A – C) cartridge cases or the same unknown firearm as the Items 3 – 5 cartridge cases.
4HQTJT	The test fires from the Ruger SR9C 9mm Luger semiautomatic pistol (item 1) were sub-itemed as Item 1.01, Item 1.02, and Item 1.03. The first expended cartridge case recovered from the parking lot (item 2) is excluded by microscopic comparison of the class characteristics as having been fired in the seized Ruger SR9C 9mm Luger chambered semiautomatic pistol. The second expended cartridge case recovered from the parking lot (item 3) is excluded by microscopic comparison of the class and individual characteristics as having been fired in the seized Ruger SR9C 9mm Luger chambered semiautomatic pistol. The third expended cartridge case recovered from the parking lot (item 4) is identified by microscopic comparison of the class and individual characteristics as having been fired in the seized Ruger SR9C 9mm Luger chambered semiautomatic pistol. The expended cartridge case recovered from the grass area near the parking lot (item 5) is excluded by microscopic comparison of the class and individual characteristics as having been fired in the seized Ruger SR9C 9mm Luger chambered semiautomatic pistol. The second expended cartridge case recovered from the parking lot (item 3) is identified by microscopic comparison of the class and individual characteristics as having been fired in the same unknown 9mm Luger chambered semiautomatic firearm that fired the expended cartridge case recovered from the grass area near the parking lot (item 5).
4MM9DA	The fired cartridge case, item 4, was identified as having been fired in the Ruger pistol, item 1. The two (2) fired cartridge cases, items 3 and 5, were consistent in all observable class characteristics (caliber, smooth firing pin impression, and firing pin aperture shear) as the Ruger pistol, item 1. While there is some disagreement of microscopic markings, the markings present are insufficient for an elimination. The results are inconclusive. The two (2) fired cartridge cases, item 3 and 5, were each identified as having been fired in the same firearm. The fired cartridge case, item 2, was eliminated as having been fired in the Ruger pistol, item 1, based on a difference in class characteristics (circular vs smooth hemispherical firing pin impression, and parallel vs smooth breechface marks). The fired cartridge case, item 2, was eliminated as having been fired in the same firearm as the two (2) fired cartridge cases, items 3 and 5, based on a difference in class characteristics (circular vs smooth hemispherical firing pin impression, and heavy parallel vs few light parallel breechface marks).
4NGYJN	Item 1 - Three (3) 9mm Luger caliber fired cartridge cases bearing the PMC headstamp (samples from Ruger pistol) (1). Item 2 - One (1) fired cartridge case (2). Item 3 - One (1) fired cartridge case (3). Item 4 - One (1) fired cartridge case (4). Item 5 - One (1) fired cartridge case (5). The submitted specimens marked Item 2 through 5 were examined and identified as four (4) fired 9mm Luger caliber cartridge cases bearing the PMC headstamp. Item 2 through Item 5 were microscopically intercompared and compared to Item 1 sample cartridge cases. As a result of microscopic comparison, it was concluded that Item 1 and Item 4 were identified as having been fired in the same firearm. Item 3 and Item 5 were identified as having been fired in the same firearm. It was concluded that they exhibit the same class characteristics, but Item 1 and Item 4 were eliminated as having been fired in the same firearm that fired Item 3 and Item 5 due to differences in individual characteristics. Item 2 was eliminated as having been fired in the same firearm that fired Items 1 and 4 and Items 3 and 5 due to differences in class characteristics.
4NHZ32	Test Fires (1.1 - 1.3) and Cartridge Casing (4) are identified as having been discharged from the SAME firearm, based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Casings (5) and Cartridge Casing (3) are identified as having been discharged from a SECOND firearm, based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Casing (2) was fired from a THIRD firearm based on the observed

TABLE 2

WebCode	Conclusions
	disagreement of class characteristics, as compared to Test Fires (1.1 - 1.3) and Cartridge Casings (3, 4, 5).
4Q4HKM	Item 4 (fired cartridge case) is identified as having been fired in Item 1 (firearm). Items 2 and 3 (fired cartridge cases) are eliminated as having been fired in the same firearm as each other. There are differences in class characteristics (firing pin impression shape and/or manufactured toolmarks). Items 2 and 3 (fired cartridge cases) are eliminated as having been fired in Item 1 (firearm) or as having been fired in the same firearm as Item 5 (fired cartridge case). There are differences in class characteristics (firing pin impression shape and/or manufactured toolmarks). Item 5 (fired cartridge case) is not identified or eliminated (inconclusive) as having been fired in Item 1 (firearm). The individual characteristics do not display agreement. However, the characteristics present suggest that Item 5 was fired in a different firearm. Submission of that firearm is necessary for further examination. Items 2, 3, 5 and test shots from Item 1 were submitted for entry into the National Integrated Ballistic Information Network (NIBIN) database and will be returned to the submitting agency. The submitting agency will be notified of any investigative leads.
4UKZL4	The cartridge cases Exhibits 1 and 4 were compared microscopically with each other and identified as having been fired in a single firearm. The cartridge case Exhibit 2 was fired in a second firearm. The cartridge cases Exhibits 3 and 5 were compared microscopically with each other and identified as having been fired in a single (third) firearm.
4ULV7V	Item #1 and Item #4 were microscopically examined and compared. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Items #1 and #4 are identified as having been fired in the same firearm. Item #1 and Items #2, #3, and #5 were microscopically examined and compared. Based on the observed disagreement of class and/or individual characteristics, Items #2, #3, and #5 are eliminated as having been fired in the same firearm as Item #1. Item #2 and Item #3 were microscopically examined and compared. Based on the observed disagreement of class characteristics, Items #2 and #3 are eliminated as having been fired in the same firearm. Item #3 and Item #5 were microscopically examined and compared. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Items #3 and #5 are identified as having been fired in the same firearm.
4UZDWU	1 Examinations showed Item 4 was discharged within the Ruger SR9C 9mm Auto pistol. 2 Examinations showed Item 2 was not discharged within the Ruger SR9C 9mm Auto pistol due to differences in class characteristics. 3 Examinations showed Items 3 and 5 were not discharged within the Ruger SR9C 9mm Auto pistol due to differences in individual characteristics. 4 Examinations showed Items 3 and 5 were discharged within the same unknown firearm. 5 Examinations showed Item 2 was not discharged within the same firearm as Items 3 and 5 due to differences in class characteristics.
62HYRJ	The Exhibit #4 cartridge case was fired in the same firearm as the Exhibit #1A - #1C cartridge cases. The Exhibit #2 cartridge case was fired in an unknown firearm. The Exhibit #3 and #5 cartridge cases were fired in a second unknown firearm. Exhibits #1A - #1C, #2, #3, #4, and #5 do not meet requirements for imaging per NIBIN criteria.
66MKJQ	The Item 4 casing was fired in the submitted 9mm Ruger pistol, model SR9C. The Item 3 and Item 5 casings were fired in a second 9mm pistol. The Item 2 casing was fired in a third 9mm pistol.
67RGKK	The items 1 and 4 fired cartridge cases were fired in the same firearm. The items 2, 3 and 5 fired cartridge cases were not fired in the same firearm as the item 1 fired cartridges. The items 3 and 5 fired cartridge cases were fired in the same firearm but not the same as the item 2

TABLE 2

WebCode	Conclusions
	fired cartridge case.
686X4D	Item 4 was microscopically identified as having been fired in the firearm represented by the Item 1 test fires. Items 3 and 5 were microscopically identified as having been fired in the same firearm; however they were not fired in the firearm represented by the Item 1 test fires. Item 2 was not fired in the same firearm as Items 1, 3, or 5.
69GN6G	Item #4 was fired from the submitted Ruger 9mm pistol based on sufficient agreement of class and individual characteristics of firing pin aperture shear marks. Item #'s 3 and 5 were not fired from the Ruger 9mm pistol based on differences of firing pin marks and firing pin aperture shear marks. These casings were fired from a 2nd firearm based on agreement of class and individual characteristics of firing pin aperture shear marks. Item #2 was fired from a 3rd firearm. It was not fired from the firearm noted above based on differences of class characteristics (breech face, aperture, firing pin marks)
69LWJW	The evidence and test fired cartridge cases were examined and microscopically inter-compared with the following results: There are three firearms represented by the evidence cartridge cases. The cartridge case (Item 4) was identified as having been fired by the same firearm that fired the test fired cartridge cases (Item 1). The two cartridge cases (Items 3 and 5) were identified as having been fired by a second firearm. The cartridge case (Item 2) represents a third firearm.
6AGCWT	Item 4 was fired in the same firearm as Item 1 (identification). Item 3 was fired in the same firearm as Item 5 (identification). Items 3 and 5 were not fired in the same firearm as Item 1 (elimination). Item 2 was not fired in the same firearm as Item 1 (elimination). Item 2 was not fired in the same firearm as Items 3 and 5 (elimination).
6ERQFD	Item 4 was microscopically identified as having been fired in the same firearm as Items 1A-1C. Items 2, 3, and 5 were not fired in the same firearm as Items 1A-1C. Items 3 and 5 were microscopically identified as having been fired in the same unknown firearm. Item 2 was not fired in the same firearm as Items 3 and 5.
6HP36X	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 item 4 and item 1 were fired in the same firearm. In my opinion, a microscopical comparison of firing marks has shown there is there is significant disagreement of class and individual characteristic markings to conclusively determine that items 2,3 & 5 were not fired in the same firearm as item 1.
6NWH4L	[No Conclusions Reported.]
6P42HA	Identification: Based on the agreement of discernible class characteristics and sufficient matching individual detail, the fired cartridge case C-4(Item 4) was identified as having been fired in the same firearm as the fired cartridge cases in Item 1. Identification: Based on the agreement of discernible class characteristics and sufficient matching individual detail, the fired cartridge cases C-3(Item 3) and C-5(Item 5) were identified as having been fired in the same firearm. Elimination: Based on the significant disagreement of class and/or individual characteristics, the fired cartridge case C-2(Item 2) was eliminated as having been fired in the same firearm as the fired cartridge cases in Item 1. Elimination: Based on the significant disagreement of class and/or individual characteristics, the fired cartridge case C-3(Item 3) was eliminated as having been fired in the same firearm as the fired cartridge cases in Item 1. Elimination: Based on the significant disagreement of class and/or individual characteristics, the fired cartridge case C-2(Item 2) was eliminated as having been fired in the same firearm as the fired cartridge case C-3(Item 3).

TABLE 2

WebCode	Conclusions
6PNKP2	A microscopic examination and comparison of the evidence described above revealed the following: Cartridge case (4) and Testfires (1.1, 1.2, and 1.3) are identified as having been fired from the SAME gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge cases (3 and 5) are identified as having been fired from a SECOND gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge case (2) is identified as having been fired from a THIRD gun based on the observed disagreement of class characteristics when compared to cartridge cases (1.1, 1.2, 1.3, and 4) and cartridge cases (3 and 5).
6Q36GQ	Casing O (Item 4) was fired in the submitted Ruger pistol, model SR9C, serial number not provided (Item 1). Casings N (Item 3) and P (Item 5) were fired in a second 9mm firearm, possibly a Ruger pistol; however, any suspect weapon should be submitted for examination. Casing M (Item 2) was fired in a third 9mm firearm. The specific brand of the suspect weapon is unknown.
6QW644	A. The cartridge cases mentioned in 3.1 marked 59669/17 A3 and A5 (Item 3 and Item 5) were fired in the same firearm but not in the firearms that fired cartridge cases mentioned in 3.1 marked 59669/17 A2, A4 (Item 2, Item 4) and 3.2. B. The cartridge case mentioned in 3.1 marked 59669/17 A4 (Item 4) and 3.2 were fired in the same firearm. C. The cartridge case mentioned in 3.1 marked 59669/17 A2 was not fired in the firearm in the firearm that fired cartridge cases mentioned in 3.1 marked 59669/17 A3, A5 (Item 3, Item 5) and 3.2.
6RTF2R	The cartridge cases in Exhibits 001-02 through 001-05 were examined in conjunction with each other and with the test fired cartridge cases in Exhibit 001-01. Based on these microscopic comparisons it was determined that: The 001-04 fired cartridge case was identified as having been fired in the same firearm as the 001-01 test fired cartridge cases. The 001-03 and 001-05 fired cartridge cases were identified as having been fired in the same firearm and eliminated as having been fired in the same firearm as the 001-01 test fired cartridge cases. The 001-02 fired cartridge case was eliminated as having been fired in the same firearm as the 001-01 test fired cartridge cases and the 001-03 and 001-05 fired cartridge cases.
6T7XBP	EXAMINATION/ANALYSIS AND INTERPRETATION OF RESULTS: Exhibits 1A, 1B and 1C consist of three (3) caliber 9mm Luger fired cartridge cases, PMC brand. These exhibits were microscopically inter-compared. There is an agreement of all discernable class characteristics and sufficient agreement of individual characteristics to identify them as having been fired in the same firearm. Exhibits 2 through 5 consist of four (4) caliber 9mm Luger fired cartridge cases, PMC brand. These exhibits were microscopically compared to the Exhibit 1 test fired cartridge cases with the following results: Exhibit 2 was eliminated as having been fired in the same firearm as the Exhibit 1 test fired cartridge cases due to a difference in class and individual characteristics. Exhibits 3 and 5 had an agreement of all discernable class characteristics but insufficient agreement of individual characteristics to identify or eliminate them as having been fired in the same firearm as the Exhibit 1 test fired cartridge cases. Exhibit 4 has is an agreement of all discernable class characteristics and sufficient agreement of individual characteristics to identify it as having been fired in the same firearm as the Exhibit 1 test fired cartridge cases. Exhibits 2, 3 and 5 were microscopically inter-compared with the following results: Exhibit 2 was eliminated as having been fired in the same firearm as the Exhibit 3 and 5 cartridge cases due to a difference in class and individual characteristics. Exhibits 3 and 5 had an agreement of all discernable class characteristics and sufficient agreement of individual characteristics to identify them as having been fired in the same firearm.



TABLE 2

WebCode	Conclusions
6TL9WB	The cartridge cases mentioned in 3.1.1 and 3.4.1 marked 316540/17 (1A),(1B),(1C) and (4) were fired in the same firearm. The cartridge cases mentioned in 3.3.1 and 3.5.1 marked 316540/17 (3) and (5) were fired in the same firearm. The cartridge case mentioned in 3.2.1 was fired in a different firearm.
6WRPFZ	Items 1 through 5 are 9mm Luger (9x19mm) cartridge cases bearing the headstamp of PMC. Item 1 and Item 4 were identified as having been fired in the same firearm. Item 3 and Item 5 were identified as having been fired in the same firearm. Due to a difference in class characteristics (firing pin aperture and breech face), Item 3 and Item 5 were not fired in the same firearm as Item 1 and Item 4. Due to a difference in class characteristics in the firing pin impression (concentric circles vs smooth) the Item 2 cartridge case was not fired in the same firearm as the Item 1 and Item 4 cartridge cases or the Item 3 and Item 5 cartridge cases.
6X3HGU	Item 4 was identified microscopically as having been fired in the same firearm that fired Items 1A-1C based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 3 and 5 were identified microscopically as having been fired in the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 3 and 5 were eliminated as having been fired in the same firearm that fired Items 1A-1C due to disagreement of individual characteristics. Item 2 was eliminated as having been fired in the same unknown firearm as Items 3 and 5 due to disagreement of discernible class characteristics. Item 2 was eliminated as having been fired in the same firearm that fired Items 1A-1C due to disagreement of discernible class characteristics.
6YVKY3	Microscopic comparisons of Item #1 with Item #4 revealed matching breech face shear marks and firing pin impressions. This finding confirms that Items #1 and 4 were fired from the same firearm. Microscopic comparisons of Item #3 with Item #5 revealed matching breech face shear marks and firing pin impressions. This finding confirms that Items #3 and 5 were fired from the same firearm. Microscopic comparisons of Item #2 with Items #1 and 4 revealed different class characteristics (breech face style, firing pin style). This finding confirms that Item #2 was not fired from the same firearm as Items #1 and 4. Microscopic comparisons of Item #2 with Items #3 and 5 revealed different class characteristics (firing pin style). This finding confirms that Item #2 was not fired from the same firearm as Items #3 and 5. Microscopic comparisons of Items #1 and 4 with Items #3 and 5 revealed different reproducible individual breech face and firing pin characteristics. This finding confirms that Items #1 and 4 were not fired from the same firearm as Items #3 and 5.
77TGDT	The 001-02 through 001-05 fired cartridge cases were microscopically compared to each other and to the 001-01 test fired cartridge cases with the following results: The 001-04 fired cartridge case was identified as having been fired in the same firearm as the 001-01 test fired cartridge cases. The 001-02 fired cartridge case was eliminated as having been fired in the same firearm as the 001-01 test fired cartridge cases and the 001-03 and 001-05 fired cartridge cases. The 001-03 and 001-05 fired cartridge cases were identified as having been fired in the same firearm and eliminated as having been fired in the same firearm as the 001-01 test fired cartridge cases.
787WXL	[No Conclusions Reported.]
7ARN4W	Item #4 was fired in the same firearm as Item 1(A,B,C). Item #2 was not fired from the same firearm as Items #1 and #4 or the same firearm as Items #3 and #5. Item #3 and #5 were fired in the same firearm. They were not fired in the same firearm as Items #1(A,B,C) and #4.
7CH3C8	Four of the seven 9mm Luger caliber cartridge cases (1A - 1C, 4) were fired in the same

TABLE 2

WebCode	Conclusions
	firearm. Two of the seven 9mm Luger caliber cartridge cases (3, 5) were fired in the same firearm, but they were not fired from the same firearm as items 1A, 1B, 1C, and 4. One of the seven 9mm Luger caliber cartridge cases (2) was not fired in the same firearms as either items 1A, 1B, 1C, and 4, or items 3 and 5.
7K8MM8	Items 3 and 5 were discharged from the same firearm but a different firearm than Items 1 and 4. Item 2 was not discharged in the guns that fired the other Items in this case.
7K8RUT	1) Exhibits 2 (One 9mm Luger Cartridge Case), 3 (One 9mm Luger Cartridge Case), 4 (One 9mm Luger Cartridge Case), and 5 (One 9mm Luger Cartridge Case) were visually examined and microscopically compared to each other and to Exhibit 1 (Three 9mm Luger Cartridge Cases). a) The Exhibits 1 and 4 cartridge cases were fired in the same firearm. b) The Exhibit 1 cartridge cases were not fired in the same firearm as the Exhibits 2, 3, and 5 cartridge cases. c) The Exhibit 2 cartridge case was not fired in the same firearm as the Exhibits 3 and 5 cartridge cases. d) The Exhibits 3 and 5 cartridge cases were fired in the same firearm.
7L3BZ2	The cartridge cases Exhibits 1 and 4 were compared microscopically with each other. They were identified as having been fired in a single firearm. The cartridge cases Exhibits 3 and 5 were compared microscopically with each other. They were identified as having been fired in a single (second) firearm. The cartridge case Exhibit 2 was fired in a third firearm. It was not fired in the same firearms as the cartridge cases Exhibits 1, 3, 4 and 5.
7L6VRA	The fired PMC 9mm Luger caliber cartridge cases (Item 1) and the fired PMC 9mm Luger caliber cartridge case (Item 4) were identified as having been fired by the same firearm. The fired PMC 9mm Luger caliber cartridge cases (Items 2, 3 & 5) have a significant disagreement of class and/or individual characteristics to the fired PMC 9mm Luger caliber cartridge cases (Item 1). Therefore the fired PMC 9mm Luger caliber cartridge cases (Items 2, 3 & 5) were not fired by the same firearm that fired the PMC 9mm Luger caliber cartridge cases (Item 1). The fired PMC 9mm Luger caliber cartridge case (Item 3) and the fired PMC 9mm Luger caliber cartridge case (Item 5) were identified as having been fired by the same firearm. The fired PMC 9mm Luger caliber cartridge case (Item 3) has a significant disagreement of class and/or individual characteristics to the fired PMC 9mm Luger caliber cartridge cases (Item 2). Therefore the fired PMC 9mm Luger caliber cartridge case (Item 3) was not fired by the same firearm that fired the PMC 9mm Luger caliber cartridge case (Item 2).
7L7VM4	The submitted fired cartridge case (Item 4) was identified as having been fired in the Ruger semiautomatic pistol (Item 1). The submitted fired cartridge cases (Items 3 and 5) were identified as having been fired in the same unknown firearm. The submitted fired cartridge cases (Items 3 and 5) were eliminated as having been fired in the submitted Ruger semiautomatic pistol (Item 1) due to difference in individual characteristics. The fired cartridge cases (Items 3 and 5) have differences in BOB, FPI, shearing on aperture, FP drag, and ejector markings compared to the test fires (Items 1-1 thru 1-3). The submitted fired cartridge cases (Items 3 and 5) were eliminated as having been fired in the same firearm as the submitted fired cartridge case (Item 2) due to difference in class characteristics. The fired cartridge case (Item 2) has a circular FPI with concentric circles and heavy parallel marks on the BOB. The submitted fired cartridge case (Item 2) was eliminated as having been fired in the Ruger semiautomatic pistol (Item 1) due to difference in class characteristics.
7P49GV	The fourth expended case recovered at the scene (Item 4) and the three known expended cartridge cases (Item 1) have an agreement in individual characteristics and all discernible class characteristics exceed the best agreement demonstrated between cartridge cases known to have been fired by different firearms and is consistent with agreement demonstrated by cartridge cases known to have been fired by the same firearm. The third and the fifth expended cases



TABLE 2

WebCode	Conclusions
	<p>recovered at the scene (Item 3 and Item 5) have an agreement in individual characteristics and all discernible class characteristics exceed the best agreement demonstrated between cartridge cases known to have been fired by different firearms and is consistent with agreement demonstrated by cartridge cases known to have been fired by the same firearm. Also, the third case recovered at the scene (Item 3) and the three known expended cartridge cases (Item 1) have significant disagreement of individual characteristics. So, the third and the fifth expended cases recovered at the scene (Item 3 and Item 5) was fired by a second firearm. The second expended case recovered at the scene (Item 2) and the three known expended cartridge cases (Item 1) have significant disagreement of individual characteristics. Also the second expended case recovered at the scene (Item 2) and the third expended cartridge case (Item 3) have significant disagreement of individual characteristics. So, the second expended case recovered at the scene (Item 2) was fired by a third firearm.</p>
7TJWY7	<p>Items 1 &amp; 4 The Item 4 cartridge case was identified as having been fired in the same firearm that fired the Item 1 cartridge cases. Item 2 The cartridge case was not fired in the same firearm that fired the Item 1 or 4 cartridge cases nor was it fired in the same unknown firearm as the Item 3 and 5 cartridge cases. Items 3 &amp; 5 The cartridge cases were identified as having been fired in the same unknown firearm. They were not fired in the same firearm that fired the Item 1 and 4 cartridge cases.</p>
7XJVJX	<p>The following results are based upon microscopic comparison of the submitted evidence: Exhibit 4 was fired in the same firearm as the three Exhibit 1 known cartridge cases. Exhibits 3 and 5 were fired in the same firearm, but were not fired in the same firearm as the three Exhibit 1 known cartridge cases. Exhibit 2 was not fired in the same firearm as Exhibit 1 or Exhibits 3 and 5.</p>
7XXKJ4	<p>The Items 01-01 and 01-04 cartridge cases were fired in the same firearm. The Items 01-01 and 01-04 cartridge cases were eliminated as having been fired in the same firearm that fired the Items 01-03 and 01-05 cartridge cases or the same firearm that fired the Item 01-02 cartridge case. The Item 01-02 cartridge case was eliminated as having been fired in the same firearm that fired the Items 01-01 and 01-04 cartridge cases or the same firearm that fired the Items 01-03 and 01-05 cartridge cases. The Item 01-02 cartridge case was fired in an unknown firearm that is capable of chambering and firing a 9mm Luger caliber cartridge. The Items 01-03 and 01-05 cartridge cases were fired in the same unknown firearm that is capable of chambering and firing a 9mm Luger caliber cartridge. The Items 01-03 and 01-05 cartridge cases were eliminated as having been fired in the same firearm that fired the Items 01-01 and 01-04 cartridge cases or the same firearm that fired the Item 01-02 cartridge case.</p>
86CM6W	<p>Item 1 - The cartridge cases matched each other and are discharged by the same firearm. The identification were based on the agreement of individual characteristics observed during a microscopic comparison. Item 2 - The cartridge cases were discharged by a second 9mm caliber firearm. The cartridge case was eliminated as having been discharged by the same firearms as the Items 1,3,4, and 5 cartridge cases based on differences in class characteristics observed during a microscopic comparison. Item 3 and 5 - The cartridge cases matched each other and are discharged by a third 9mm caliber firearm. The identification were based on the agreement of individual characteristics observed during a microscopic comparison. The cartridge cases were eliminated as having been discharged by the same firearms as the Items 1, 2, and 4 cartridge cases based on differences in class and/or individual characteristics observed during a microscopic comparison. Item 4 - The cartridge cases matched the Item 1 cartridge cases reportedly discharged by a 9mm caliber Ruger model SR9C pistol. The identification were based on the agreement of individual characteristics observed during a microscopic comparison.</p>

TABLE 2

WebCode	Conclusions
86WFV9	The expended cartridge case marked as Item 4 was discharged by the same firearm used to fired the known cartridge case from the suspect's weapon marked as Item 1. The expended cartridge cases marked as Item 2, 3 and 5 were discharged by a different firearm than the used to fired the known cartridge case from the suspect's weapon marked as Item 1. The expended cartridge case marked as Item 3 was discharged by the same firearm used to fired the cartridge case marked as Item 5.
8F28WN	As a result of my comparisons, I formed the opinions that: 1) The fired cartridge case (Item 4) recovered from the parking lot was discharged in the exhibit Ruger manufactured, SR9C model, 9MMLUGER calibre, semi-automatic pistol. And, 2) The remaining fired cartridge cases (Items 2, 3 & 5) were not discharged in the exhibit Ruger manufactured, SR9C model, 9MMLUGER calibre, semi-automatic pistol.
8HJMT9	Items 2, 3 and 5 were not discharged in the suspect's weapon. Item 4 was discharged in the suspect's weapon.
8KLL2G	Microscopic examination and comparison of the 3 test fired cartridge cases (item # 1) fired in the suspect's weapon with the fired cartridge case (item # 4) revealed sufficient microscopic evidence to conclude that the fired cartridge case (Item # 4) was fired in the suspect's weapon (item # 1). Microscopic examination and comparison of the 3 test fired cartridge cases (item # 1) fired in the suspect's weapon with the 3 fired cartridge cases (items # 2, 3 and 5) revealed sufficient microscopic differences to exclude these 3 fired cartridge cases (items # 2, 3 and 5) from being fired in the same weapon (suspect's weapon) which fired the 3 test firings (item # 1).
8KMCEQ	Based on class characteristics, Item 2 was eliminated as having been fired in the same firearm that fired Item 1. Based on class characteristics, Item 3 was eliminated as having been fired in the same firearm that fired Item 1. Item 4 was identified as having been fired in the same firearm that fired Item 1. Based on class characteristics, Item 5 was eliminated as having been fired in the same firearm that fired Item 1. Item 3 and Item 5 are identified as having been fired in the same firearm.
8KMHCC	The cartridge case marked #4 was compared microscopically against the test cartridges and was identified as having been discharged from the Ruger SR9C 9mm handgun. The three cartridge cases marked #2, #3, and #5 were compared microscopically against the test cartridges and were eliminated as having been discharged in the Ruger SR9C 9mm handgun.
8LDLYR	1. Third expended cartridge case (Item 4) is a positive identification with the three expended cartridge cases discharged from the Ruger SR9C9, 9 mm Auto handgun (suspect firearm). 2. Second expended cartridge case (Item 3) and the expended cartridge case recovered from the grass area near the parking lot (Item 5), were both expended by a second firearm. 3. First expended cartridge case (Item 2) was expended by a third firearm.
8LF8YD	Item 4 was microscopically examined and identified as having been fired in the Item 1 firearm based on agreement of individual characteristics and all discernible class characteristics. Items 3 and 5 were microscopically examined and identified as having been fired in the same firearm based on agreement of individual characteristics and all discernible class characteristics, however were eliminated as fired in Item 1. Item 2 was eliminated as having been fired in the same firearm as Items 3 and 5, as well as eliminated as fired in Item 1 firearm.
8M7HLZ	3. On 2017-06-21 during the performance of my official duties I received a sealed evidence bag with number PA4001476925 from Case Administration of the Ballistics Section, containing five (5) white boxes marked (1) Test no 17-526 Item 1; (2) Test no 17-526 Item 2; (3) Test no 17-526 Item 3; (4) Test no 17-526 Item 4 and (5) Test no 17-526 Item 5 containing the

## TABLE 2

WebCode	Conclusions
	<p>following exhibits: In (1) 3.1 Three (3) 9mm Parabellum calibre fired cartridge cases each marked "295350/17 T1". In (2) 3.2 One (1) 9mm Parabellum calibre fired cartridge case marked "295350/17 2". In (3) 3.3 One (1) 9mm Parabellum calibre fired cartridge case marked "295350/17 3". In (4) 3.4 One (1) 9mm Parabellum calibre fired cartridge case marked "295350/17 4". In (5) 3.5 One (1) 9mm Parabellum calibre fired cartridge case marked "295350/17 5". 4. The intention and scope of this forensic examination comprise the following: 4.1 The examination and identification of fired cartridge cases. 4.2 Microscopic individualization of fired cartridge cases. 5. I examined the fired cartridge cases mentioned in paragraphs 3.1 to 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: 5.1 The cartridge cases mentioned in paragraphs 3.1 and 3.4 were fired in the same firearm (1st) firearm. 5.2 The cartridge cases mentioned in paragraphs 3.3 and 3.5 were fired in the same firearm (2nd) firearm. 5.3 The cartridge case mentioned in paragraph 3.2 was fired in a third (3rd) firearm.</p>
8MBTQJ	<p>Based on similarities of class characteristics, Item 1, test fired exemplars from recovered pistol, and Items 3, 4, and 5 cartridge cases were microscopically compared to each other. The Item 4 cartridge case was identified as having been fired by the recovered pistol. Items 3 and 5 were identified as having been fired by an unknown firearm. These identifications are to the practical, not absolute exclusion of all other firearms. Based on differences in individual characteristics, the Items 3 and 5 are eliminated as having been fired by the recovered pistol. Based on differences in class characteristics, the Item 2 cartridge case is eliminated as having been fired by the recovered firearm and the unknown firearm that fired Items 3 and 5. The submitted evidence represents three firearms.</p>
8MQC9V	<p>MICROSCOPIC COMPARISONS OF EVIDENCE 9mm CARTRIDGE CASES Q1 THROUGH Q4 (ITEMS 2-5) WITH TEST FIRED CARTRIDGE CASES FROM K1 RUGER PISTOL (ITEM 1) REVEAL THAT SUFFICIENT AGREEMENT EXISTS TO IDENTIFY Q3 (ITEM 4) AS HAVING BEEN FIRED WITH K1 RUGER PISTOL (ITEM 1). SUFFICIENT AGREEMENT EXISTS TO IDENTIFY Q2 (ITEM 3) AND Q4 (ITEM 5) AS HAVING BEEN FIRED WITH THE SAME UNKNOWN FIREARM. Q1, Q2 AND Q4 (ITEMS 2, 3 AND 5) WERE NOT FIRED WITH K1 RUGER PISTOL (ITEM 1) DUE TO DIFFERENCES IN INDIVIDUAL MARKINGS PRESENT. SHOULD ANOTHER SUSPECTED FIREARM BE RECOVERED PLEASE SUBMIT IT IN REFERENCE TO THE ABOVE CC#.</p>
8MX9PM	<p>The cartridge cases in Items #1, #2, #3, #4, and #5 were microscopically examined in conjunction with one another. Based on these comparative examinations and observed class and individual characteristics, it was determined that: A. The cartridge case in Item #4 had been fired in the same firearm as the cartridge cases in Item #1. B. The cartridge cases in Items #3 and #5 had both been fired in the same unknown firearm. C. The cartridge case in Item #2 bears the same class characteristics as the cartridge cases in Items #1, #3, #4, and #5. However, no marks were found to link this cartridge case as having been fired in the same firearm as Items #1 and #4 or Items #3 and #5.</p>
8P22L7	<p>Item 2 was fired in neither the Ruger pistol nor the same firearm as Items 3 and 5. Items 3 and 5 were fired in the same firearm, but not the Ruger pistol. Item 4 was fired in the same Ruger pistol as Item 1b.</p>
8RQF4P	<p>The Exhibit 1 and Exhibit 4 cartridge cases were all fired in the same firearm. The Exhibit 3 and 5 cartridge cases were both fired in the same firearm. They were not fired in the same firearm as Exhibits 1 and 4. The Exhibit 2 cartridge case was not fired in the same firearm as Exhibits 1 and 4 or the same firearm as Exhibits 3 and 5.</p>

TABLE 2

WebCode	Conclusions
8VB36P	The test fired cartridge cases from Item 1 were microscopically examined in conjunction with the cartridge cases in Items 2, 3, 4 and 5. Based on these examinations it was determined that: A) Item 4 had been fired in Item 1. B) Items 3 and 5 were fired in the same unknown 9mm caliber firearm. C) Item 2 was fired in a second unknown 9mm caliber firearm.
9423Y8	The fired cartridge case, item 4, was fired in the same firearm that generated the test fire cartridge cases, item 1. The two (2) fired cartridge cases, items 3 and 5, were fired in a second firearm. The fired cartridge case, item 2, was fired in a third firearm.
99N6R7	Item 4 was the same pistol than Item 1. Item 3 and Item 5 weere discharged from the same pistol, different of Item 1 pistol. Item 2 was discharged from third pistol.
9AJHGJ	The fired cartridge case (Item 4) is identified as having been fired in the same firearm as Item 1 (1-A, 1-B and 1-C). The fired cartridge cases (Items 3 and 5) are identified as having been fired in the same firearm. The submitted fired cartridge case (Item 2) is not identified or eliminated (Inconclusive) as having been fired in the same firearm as Items 1, 3, 4 and 5). The individual characteristics present do not display sufficient agreement.
9C7B68	The cartridge case marked 316611/17 4 is positive to the tests marked 316611/17 TC1A-TC1C. The cartridge cases marked 316611/17 3 and 5 were fired in another firearm (2nd firearm). The cartridge case marked 316611/17 2 was fired in 3rd firearm.
9D4HK7	Per the case agent, the cartridge cases in Item 1 were test-fired in a Ruger SR9C firearm. Only the test-fired cartridge cases and not the firearm were submitted for examination. Item 2 Item 2 was compared to a test-fired cartridge case from Item 1. Microscopic comparison of these cartridge cases revealed significant differences in class of firearm-produced marks. Item 2 was not discharged in the Ruger firearm. Item 2 was compared to Item 3. Microscopic comparison of these cartridge cases revealed significant differences in class of firearm-produced marks. These cartridge cases were discharged in different firearms. Item 4 Item 4 was compared to a test-fired cartridge case from Item 1. Microscopic comparison of these cartridge cases revealed that they have the same class of firearm-produced marks and sufficient corresponding individual marks to conclude that Item 4 was discharged in the Ruger firearm. Items 3 and 5 Microscopic comparison of these cartridge cases revealed that they have the same class of firearm-produced marks and sufficient corresponding individual marks to conclude that they were discharged in the same firearm. Item 3 was compared to a test-fired cartridge case from Item 1. Microscopic comparison of these cartridge cases revealed significant differences in class of firearm-produced marks. Item 3 was not discharged in the Ruger firearm, nor was Item 5. There are three firearms represented in Items 2 through 5. Item 4 was fired in the Ruger Firearm. Items 2, 3, and 5 were eliminated as having been fired in the Ruger firearm.
9D76A7	2.1.) Item 4 evidence is equal to Item 1, and were fired by Ruger SR9C 9mm Auto handgun, the suspect firearm. 2.2.) Items 2, 3 and 5 evidences are different to Item 1 and were not fired by Ruger SR9C 9mm Auto handgun.
9GLH38	Item 4 was identified as having been fired by the same firearm that produced the test fired cartridge cases received with item 1 based on the sufficient agreement of class and individual characteristics. Items 2, 3, and 5 were eliminated as having been fired by the same firearm that produced the test fired cartridge cases received with item 1 based on the sufficient disagreement of subclass characteristics. Items 3 and 5 were identified as having been fired by the same unknown firearm based on the sufficient agreement of class and individual characteristics and were eliminated as having been fired by the same firearm as that which fired item 2 based on the sufficient disagreement of subclass characteristics.
9K6K3K	Identification: The following items were compared and found to show the presence of matching

TABLE 2

WebCode	Conclusions
	features: Test fired discharged case from Item 1 pistol (Ruger); Item 4. Identification: The following items were compared and found to show the presence of matching features: Items 3 and 5. Elimination: Items 2, 3, and 5 are eliminated as having been fired by the Item 1 (Ruger). Elimination: Item 2 was eliminated as having been fired by the same firearm as Item 3 and 5.
9QQM2B	1.The cartridge case(item 4) was identified to be fired from the same firearm as the known cartridge case(item 1). 2.The cartridge cases(item 2, 3, 5) were eliminated to be fired from the same firearm as the known cartridge case(item 1). 3.The cartridge cases(item 3, 5) were identified to be fired from the same firearm.
9QUBDM	Item 4 was identified as having been fired from the same firearm as Item 1. Items 3 and 5 were identified as having been fired from the same unknown firearm. Items 3 and 5 were not fired from the same firearm as Item 1. Item 2 was fired from a different unknown firearm.
9U84YL	A test fired cartridge case from Item 1 was microscopically examined and compared with a recovered fired cartridge case, 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 that fired the test fired cartridge cases, Item 1. A recovered fired cartridge case, Item 3, was microscopically examined and compared with a recovered fired cartridge case, Item 5. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, Items 3 and 5 are identified as having been fired in the same firearm, but different than the firearm that fired the test fired cartridge cases, Item 1. A test fired cartridge case from Item 1 was microscopically examined and compared with recovered fired cartridge cases, Items 2 and 3. Based on the observed disagreement of some class characteristics and individual characteristics, Item 1 is eliminated as having been fired in the same firearm as either Item 2 or Item 3.
9V2U6Z	The one (1) 9mm Luger fired cartridge case, item #4, was microscopically compared with cartridge cases test fired by the Ruger pistol, item #1. These comparisons revealed matching individual breech face characteristics, confirming that the one (1) 9mm Luger fired cartridge case, item #4, was fired by the Ruger pistol, item #1. The one (1) 9mm Luger fired cartridge case, item #2, was microscopically compared with cartridge cases test fired by the Ruger pistol, item #1. These comparisons revealed different individual breech face and firing pin characteristics, excluding the one (1) 9mm Luger fired cartridge case, item #2, as having been fired by the Ruger pistol, item #1. The two (2) 9mm Luger fired cartridge cases, items #3 and #5, were microscopically compared with each other. These comparisons revealed matching individual breech face characteristics, confirming that the two (2) 9mm Luger fired cartridge cases, items #3 and #5, were fired by the same firearm. The one (1) 9mm Luger fired cartridge case, item #3, was microscopically compared with cartridge cases test fired by the Ruger pistol, item #1. These comparisons revealed different individual breech face characteristics, excluding the one (1) 9mm Luger fired cartridge case, item #3, as having been fired by the Ruger pistol, item #1. The two (2) 9mm Luger fired cartridge cases, items #2 and #3, were microscopically compared with each other. These comparisons revealed different individual breech face and firing pin characteristics, excluding the two (2) 9mm Luger fired cartridge cases, items #2 and #3, as having been fired by the same firearm.
9V68W3	1.) The Item 2 cartridge case was not fired in the same firearm as the Item 1, Item 3, & Item 5 cartridges. 2.) The Item 3 cartridge case was fired in the same firearm as the Item 5 cartridge case. 3.) The Item 3 cartridge case was not fired in the same firearm as the Item 1 cartridge cases. 4.) The Item 4 cartridge case was fired in the same firearm as the Item 1 cartridge cases. 5.) The Item 5 cartridge case was not fired in the same firearm as the Item 1 cartridge cases.

TABLE 2

WebCode	Conclusions
9VM9VY	A microscopic examination and comparison of the evidence described above revealed the following: Test fires (1.1 - 1.3) and cartridge casing (4) are identified as having been discharged in the above listed firearm (1) based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge casings (3,5) are identified as having been discharged in a SECOND gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge casing (2) is identified as having been discharged in a THIRD gun based on the observed disagreement of class characteristics as compared to test fires (1.1 - 1.3), cartridge casing (4), and cartridge casings (3,5).
9WYX3G	Exhibit 1 is three (3) 9mm Luger fired cartridge cases reportedly fired in the Ruger, model SR9C pistol. Exhibits 2, 3, 4 and 5 are 9mm Luger fired cartridge cases. The tests in Exhibit 1 were compared with the fired cartridge cases in Exhibits 2, 3, 4 and 5 using a comparison microscope with the following results: The fired cartridge case in Exhibit 4 was identified as having been fired in Exhibit 1, the Ruger Pistol. The fired cartridge cases in Exhibits 2, 3 and 5 were eliminated as being fired in Exhibit 1. Exhibits 3 and 5 were identified to being fired in the same firearm, a second firearm. Exhibit 2 was eliminated as being fired in the firearm that fired Exhibits 3 and 5. Exhibit 2 was fired in a third firearm.
9XTQVF	On comparison, i. I found the characteristic marks on the known expended cartridge case Item 1 to be similar to the characteristic marks on the questioned expended cartridge case recovered from the parking lot Item 4. ii. I found the characteristic marks on the known expended cartridge case Item 1 to be dissimilar to the characteristic marks on the questioned expended cartridge cases Item 2, Item 3 and Item 5. Therefore, I am of the opinion that the: i. Questioned cartridge case recovered from the parking lot Item 4 was fired from the suspect's weapon Ruger SR9C 9mm Auto handgun. ii. Questioned expended cartridge cases Item 2, Item 3 and Item 5 were not fired from suspect's weapon Ruger SR9C 9mm Auto handgun.
A46C8Q	From the microscopic comparison it was determined that the cartridge case marked as Item 4, was fired from the pistol Ruger 9 mm, model SR9C, to observe that it surpasses the quality and quantity of concordant coincidences.
A7ZUNJ	I microscopically compared the four spent cartridge cases recovered from the scene (Items 2, 3, 4 and 5) to the spent cartridge cases (Item 1) produced during test firing of the Ruger SR9C self-loading handgun, comparing both class and individual characteristics. From these examinations, I formed the following opinions: That there was significant disagreement of the discernible class characteristics, and no agreement of the observed individual characteristics, between the spent cartridge cases (Items 2,3 and 5) and the test fired cartridge cases (Item 1). Therefore, items 2, 3 and 5 could not have been discharged from the Ruger SR9C self-loading handgun. That there was agreement of all discernible class characteristics, and significant agreement of the observed individual characteristics, between the spent cartridge case (Item 4) and the test fired cartridge cases (Item 1). Therefore, Item 4 was discharged from the Ruger SR9C self-loading handgun.
A8AVFK	The Items 2-5 fired 9mm Luger caliber cartridge cases and the Item 1.1-1.3 test fired 9mm Luger caliber cartridge cases were examined and microscopically compared to each other with the following results: Item 4 was identified as having been fired in the suspect firearm. Items 3 and 5 were eliminated from having been fired in the suspect firearm based on differences in individual characteristics. Items 3 and 5 were fired in a second unknown 9mm Luger caliber firearm. Item 2 was eliminated from having been fired in either the suspect firearm or the second unknown firearm used to fire Items 3 and 5 based on differences in class and individual characteristics. Item 2 was fired in a third unknown 9mm Luger caliber firearm.



TABLE 2

WebCode	Conclusions
A98YE2	The submitted fired 9mm Luger caliber cartridge case (CTS Item 4 ; Laboratory Item 01-03) was fired in the suspected Ruger SR9C pistol. The submitted fired 9mm Luger caliber cartridge cases (CTS Items 2, 3, 5 ; Laboratory Items 01-01, 01-02, 01-04) were not fired in the suspected Ruger SR9C pistol. The submitted fired 9mm Luger caliber cartridge cases (CTS Items 3 and 5 ; Laboratory Items 01-02, 01-04) were fired in the same firearm. The submitted fired 9mm Luger caliber cartridge cases (CTS Items 2, 3, 4 ; Laboratory Items 01-01, 01-02, 01-03) will be transferred to [laboratory].
AC7EMP	Item 4 was microscopically Identified as having been fired in the firearm Item 1. Items 3 & 5 were fired in the same unknown firearm based on microscopic comparison a different firearm than Item 1. Item 2 was microscopically eliminated as having been fired in Item 1 and was fired in a different unknown firearm than Items 3 & 5.
AE7R22	Item 4 was identified as having been fired in the same firearm as Item 1. Item 2 was not fired in the same firearm as Items 1 and 4 or in the same unknown firearm as Items 3 and 5. Items 3 and 5 were identified as having been fired in the same unknown firearm and not in the same firearm as Items 1 and 4.
AJNPVJ	Item 4 was fired, after our opinion, in the questioned firearm. Item 3 and Item 5 can be pooled together to having been fired in the same, unknown firearm. Item 3 and 5 can be excluded from having been fired by the questioned firearm. Item 2 has been shot in a third, unknown weapon.
ALWZRM	The Exhibit #4 cartridge case was fired in the same firearm as the Exhibit #1 cartridge cases. The Exhibit #3 and #5 cartridge cases were fired in the same firearm as each other; however, they were not fired in the same firearm as the Exhibit #1 and #4 cartridge cases. The Exhibit #2 cartridge case was not fired in the same firearm as the Exhibit #1 and #4 cartridge cases, nor was it fired in the same firearm as the Exhibit #3 and #5 cartridge cases.
AMN4E3	Exhibit 4 was identified as having been fired in the same firearm as the Exhibit 1 cartridge cases. Exhibit 3 and 5 were identified as having been fired in the same unknown firearm; however, not the same firearm as the Exhibit 1 cartridge cases or the same unknown firearm as the Exhibit 2 cartridge case. Exhibit 2 was not fired from the same firearm as the Exhibit 1 cartridge cases.
ANFAM7	Through the use of microscopic comparisons it was determined that Item #4 was fired from the Ruger pistol (Firearm #1.) Items #3 and #5 were both fired from the same firearm (Firearm #2) but were excluded from the Ruger pistol (Firearm #1.) Item #2 was excluded from but the Ruger pistol (Firearm #1) and from Items #3 and #5 (Firearm #2.) Item #2 was fired from a third unknown firearm (Firearm #3.)
AQ7AT4	Item 4 the third expended cartridge case recovered from the parking lot was fired in the Ruger SR9C 9X19mm pistol recovered from a suspect. Item 3 the second expended cartridge case recovered from the parking lot, and item 5 the expended cartridge case recovered from grass near the parking lot were not fired in the Ruger SR9C 9X19mm pistol recovered from a suspect. Items 3 and 5 were fired in the same firearm; however it was a different firearm than the suspect's Ruger SR9C 9X19mm. Item 2 was fired in a different firearm than the suspect's pistol and the firearm used to fire items 3 and 5.
AREGVV	Items #1 and #4 were both fired in same firearm. Items #3 and #5 were both fired in the same 2nd firearm. Item #2 was fired in a third firearm.
AWFC7K	Item 1 - three (3) known fired cartridge cases from Suspect firearm. Item 2 - one (1) fired cartridge case. Item 3 - one (1) fired cartridge case. Item 4 - one (1) fired cartridge case, Item 5 - one (1) fired cartridge case. The submitted specimens marked as Items 2 through 5 were

TABLE 2

WebCode	Conclusions
	microscopically examined and identified as four (4) fired caliber 9mm Luger cartridge cases bearing the PMC headstamp. Items 2 through 5 were microscopically compared to known test fired cartridge cases identified as Item 1. As a result of microscopic comparison it was concluded that Item 4 was identified as having been fired from the same firearm as the known cartridge cases, identified as Item 1. Items 3 and 5 were identified as having been fired in a second firearm (unknown). Item 2 was not fired in the same firearm as Items 1,3,4 or 5.
AX2FEH	Item 1.1 consists of three fired PMC brand 9mm Luger cartridge cases stated to have been fired by a Ruger brand model SR9C 9mm Luger pistol. Items 1.2, 1.3, 1.4 and 1.5 consist of four fired PMC brand 9mm Luger cartridge cases. They were microscopically compared to Item 1.1 and to each other. Item 1.4 was identified as having been fired by the same firearm that fired the cartridge cases from Item 1.1. Items 1.3 and 1.5 were identified as having been fired by the same firearm. They can be eliminated as having been fired by the same firearm that fired the cartridge cases from Item 1.1. Item 1.2 can be eliminated as having been fired by the same firearm that fired Items 1.1, 1.3, 1.4 and 1.5.
AXL4UR	The Item 1A, Item 1B, Item 1C, and Item 4 cartridge cases were fired in the same firearm. The Item 2 cartridge case was fired in a second firearm. The Item 3 and Item 5 cartridge cases were fired in a third firearm.
AYCCTV	From the sample that had been received, it can be concluded that one expended cartridge (item 4) that had been recovered from the crime scene have same characteristics as three expended cartridge (item 1) that had been discharged from the firearm (Ruger SR9C 9mm Auto) which had been seized from the suspect. Meanwhile, three expended cartridge (item 2, 3 & 5) did not have same characteristics as three expended cartridge (item 1). On the comparison between three expended cartridge (item 2, 3 & 5) at the crime scene, it can be concluded that item 2 are been discharged from the one firearm while item 3 and 5 from same firearm which both firearm are in 9mm caliber firearm. Therefore, from the comparison and finding, it can be conclude that 3 firearm are been used in the crime scene including the suspect firearm.
AYEUZ7	The three (3) cartridge cases (Item 1) possessed similar and reproducible firing pin impressions and breech face markings, thus were identified as having been discharged in the same known firearm. The cartridge case, Item 4 possessed similar firing pin impressions and breech face markings as Item 1, thus Item 4 was identified as having been discharged in the known firearm that discharged Item 1. The cartridge cases, Items 3 and 5 were identified as having been discharged in the same firearm, however because of differences in firing pin impressions and breech face markings, these cartridge cases were not discharged in the known firearm which discharged Item 1. Based on differences in firing pin impressions and breech face markings, the cartridge case, Item 2 was eliminated as having been discharged in the known firearm that discharged Item 1 or the firearm which discharged Items 3 and 5.
AZU62K	Items 3 and 5 were fired from the same firearm and Items 1, 1A, 1B and 4 were fired from the same firearm, however there are not enough similarities or dissimilarities to conclude and identification or elimination. Items 1, 1A, 1B, 4 and 5 all exhibit concentric circular marks on the headstamp area of the cartridge case, Item 3 does not exhibit these markings. Since Items 3 and 5 were identified to each other and Item 3 does not exhibit the circular marks this indicates that they are either manufacturer marks or that the questioned firearm(s) are not marking consistently. Though the two groups appear to have been fired in separate firearms the inconsistent marking of individual characteristics leads me to an inconclusive result of examination.
B2H69E	Item #4 (fired cartridge case) is identified as having been fired in the same firearm as Items



TABLE 2

WebCode	Conclusions
	<p>#1A, #1B, and #1C (test fired cartridge cases). Items #3 and #5 (fired cartridge cases) are identified as having been fired in the same firearm. Items #3 and #5 are not identified or eliminated (inconclusive) as having been fired in the same firearm as Items #1A, #1B, and #1C. The individual characteristics do not display sufficient agreement. Item #2 is not identified or eliminated (inconclusive) as having been fired in the same firearm as Items #1A, #1B, and #1C. The individual characteristics present do not display agreement. Differences observed in the firing pin impressions and breech face marks suggest Item #2 was fired in a different firearm. Submission of the suspected Ruger pistol is necessary for further examination. Item #2 is not identified or eliminated (inconclusive) as having been fired in the same firearm as Items #3 and #5. The individual characteristics present do not display agreement. Differences observed in the firing pin impressions and breech face marks suggest Item #2 was fired in a different firearm. Submission of a suspected firearm is necessary for further examination. The following fired cartridge cases were submitted for entry into the National Integrated Ballistic Information Network (NIBIN) database. The submitting agency will be notified of any investigative leads: - Item #1A - Item #2 - Item #3</p>
B46R23	<p>The cartridge case marked as Item 4 was fired with the Ruger SR9C 9mm Auto suspect's handgun. The cartridge cases marked as Item 2, 3 and 5 were not fired with the Ruger SR9C 9mm Auto suspect's handgun. The cartridge cases marked as Item 3 and 5 were fired with the same handgun but a different one to the Ruger SR9C 9mm Auto suspect's handgun.</p>
B4PED6	<p>The tests marked 855TC11, 855TC12 &amp; 855TC13 are positive to 300855/174 exhibit. The exhibit marked 300855/172 was fired in the second firearm. The exhibits marked 300855/173 &amp; 300855/175 were fired in the third firearm.</p>
B7DWGC	<p>Item #4 was fired in the same firearm as Items #1A - #1C. Items #3 and #5 were fired in a second firearm. Item #2 was fired in a third firearm.</p>
BDP6WR	<p>The identification of the firearm-produced toolmarks described in this report 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 likelihood another unknown firearm could have made the questioned marks is so remote as to be considered a practical impossibility. Representative digital images were taken of the microscopic comparisons. All of these images are depicted in the case notes. Based upon the presence of sufficient agreement of individual firearm-produced firing pin aperture shear and firing pin aperture marks, Item 4 was determined to have been fired from the same firearm as the test-fired cartridge cases, Items 1A, 1B, and 1C. Questioned cartridge cases 2, 3, and 5 were not fired in this firearm. Based upon the presence of sufficient agreement of individual firearm-produced firing pin aperture shear marks, questioned cartridge cases 3 and 5 were both fired in the same unknown firearm. Questioned cartridge case 2 was fired in a different unknown firearm.</p>
BE6C7F	<p>The cartridge case Item 4 was identified as having been fired in the same firearm as the known, fired cartridge cases in Item 1. The cartridge cases Items 3 and 5 were identified as having been fired in a second firearm. The cartridge case Item 2 was fired in a third firearm.</p>
BH6AVM	<p>From the microcomparison made of the ballistic elements on item # 1, it was found that its ballistic marks match with the ballistic marks that were found on item # 4; so then said cartridge casings were fired from the very same firearm, gun type, Ruger, SR9C, 9 mm. caliber. That is not the case of the ballistic impression marks that were found on the ballistic element marked as item # 2, since this one was fired from a different firearm. Finally, regarding the ballistic elements marked as items # 3 and # 5, these were fired from the same firearm;</p>

TABLE 2

WebCode	Conclusions
	however, it was a different firearm from which the cartridge casings identified as items #1, item #2 and item #4 were fired.
BHBLRJ	I conducted a comparison examination of test Item 1 with those of exhibit Items 2,3,4 & 5. Item 2 is eliminated and was discharged in a firearm other than that which produced Item 1. Items 3 & 5 are also eliminated but were matched to each other, however they were discharged in a firearm other than those that produced Items 1 and 2. Item 4 exhibited both class and individual matching characteristic of sufficient agreement to be an identification. In my opinion the exhibit cartridge case of Item 4 was discharged in the same firearm that produced the test cartridge cases of Item 1.
BJLH6B	Based on the agreement of class characteristics and sufficient agreement of individual characteristics, the questioned cartridge case marked "Item 4" was fired from the same firearm as the three known cartridge cases in the exhibit marked "Item 1". Based on the disagreement of class characteristics and individual characteristics, the questioned cartridge cases marked "Item 2", "Item 3" and "Item 5" were not fired from the same firearm as the three known cartridge cases in the exhibit marked "Item 1".
BJWN4X	Items #2 – 5 were examined and each found to contain one (1) fired PMC brand 9mm Luger cartridge case. Microscopic comparisons of the cartridge case from Item #4 with the test fired cartridge cases from Item #1 revealed matching breech face shear marks and firing pin impressions. This finding confirms that the cartridge case from Item #4 and the test fired cartridge cases from Item #1 were all fired from the same firearm (Ruger 9mm Luger semi-automatic pistol, model SR9c, serial number unknown). Microscopic inter-comparison of the cartridge cases from Items #3 and 5 revealed matching breech face shear marks and firing pin impressions. This finding confirms that the cartridge cases from Items #3 and 5 were both fired from the same firearm. Microscopic comparisons of the cartridge cases from Items #3 and 5 with the test fired cartridge cases from Item #1 revealed distinct differences in individual characteristics (breech face shear marks and firing pin impressions). This finding confirms that the cartridge cases from Items #3 and 5 were not fired from the same firearm as the test fired cartridge cases from Item #1. Microscopic comparisons of the cartridge case from Item #2 with the test fired cartridge cases from Item #1 revealed different class characteristics (breech face style, firing pin style). This finding confirms that the cartridge case from Item #2 was not fired from the same firearm that fired the cartridge cases from Item #1. Microscopic comparison of the cartridge case from Item #2 with the cartridge cases from Items #3 and 5 revealed different class characteristics (firing pin style). This finding confirms that the cartridge case from Item #2 was not fired from the same firearm that fired the cartridge cases from Items #3 and 5.
BV77RU	From the sample that had been received, it can be concluded that one expended cartridge (item 4) that had been recovered from the crime scene have same characteristics as three expended cartridge (item 1) that had been discharged from the firearm (Ruger SR9C 9mm Auto) which had been seized from the suspect. Meanwhile, three expended cartridge (item 2, 3 & 5) did not have same characteristics as three expended cartridge (item 1). On the comparison between three expended cartridge (item 2, 3 & 5) at the crime scene, it can be concluded that item 2 are been discharged from the one firearm while item 3 and 5 from same firearm which both firearm are in 9mm caliber firearm. Therefore, from the comparison and finding, it can be conclude that 3 firearm are been used in the crime scene including the suspect firearm.
BVD6GX	Item 1 and Item 4 were fired in the same firearm (firearm one). Items 2, 3 and 5 were not fired in the same firearm that fired Items 1 and 4. Items 3 and 5 were fired in the same firearm (firearm two). Items 2 were fired in a firearm different from the firearm that fired Items 1 and 4

TABLE 2

WebCode	Conclusions
	and the firearm that fired Items 3 and 5 (third firearm).
BZBFG4	The cartridge case, Item 4, was determined to have been fired from the suspect's Ruger Model SR9C pistol. The cartridge cases, Items 3 and 5, were determined to have been fired from a second separate firearm. The cartridge case, Item 2, was determined to have been fired from a third firearm.
C3PT2Q	In my opinion, based upon significant matching firing details, the cartridge case item 4 had been discharged from the recovered Ruger SR9C self-loading pistol. In my opinion the fired cartridge cases item 3 and item 5 had not been discharged from the recovered Ruger SR9C, but from a different self-loading pistol, which for clarity and distinction, I will call 'Gun 2'. In my opinion the fired cartridge case item 2 had not been discharged from the recovered Ruger SR9C, but from a different self-loading pistol, which for clarity and distinction, I will call 'Gun 3'. In my opinion three 9mm Parabellum calibre self-loading pistols had been discharged outside the nightclub.
C46YR2	Items 1 through 5 were examined microscopically. Item 1, consisting of three (3) PMC caliber 9mm Luger cartridge cases, and Item 4, a PMC caliber 9mm Luger cartridge case, were identified as having been fired in the same firearm. Items 3 and 5, each a PMC caliber 9mm Luger cartridge case, were identified as having been fired in the same firearm. Items 3 and 5 were eliminated as having been fired in the same firearm as Items 1 and 4 due to sufficient differences in individual characteristics. Item 2, a PMC caliber 9mm Luger cartridge case, was eliminated as having been fired in the same firearm as Items 1, 3, 4, and 5 due to a difference in class characteristics. Item 2 was found to exhibit markings that may be suitable for identification with the firearm in which it was fired.
CBJUNV	Microscopic examination and comparison of Item #1 to Items #2, #3, and 5 reveals dissimilar toolmarks in the firing pin and breech face establishing that Item's #2, #3 and #5 were not fired by the same firearm that fired Item #1. Microscopic examination and comparison of Item #1 to Item #4 reveals corresponding toolmarks in the firing pin and on the breech face establishing that Item #4 was fired by the same firearm that fired Item #1. Microscopic examination and comparison of Item #3 to Item #5 reveals corresponding toolmarks in the firing pin and on the breech face establishing that Item's #3 and #5 were fired by the same unknown 9mm caliber firearm. Microscopic examination and comparison of Item #2 to Item's #3 and #5 reveals dissimilar toolmarks in the firing pin and on the breech face establishing that Item #2 was fired by a second unknown 9mm caliber firearm.
CCCMJE	Group #1: Item 1 (test fired cartridge cases) and Item 4 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 in the same firearm that fired Item 1, the Ruger semiautomatic pistol. Group #2: Item 2 was examined and is as described above. Group #3: Items 3 and 5 were microscopically examined and compared. Based on observed agreement of class characteristics and sufficient agreement of individual characteristics, the cartridge cases were identified as having been fired in the same firearm. Group #1, Group #2, and Group #3 were microscopically examined and compared. Based on observed disagreement of class and individual characteristics, Group #1, Group #2 and Group #3 were eliminated as having been fired in the same firearms.
CEFPZ3	C/case marked 316533/17 (4) was fired in the same firearm as tests marked 553TC1, 553TC2 and 553TC3. C/cases marked 316533/17 (3) and (5) were fired in the second firearm. The exhibits were not fired in the same firearm as tests marked 553TC1, 553TC2 and 553TC3. C/case marked 316553/17 (2) was fired in the third firearm.

TABLE 2

WebCode	Conclusions
CGQH2W	A microscopic examination and comparison of the evidence described above revealed the following: Cartridge casing (4) and test fires (1.1 - 1.3) are identified as having been discharged from the SAME firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge casings (3, 5) are identified as having been discharged from a SECOND gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge casing (2) is identified as having been discharged from a THIRD gun, based on the observed disagreement of class characteristics as compared to cartridge casings (3,5), cartridge casing (4) and test fires (1.1 -1.3).
CHMPTP	Items 2-5 were examined and microscopically compared to the cartridge cases submitted under Item 1. Item 4 was fired in the same firearm as the cartridge cases submitted under Item 1. Items 3 and 5 were fired in the same firearm, but were not fired in the same firearm as the cartridge cases submitted under Item 1. Item 2 was not fired in the same firearm as the cartridge cases submitted under Item 1 or the same firearm as Items 3 and 5.
CJDXUD	Item 1 and Item 4 are fired by the same firearm.
CKWPZG	The Item 4 cartridge case was identified, within the limits of practical certainty, as having been fired in the same firearm that generated the Item 1 test fired cartridge cases. The Item 3 and 5 cartridge cases were identified, within the limits of practical certainty, as having been fired in the same firearm, but not the firearm that generated the Item 1 test fired cartridge cases. The Item 2 cartridge case was not fired in the firearm that fired Items 1 and 4 or in the firearm that fired Items 3 and 5. Items 1 through 5 represent three (3) different firearms.
CMZE9R	Items 1 through 5 are 9mm Luger (9x19mm) cartridge cases bearing the headstamp of PMC ammunition. Items 1 and 4 were identified as having been fired in the same firearm. Item 2 was excluded as having been fired in the same firearms Items 1, 3, 4, and 5 were fired in. Items 3 and 5 were identified as having been fired in the same firearm, but excluded as having been fired in the same firearm as Item 1 and Item 4.
CP3BXL	Item 004 was identified as having been fired by Item 001. Item 002 was eliminated as having been fired by Item 001 and the same firearm that fired Items 003 and 005 based on differences in class characteristics. Items 003 and 005 were identified as having been fired by the same firearm. Items 003 and 005 could not be identified or eliminated as having been fired by Item 001 because microscopic examination of individual characteristics did not reveal enough information.
CQGZ2Y	The Item 1 cartridge cases were verified as having been fired in the same firearm and compared to the Item 2 through Item 5 cartridge cases. The Item 4 cartridge case was determined to have been fired in the same firearm as the Item 1 cartridge cases. The Item 3 and Item 5 cartridge cases were determined to have not been fired in the same firearm as the Item 1 cartridge cases due to difference in individual characteristics. However, the Item 3 and Item 5 cartridge cases were also compared to each other and were determined to have been fired in a same second firearm. The Item 2 cartridge case was determined to have not been fired in either the same firearm as the Item 1 cartridge cases or the same firearm as the Item 3 and Item 5 cartridge cases due to differences in class characteristics.
CUFF6F	The Item 2-5 fired cartridge cases were microscopically compared to each other and to the Item 1 cartridge cases with the following results: Item 4 was identified as having been fired in the same firearm as Item 1. Items 3 and 5 were identified as having been fired in a second unknown 9mm Luger firearm. Item 2 was identified as having been fired in a third unknown 9mm Luger firearm.

TABLE 2

WebCode	Conclusions
CXER6L	The Item 4 cartridge case was identified as having been fired by the same (known) firearm as the Item 1 cartridge cases. The Item 3 and Item 5 cartridge cases were eliminated from the group above, but were identified as having been fired in the same unknown firearm. The Item 2 cartridge case displays different class characteristics than all the others, and represents a third firearm.
D2V94H	The test fired cartridge cases in Item 1 were microscopically examined in conjunction with the fired cartridge cases in Items 2, 3, 4 and 5. Based on these comparative examinations, it was determined that: A. Item 4 had been fired in the same firearm as the test cartridge cases in Item 1. B. Items 3 and 5 had been fired in the same firearm as one another. There were no individual characteristics present on Items 3 and 5 to link them as having been fired in the same firearm as Items 1 and 4. C. Item 2 had not been fired in the same firearm as Items 1, 3, 4 or 5.
D7929P	Items 1 through 5 are 9mm Luger cartridge cases bearing the headstamp of PMC Ammunition. The Item 4 cartridge case was identified as having been fired in the same firearm as the Item 1 cartridge cases. The Item 3 and Item 5 cartridge cases were identified as having been fired in the same firearm, but due to a difference in class characteristics, were eliminated as having been fired in the same firearm as the Item 1 and 4 cartridge cases. The Item 2 cartridge case was excluded as having been fired in the same firearms as the Item 1, 3, 4 and 5 cartridge cases due to a difference in class characteristics.
D8EQ4L	Item 4 was fired from the firearm, item 1. Items 2,3, 5 were not fired from the firearm, item 1
DA7MX8	1. The three cartridge cases described in item 1 and the cartridge case described in item 4, are 9mm Luger caliber and were fired by the same firearm. The three cartridge cases described in item 1 and the cartridge case described in item 4, were not fire by the firearm used to fired the cartridge case described in item 2. 3. The cartridge case described in item 3 and the cartridge case described in item 5, are 9mm Luger caliber and were fired by the same firearm. 4. The cartridge case described in item 3 and the cartridge case described in item 5, were not fired by the firearm used to fired the cartridge case described in item 2. 5. The cartridge case described in item 2, is 9mm Luger caliber and was fired by a firearm.
DAQEVY	Examination of Item #1 revealed three (3) fired 9mm caliber cartridge cases that were reportedly test fired in the Ruger model SR9c, semi-automatic pistol. Examination of Item #4 revealed one (1) fired 9mm caliber cartridge case. Further examination of Item #4 with the reported test fired cartridge cases in Item #1 revealed Item #4 was fired in the Ruger model SR9c semi-automatic pistol. Examination of Items #3 & #5 revealed two (2) fired 9mm caliber cartridge cases. Further examination of Items #3 & #5 revealed they were fired in the same firearm. Examination of Item #2 revealed one (1) fired 9mm caliber cartridge case that was not fired in the same firearm as Items #1 & #4 or the same firearm as Items #3 & #5.
DCXJM2	Microscopic examination and comparison of Item #1 to Items #2, #3 and #5 reveals dissimilar toolmarks in the firing pin and on the breechface establishing that Items #2, #3 and #5 were not fired by the firearm that fired Item #1. Microscopic examination and comparison of Item #1 to Item #4 reveals corresponding toolmarks in the firing pin and on the breechface establishing that Item #4 was fired by the same firearm that fired Item #1. Microscopic examination and comparison of Item #3 to Item #5 reveals corresponding toolmarks in the firing pin and on the breechface establishing that Item #3 and #5 were fired by the same unknown firearm.
DG4JDX	On 2017-06-21 during the performance of my official duties I received a sealed evidence bag with number PA4001476922 from Case Administration of the Ballistics Section, containing the

TABLE 2

WebCode	Conclusions
	<p>following exhibits: 3.1 Three (3) 9mm Parabellum calibre fired cartridge cases marked 339TC1 to 339TC3 respectively (known exhibits). 3.2 Four (4) 9mm Parabellum calibre fired cartridge cases marked "295339/17" each and "2" to "5" respectively (questioned exhibits). 4. The intention and scope of this forensic examination comprise the following: 4.1 The examination and identification of fired cartridge cases. 4.2 Microscopic individualization of fired cartridge cases. 5. I examined the fired cartridge cases mentioned in paragraphs 3.1 and 3.2 compared the individual and class characteristics markings on them using a comparison microscope and found: 5.1 The cartridge case mentioned in paragraph 3.2 marked "295339/17 4" was fired in the same firearm that fired cartridge cases mentioned in paragraph 3.1. 5.2 The cartridge cases mentioned in paragraph 3.2 marked "295339/17" each and "3" and "5" respectively, were fired in the same firearm. 5.3 The cartridge cases mentioned in paragraph 5.2 were not fired in the same firearm that fired the cartridge cases mentioned in paragraph 5.1. 5.4 The cartridge case mentioned in paragraph 3.2 marked "295339/17 2" was not fired in the same firearms that fired the cartridge cases mentioned in paragraphs 5.1 and 5.2 respectively.</p>
DKLCWD	<p>Item 1 is three test fired 9mm cartridge cases from the suspect firearm. Items 2 through 5 are fired 9mm cartridge cases. From an intra-comparison it was determined that there were three firearms involved in shooting them. There are separated into the following groups: Item 4 was fired in item 1 (suspect firearm). Item 2 was fired in a separate firearm. Items 3 and 5 were fired in the same firearm. Items 2, 3, and 5 (cartridge cases) lack the features necessary to determine the brand of model of firearm that may have fired them. Items 1 through 5 were not entered into the National Integrated Ballistic Information Network (NIBIN).</p>
DMQAYT	<p>Microscopic Comparison made between test shots from the submitted Weapon (Item 1) and four submitted discharged Cartridge Cases (Items 2 thru 5) with the following results: Item 2 NEGATIVE Results. Item 3 NEGATIVE Results. Item 4 POSITIVE Results. Item 4 was discharged from the submitted Weapon. Item 5 NEGATIVE Results.</p>
DV9JHM	<p>The test fired cartridge cases (Item 1) from the Ruger pistol and the evidence cartridge cases (Items 2-5) were examined and microscopically inter-compared with the following results: One cartridge case (Item 4) was identified as having been fired by the Ruger pistol. Two of the cartridge cases (Items 3 &amp; 5) were identified as having been fired by a single firearm. These cartridge cases had not been fired by the Ruger pistol. The remaining cartridge case (Item 2) had been fired by a third firearm. It had not been fired by the Ruger pistol or the firearm related to Items 3 &amp; 5.</p>
DYLBAK	<p>The four (4) 9mm Luger fired cartridge cases, items #2, #3, #4, and #5, were microscopically compared with each other, and with cartridge cases reported as having been previously test fired by the Ruger pistol, item #1. These comparisons revealed the following: Item #1 and item #2: Different individual breech face and firing pin impression characteristics, excluding the one (1) 9mm Luger fired cartridge case, item #2, as having been fired by the Ruger pistol. Item #1 and item #3: Different individual breech face characteristics, excluding the one (1) 9mm Luger fired cartridge case, item #3, as having been fired by the Ruger pistol. Item #1 and item #4: Matching individual breech face characteristics, confirming that the one (1) 9mm Luger fired cartridge case, item #4, was fired by the Ruger pistol. Item #3 and item #5: Matching individual breech face characteristics, confirming that the two (2) 9mm Luger fired cartridge cases, item #3 and item #5, were fired by the same firearm. Item #2 and item #3: Different individual breech face and firing pin impression characteristics, excluding the two (2) 9mm Luger fired cartridge cases, item #2 and item #3, as having been fired by the same firearm. No fired cartridge cases were entered into the NIBIN database.</p>
DZKG6A	<p>Items 001 and 004 were identified as having been fired by the same firearm. Assuming Item 001 was fired by the specific Ruger SR9C pistol listed, then Item 004 was also fired by the</p>



TABLE 2

WebCode	Conclusions
	<p>same Ruger SR9C pistol. Item 002 displays different class characteristics than those observed on Items 001, 003, 004, and 005. Therefore, Item 002 was not fired by the same firearm as any of the other submitted items. Items 003 and 005 were identified as having been fired by the same firearm. Items 003 and 005 display similar class characteristics to Items 001 and 004, but insufficient individual characteristics to either identify or eliminate these two groups as having been fired by the same firearm. Therefore, the results of these comparisons are inconclusive.</p>
E4C628	<p>Examination under 2 comparison microscopes LEICA FSC showed that the 3 expended cartridge cases "item 2", "item 3" and "item 5" were not fired from the RUGER SR9C handgun seized from the suspect. Examination under the same 2 comparison microscopes showed that the expended cartridge case "item 4" was fired from this handgun.</p>
E9U6GM	<p>Exhibit #2 was not fired in the same firearm as Exhibits #3 and #5. It was not fired in Exhibit #1. Exhibit #3 and #5 were fired in the same firearm. They were not fired in Exhibit #1. Exhibit #4 was fired in Exhibit #1</p>
EBCMCD	<p>Four fired cartridge cases Items 1A, 1B, and 1C and 4 are identified as having been fired in the same firearm. Two fired cartridge cases, Items 3 and 5, are identified as having been fired in the same firearm. They exhibit the same class characteristics as Items 1A, 1B, 1C, and 4, and cannot be eliminated as having been fired from the same gun. However, they lack sufficient matching individual characteristics for a positive identification (Inconclusive). Differences in identifiable individual characteristics would suggest that they were fired in different firearms. Item 2 is eliminated as having been fired in the same firearm(s) as Items 1A, 1B, 1C, 3, 4, and 5. It exhibits different identifiable characteristics (parallel breech face marks/concentric circles in FPI) than Items 1A, 1B, 1C, 3, 4, and 5.</p>
ECRQ76	<p>Part I: Examined the test standards marked #1, #1A, #1B. They are 9mm Luger caliber discharged cartridge cases, headstamped PMC. Brass cases, brass primers, hemispherical FP Imps. Examined the four specimens marked #2 through #5. They are 9mm Luger caliber discharged cartridge cases, headstamped PMC. Brass cases, brass primers, hemispherical FP Imps. The cartridge case marked #4 was compared microscopically against test standards and IDENTIFIED as having been discharged in the submitted firearm (Ruger SR9C). The four cartridge cases marked #1, #2, #3 and #5 were compared microscopically against test standards and ELIMINATED as having been discharged in the submitted firearm (Ruger SR9C). Part II: The two cartridge cases marked #3 and #5 were compared microscopically and IDENTIFIED as having been discharged in the same firearm (different from the submitted Ruger SR9C). Part III: The cartridge case marked #2 was compared microscopically against the four cartridge cases marked #1 #3, #4 and #5 and ELIMINATED as having been discharged in the same firearm.</p>
EDLCYV	<p>A microscopic examination and comparison of the evidence described above revealed the following: Cartridge case (4) to Test Fires (1.1-1.3) are identified as having been discharged from the SAME gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge case (3) and cartridge case (5) are identified as having been discharged from a SECOND gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge case (2) is identified as having been discharged from a THIRD gun as compared to cartridge case (4), Test Fires (1.1-1.3) and cartridge cases (3,5) based on the observed disagreement of individual characteristics.</p>
EJR479	<p>The four recovered 9mm Luger caliber cartridge cases from items 2, 3, 4 and 5 were visually examined and microscopically compared to each other and with the test cartridge cases from</p>

TABLE 2

WebCode	Conclusions
	the recovered Ruger pistol (item 1). The cartridge case from container number 4 displayed similar class firing markings and areas of matching individual detail with the test cartridge cases. Item 4 was microscopically identified as having been discharged in the same gun as the test cartridge cases from item 1 (Identification). The cartridge cases from container numbers 2, 3 and 5 displayed some differences of their individual characteristics when compared with the test cartridge cases from item 1. These three cartridge cases (2, 3 and 5) were determined not to have been discharged in the same gun as the test cartridge cases from item 1 (Elimination). Two of the cartridge cases (3 and 5) that were eliminated as having been discharged in the same gun as item 1, displayed similar class firing markings and areas of matching individual detail with each other. Items 3 and 5 were determined to have been discharged in the same gun (Identification). Item 2 displayed different areas of individual detail as the other submitted cartridge cases. This cartridge case (#2) was determined to have been discharged in a different gun than items 1 and 4 or 3 and 5 (Elimination).
ELU43Y	The cartridge case marked as Item 4 was fired by the same firearm as the expended cartridge case marked as Item 1. The cartridge cases marked as Item 2, 3 and 5 were not discharged by the same firearm as the known cartridge case marked as Item 1.
EMM7MT	Cartridge case marked Item 4 was fired in the same firearm as the test cartridge cases marked Item 1. C/cases marked Item 3 and Item 5 were fired in a second unknown firearm. C/case marked Item 2 was fired in a third unknown firearm.
EMQGRC	Item #4 Based on the agreement of all discernible class characteristics and a sufficient agreement of corresponding individual characteristics Item #4, fired cartridge case, has been identified as having been fired in the same firearm as those in Item #1. Due to differences in class characteristics, Item #4 was not fired in the same firearm as those in Item #2 or Item #3. Item #5 Based on the agreement of all discernible class characteristics and a sufficient agreement of corresponding individual characteristics Item #5, fired cartridge case, has been identified as having been fired in the same firearm as Item #3. Due to differences in class characteristics, Item #3 and #5 were not fired in the same firearm as those in Item #1, #2 or #4.
EPRPU2	The cartridge Item 4 was fired in the recovered handgun Ruger SR9C. The cartridges Item 2, Item 3 and Item 5 were not fired in the pistol Ruger SR9C.
ERLBMT	Microscopic examination and comparison disclosed that the fired cartridge case of Item 4 was fired in the same firearm as those of Item 1. Items 3 and 5 were fired in the same second firearm. Item 2 was fired in a third firearm.
EU4HZU	I examined the test cartridge cases (Item 1) and recovered cartridge cases (Item 2, Item 3, Item 4 and Item 5) and compared the individual and class characteristics markings on them using a comparison microscope and found: 2.1 Recovered cartridge case 4 (Item 4) and test cartridge cases (Item 1) were fired in the same firearm. 2.2 Recovered cartridge cases 3 and 5 (Item 3 and Item 5) were fired in a second firearm. 2.3 Recovered cartridge case 2 (Item 2) was fired in a third firearm.
EVM9KZ	Item 4 was identified as having been fired in the same firearm as Item 1 (test-fires from Ruger SR9C). Items 3 and 5 were identified as having been fired in the same firearm as each other, but eliminated from having been fired in the Ruger SR9C. Item 2 was eliminated, based on different class characteristics, from having been fired in any of the firearms associated with other submitted cartridge cases. The identifications and eliminations were confirmed by another analyst.
EXBL4H	Microscopic comparison of submission #001-4 with the submission #001-1 test fires



TABLE 2

WebCode	Conclusions
	<p>determined that these cartridge cases were fired in one 9mm Luger firearm at some point in time prior to this examination. Comparison of submission #001-2 with the submission #001-1 test fires revealed a disagreement of class characteristics, specifically in the marks of the firing pin impressions. This cartridge case was eliminated as having been fired in the same firearm as the submission #001-1 test fires. Microscopic comparison of submissions #001-3 and #001-5 with the submission #001-1 test fires revealed corresponding class characteristics but significant disagreement of individual characteristics. These cartridge cases were eliminated as having been fired in the same firearm as the submission #001-1 test fires. Microscopic comparison of submissions #001-3 and #001-5 determined that these cartridge cases were fired in a second 9mm Luger firearm at some point in time prior to this examination. Comparison of submission #001-2 with submissions #001-3 and #001-5 revealed a disagreement of class characteristics, specifically in the marks of the firing pin impressions. These cartridge cases were eliminated as having possibly been fired in the same firearm. The cartridge cases in this investigation were fired in three different firearms: 1) The suspect Ruger SR9C (submission #001-1 test fires and submission #001-4); 2) an unknown second firearm (submissions #001-3 and #001-5); and 3) an unknown third firearm (submission #001-2).</p>
EY3WNJ	<p>Items 4 &amp; 5 were fired in the same firearm that fired Item's 1. Item 2 was not fired in the firearm that fired Items 1, 4, &amp; 5 or the unknown firearm that fired Item 3. Item 3 was not fired in the firearm that fired Items 1, 4, &amp; 5 or the unknown firearm that fired Item 2.</p>
EYMJCU	<p>Using the Bayesian approach in casework we view our findings under two hypotheses, namely: H1: The questioned cartridge case is fired by the submitted firearm. H2: The questioned cartridge case is fired by another firearm of the same caliber and with the same class characteristics as the submitted firearm. The likelihood of the findings under the two hypotheses is estimated. The likelihood ratio is expressed on a verbal scale: Approximately equally probable (LR = 1-2). Slightly more probable (LR = 2-10). More probable (LR = 10-100). Much more probable (LR = 100-10,000). Very much more probable (LR = 10,000-1,000,000). Extremely more probable (LR = &gt;1,000,000). Item 2: The class characteristics in Item 2 differ from those in Item 1. Due to this difference the cartridge case (Item 2) cannot have been be fired by the same firearm as the test fired cartridge cases (Item 1). Item 3: The findings are extremely more probable when H2 is true than when H1 is true. Item 4: The findings are extremely more probable when 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.</p>
EZVPJ3	<p>Only c/c marked 300987/17 4A was fired in the same firearm with tests.</p>
F7FBXT	<p>The questioned cartridge cases, Items 1 through 5, were examined, documented, and compared with the known cartridge cases, Item 1, with the following results: Item 4 was identified as having been fired in the same firearm as Item 1 cartridge cases. Items 2, 3 and 5 cartridge cases were eliminated as having been fired in the same firearm as the Item 1 cartridge cases, because of a difference in individual characteristics. Items 3 and 5 were identified as having been fired in the same firearm.</p>
F7ZRH2	<p>Item 4 and Item 1 have the same class of firearm produced marks and sufficient corresponding individual marks to conclude that item 4 was fired from the same firearm as item 1. Item 3 and Item 5 have the same class of firearm produced marks and sufficient corresponding individual marks to conclude that they were fired in a single firearm. I compared item 5 to item 1 and found significant differences in both class and individual marks. In the absence of alteration, item 5 and therefore item 3 were not fired in the same firearm as item 1. I compared item 2 to items 1 and 5 and found significant differences in both class and individual marks. In the absence of alteration, item 2 was not fired in the same firearm as item 1 and it was not fired in</p>

TABLE 2

WebCode	Conclusions
	the same firearm as item 5.
F96DW2	a) The cartridge case mentioned in 3.2 marked 300865/17 Item 4 was fired in the same firearm as test cartridge cases mentioned in 3.1. b) The cartridge cases mentioned in 3.2 marked 300865/17 Item 3 & Item 5 were fired in the second firearm. c) The case mentioned in 3.2 marked 300865/17 Item 2 was fired in the third firearm.
F9N7ZK	The submission 4-4 cartridge case and the submission 1-1 test fires were identified as having been fired in the same firearm. The submission 3-3 and 5-5 cartridge cases were identified as having been fired in the same unknown firearm. The submission 1-1 cartridge cases were eliminated as having been fired in the same firearm that fired the cartridge cases in submission 2-2, 3-3, and 5-5 due to differences in individual characteristics. The submission 2-2 cartridge case was eliminated as having been fired in the same firearm that fired the cartridge cases in submission 3-3 and 5-5 due to differences in individual characteristics. All identifications were based on microscopic comparison and the correspondence of individual characteristics.
FB8C8U	1) Fired cartridge cases marked 339676/17 A4 (Item 4) and 676TC1-TC3 (Item 1) were fired in the same firearm. Breechface and f/pin marks correspond (Ruger SR9C). 2) Fired cartridge cases marked 339676/17 A3 (Item 3) and 339676/17 A5 (Item 5) were fired in the same unknown firearm, however they are negative with those mentioned in (point 1). 3) Fired cartridge case marked 339676/17 A2 (Item 2) is negative with all the above mentioned cartridge cases.
FBTXQC	Item #4 was identified as having been fired in the seized Ruger pistol based on the agreement of their class characteristics and sufficient agreement of their individual characteristics. Item #3 and #5 were microscopically compared. Based on the agreement of their class characteristics and sufficient agreement of their individual characteristics, they were identified as having been fired in the same firearm. Items #3 and #5 exhibit class characteristics similar to those of the test fired cartridge cases but were eliminated as having been fired in the seized Ruger pistol based on disagreement of their individual characteristics. Item #2 was eliminated as having been fired in the seized Ruger pistol based on the disagreement of their class characteristics. Item #2 and #3 were microscopically compared. They were eliminated as having been fired in the same firearm based on the disagreement of their class characteristics.
FCKYP9	Item1(test fired cartridge cases), 2, 3, 4 and 5 were microscopically examined and compared. Based on observed agreement of class characteristics and sufficient agreement of individual characteristics, only Item4 were identified as having been fired in the same Ruger SR9C Auto handgun that fired Item1. Item2 could not match with Item1 in the shape of firing fin marks. Item3 and 5 could not match with Item1 in the position of extractor marks and ejector marks.
FJ38D6	1. The cartridge cases described in the Item #1 and the cartridge case described in the Item #4, are 9mm Luger caliber and were fired by the same firearm. 2. The cartridge case described in the Item #2 is 9mm Luger caliber and was fired by a firearm; it was not fired by the firearms that fired the cartridge cases described in the Items #1 and #4 ;#3 and #5. 3. The cartridge case described in the Item #3 and the cartridge case described in the Item #5 , are 9mm Luger caliber and were fired by de same firearm.
FJ6ZAR	a microscopic exam and comparison of the evidence revealed: Test fires( 1.1 - 1.3 ) and Cartridge Casing ( 4 ) are identified as having been fired from SAME firearm based on observed agreement of their class and sufficient agreement of their individual characteristics. Cartridge Casing ( 3 ) and Cartridge Casing ( 5 ) are identified as having been fired from SECOND firearm based on observed agreement of their class and sufficient agreement of their individual characteristics. Cartridge Casing ( 2 )was identified as having been fired from a THIRD firearm based on observed disagreement of their class characteristics when compared to

TABLE 2

WebCode	Conclusions
	Test fires( 1.1 - 1.3 )and cartridge casings ( 3, 4, 5 ).
FNECP6	Item 4 (third expended cartridge case recovered from the parking lot) was discharged by the same weapon as Item 1 (cartridge case discharged from the suspect`s weapon). Items 2, 3 and 5 were not discharged by the suspect`s weapon.
FU4U62	Item 4 was identified as having been fired in Item 1. Items 2, 3, and 5 were eliminated from having been fired in Item 1 due to a difference in individual characteristics. Items 3 and 5 were identified as having been fired in the same firearm.
G3ECEM	MICROSCOPIC COMPARISON EXAMINATION OF EVIDENCE CARTRIDGE CASES Q1 THROUGH Q4 (ITEMS #'S 2 THROUGH 5) WITH TEST FIRED CARTRIDGE CASES (ITEM #1) FROM K1 RUGER PISTOL REVEALED SUFFICIENT AGREEMENT OF INDIVIDUAL CHARACTERISTICS EXISTS TO IDENTIFY THE FOLLOWING: EVIDENCE CARTRIDGE CASE Q3 (ITEM #4) WAS FIRED WITH K1 RUGER PISTOL. EVIDENCE CARTRIDGE CASES Q2 (ITEM #3) AND Q4 (ITEM #5) WERE FIRED WITH THE SAME UNKNOWN FIREARM. DUE TO DIFFERENCES IN BREECHFACE MARKINGS AND FIRING PIN IMPRESSIONS, EVIDENCE CARTRIDGE CASES Q1, Q2, AND Q4 (ITEMS #'S 2, 3, AND 5) WERE NOT FIRED WITH K1 RUGER PISTOL. DUE TO DIFFERENCES IN BREECHFACE MARKINGS AND FIRING PIN IMPRESSIONS, EVIDENCE CARTRIDGE CASE Q1 (ITEM 2) WAS NOT FIRED WITH THE SAME UNKNOWN FIREARM AS EVIDENCE CARTRIDGE CASES Q2 AND Q4 (ITEMS #'S 3 AND 5).
G3TV6C	Exhibits 2, 3, 4, and 5 (four cartridge cases) were visually and microscopically compared to each other and to Exhibit 1 (three test-fired cartridge cases). Based on sufficient agreement of class and individual characteristics, Exhibit 4 was fired in the same firearm as Exhibit 1. Based on differences in class and/or individual characteristics, Exhibits 2, 3, and 5 were not fired in the same firearm as Exhibit 1. Based on sufficient agreement of class and individual characteristics, Exhibits 3 and 5 were both fired in the same firearm. Based on differences in class characteristics, Exhibit 2 was not fired in the same firearm as Exhibits 3 and 5.
G6KYRR	Microscopic comparisons of the fired cartridge case from Item #4 with the submitted test fired cartridge cases from Item #1 revealed matching breech face shear marks and firing pin impressions. This finding confirms Item #4 was fired in the same firearm as the test fires from Item #1. Microscopic inter-comparisons of the two (2) fired cartridge cases from Items #3 and #5 revealed matching breech face shear marks and firing pin impressions. This finding confirms Item #3 and #5 were both fired in the same firearm. Microscopic comparisons of the fired cartridge case from Item #2 with the submitted test fired cartridge cases from Item #1 revealed differences in class characteristics (breech face and firing pin styles). This finding confirms that Item #2 was not fired in the same firearm that fired the submitted cartridge cases from Item #1. Microscopic comparisons of the fired cartridge case from Item #2 with the previously identified group of two (2) cartridge cases from Items #3 and #5 revealed differences in class characteristics (firing pin styles). This finding confirms that Item #2 was not fired in the same firearm that fired Items #3 and #5. Microscopic comparisons of the submitted test fired cartridge cases from Item #1 with the previously identified group of two (2) cartridge cases from Items #3 and #5 revealed distinct differences in individual breech face and firing pin characteristics. This finding confirms the cartridge cases from Items #3 and #5 were not fired in the same firearm that fired the submitted test fired cartridge cases in Item #1.
G9D63M	The item 2, 3, 4 and 5 were not fired in the same gun as the item 1 when compare them under comparison microscope.
GB72PW	The fired cartridge case (item 4) was identified as having been fired from the suspect's firearm (item 1). The fired cartridge cases (items 2, 3, and 5) were eliminated as having been fired from the suspect's firearm (item 1). The fired cartridge cases (items 3 and 5) were identified as

TABLE 2

WebCode	Conclusions
	having been fired from the same firearm.
GB9EPC	Item 1 (three cartridge cases said to be test fired from a Ruger Model SR9C 9mm Luger caliber pistol) was fired by the same firearm as Item 4 (one 9mm Luger caliber cartridge case). Item 1 was fired by a different firearm than Items 2, 3 and 5 (three 9mm Luger caliber cartridge cases). Items 3 and 5 were fired by the same firearm. Item 2 was fired by a different firearm than Items 3 and 5.
GE9L9N	Item 4 was fired in the same firearm as the item 1 test fires. Item 3 and 5 were fired in a second firearm. Item 2 was fired in a third firearm.
GJJXLF	The cartridge cases in Exhibits 1 and 4 were fired in the same firearm. The cartridge cases in Exhibits 3 and 5 were fired in the same firearm. The cartridge cases in Exhibits 1 and 4 could not be identified or eliminated as having been fired in the same firearm as the cartridge cases in Exhibit 3 and 5. The cartridge case in Exhibit 2 was not fired in the same firearm as the cartridge cases in Exhibits 1, 3, 4, or 5.
GK9C4Y	The questioned expended cartridge case marked as Item 4 was fired by the same firearm as the known expended cartridge case marked as Item 1, collected from the Ruger SR9C 9mm Auto suspect's handgun.
GN9KBU	Item 2 was not fired in the same firearm as the Item 1 tests. Item 2 was not fired in the same unknown firearm as Items 3 and 5. Items 3 and 5 were identified as having been fired in the same unknown firearm. They were not fired in the same firearm as the Item 1 tests. Item 4 was identified as having been fired in the same firearm as the Item 1 tests.
GNQJHZ	1) The cartridge cases mentioned in 3.2 (marked 4A) was fired in the same firearm as the tests mentioned in 3.1 (marked 9597C1-7C3). 2) The cartridge cases mentioned in 3.3 (marked 3A & 5A) were fired in a second firearm. 3) The cartridge case mentioned in 3.4 (marked 2A) was fired in a third firearm.
GNVQT9	Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired 9mm caliber cartridge cases from Items 1 and 4 were identified as having been fired in the same firearm. Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired 9mm caliber cartridge cases, Items 3 and 5, were identified as having been fired in the same firearm. Based on significant disagreement of class characteristics, the fired 9mm caliber cartridge cases, Items 3 and 5, could not have been fired in the same firearm as the fired 9mm caliber cartridge cases from Items 1 and 4. Based on significant disagreement of class characteristics, the fired 9mm caliber cartridge case, Item 2, could not have been fired in the same firearm as the fired 9mm caliber cartridge cases from Items 1 and 4. Based on significant disagreement of class characteristics, the fired 9mm caliber cartridge case, Item 2, could not have been fired in the same firearm as the fired 9mm caliber cartridge cases, Items 3 and 5.
GP9F3C	There is agreement of all discernible class characteristics and sufficient agreement of individual characteristics to identify Exhibit 4 as having been fired in the same firearm as the Exhibit 1 test fired cartridge cases. However, due to a difference in class and individual characteristics, Exhibits 2, 3 and 5 were eliminated as having been fired in the same firearm as the Exhibit 1 test fired cartridge cases.
GQZJNR	Microscopic comparisons of Item #4 with test fired cartridge cases from the Item #1 revealed matching breech face sheer marks and firing pin impressions. This finding confirms that Item #4 was fired from the same firearm as Item #1. Microscopic comparisons of Items #3 and #5 revealed matching breech face sheer marks and firing pin impressions. This finding confirms that Items #3 and #5 were fired from the same firearm. Microscopic comparisons of Item #2

TABLE 2

WebCode	Conclusions
	with the test fired cartridge cases from Item #1 revealed different class characteristics (breech face style and firing pin style). This finding confirms that Item #2 was not fired from the same firearm as Item #1. Microscopic comparisons of Item #2 with Items #3 and #5 revealed different class characteristics (firing pin style). This finding confirms that Item #2 was not fired from the same firearm as Items #3 and #5. Microscopic comparisons of Items #3 and #5 with test fired cartridge cases from Item #1 revealed different reproducible individual breech face and firing pin details. This finding confirms that Items #3 and #5 were not fired from the same firearm as Item #1.
GRXMMMA	[No Conclusions Reported.]
GTAG4V	Item A1-1 was compared to items A1-2, A1-3 and A1-5. Items A1-1 and the items A1-2, A1-3, and A1-5 exhibit similar class characteristics; however, microscopic examination revealed sufficient differences in individual characteristics to eliminate items A1-2, A1-3 and A1-5 as having been fired in the same firearm as Items A1-1. Item A1-1 was compared to item A1-4. Items A1-1 and A1-4, all exhibits being 9mm Luger caliber cartridge cases were identified as having been fired in the same firearm.
H6CEGU	Item 4 was identified as having been fired in the Item 1 pistol. Item 3 and Item 5 were fired in the same unknown firearm. They were not fired in the Item 1 pistol. Item 2 was not fired in the Item 1 pistol or the same unknown firearm as the Item 3 and Item 5 cartridge cases.
H9F8BR	The Item 4 cartridge case was identified as having been fired in the same firearm as the Item 1 cartridge cases. Items 3 and 5 were identified as having been fired in the same unknown firearm. They were not fired in the same firearm as the Item 1 cartridge cases. Item 2 was not fired in the same firearm as the Item 1 cartridge cases or in the same unknown firearm as Items 3 and 5.
HBXEPU	I microscopically compared the submitted 9 mm luger fired cartridge cases (Items 1 (1A, 1B, and 1C), 2, 3, 4, and 5) to one another. All of the cartridge cases are headstamped with "PMC 9mm Luger" and are visually similar. Sufficient agreement of possible individual characteristics was found in the firing pin impressions and firing pin aperture shear marks between Items 1A and 4 to conclude that they were fired in the same firearm or one manufactured at or near the same time using the same tooling. Sufficient agreement of possible individual characteristics was found in the firing pin impressions and firing pin aperture shear marks between Items 3 and 5 to conclude that they were fired in the same firearm or one manufactured at or near the same time using the same tooling. There was sufficient amount of differences in the possible individual characteristics to conclude that Item 1A (therefore Item 4) was not fired in the same firearm as Items 2, 3, and 5, assuming there was no significant alterations made to the firearm between firing of these cartridge cases. There was sufficient amount of differences in the possible individual characteristics to conclude that Item 3 (therefore Item 5) was not fired in the same firearm as Item 2, assuming there was no significant alterations made to the firearm between firing of these cartridge cases.
HCFCDD	Items 1, 2, 3, 4 and 5 were physically examined and microscopically compared with each other with the following results: Matching individual identifying characteristics were found in the breechface marks and the firing pin marks and it was concluded that Item 4 and the three Item 1 cartridge cases were fired by the same firearm. Matching individual identifying characteristics were found in the breechface marks and it was concluded that Items 3 and 5 were fired by a second firearm. Due to differences in class and individual identifying characteristics, Item 2 was fired by a third firearm. Items 2-5 bore marks of value and may be suitable for identification.
HGPJKJ	Items # 2,3,5 not fired from recovered Ruger SR9C when compared to testifire specimens #1.

TABLE 2

WebCode	Conclusions
	<p>Item # 2 is out on class and individual characteristics when compared to testifier specimens Item #1 from recovered weapon. Item #3 and Item #5 out on individual characteristics when compared to Item #1 Item #4 fired from recovered gun. Item #4 in agreement with class and individual characteristics when compared to Item #1</p>
HJDX9T	<p>3. On 2017-06-15 during the performance of my official duties I received a sealed evidence bag with number PA4001476921 from Case Administration of the Ballistics Section containing the following: 3.1 One (1) white container containing three (3) 9mm Parabellum calibre fired cartridge cases marked "Item1" each. 3.2 One (1) white container containing one (1) 9mm Parabellum calibre fired cartridge case marked by me "295356/17 2". 3.3 One (1) white container containing one (1) 9mm Parabellum calibre fired cartridge case marked by me "295356/17 3". 3.4 One (1) white container containing one (1) 9mm Parabellum calibre fired cartridge case marked by me "295356/17 4". 3.5 One (1) white container containing one (1) 9mm Parabellum calibre fired cartridge case marked by me "295356/17 5". 4. The intention and scope of this forensic examination comprise of the following: 4.1 The examination and identification of fired cartridge cases. 4.2 Microscopic individualization of fired cartridge cases. 5. I examined the fired cartridge cases mentioned in paragraphs 3.1, 3.2, 3.3, 3.4 and 3.5 and compared the individual and class characteristics markings on them using a comparison microscope and found: 5.1 The cartridge cases mentioned in paragraph 3.1 marked "Item 1" and the cartridge case mentioned in paragraph 3.4 marked "295356/17 4", were fired in the same firearm. 5.2 The cartridge cases mentioned in paragraphs 3.3 and 3.5 marked "295356/17 3" and "295356/17 5" respectively, were fired in a second (2nd) firearm. 5.3 The cartridge case mentioned in paragraph 3.2 was fired in a third (3rd) firearm.</p>
HMD7EN	<p>Item #1.1 was three fired cartridge cases with headstamp markings of "PMC 9mm Luger" submitted as known test fires of the suspect firearm reported to be a "Ruger SR9C 9 mm Auto handgun". Items #1.2 through 1.5 were all fired cartridge case with the headstamp markings of "PMC 9mm Luger", which were all microscopically examined and compared to Item #1.1 cartridge cases. Item #1.4 cartridge case was identified as having been fired from the suspect firearm (Item #1.1 test fires). Items #1.2, 1.3 and 1.5 cartridge cases were all eliminated as having been fired from the suspect firearm (Item #1.1 test fires). These items were microscopically inter-compared. Item #1.3 and Item #1.5 were identified as having been fired from the same unknown firearm. Item #1.2 was fired from a different unknown firearm.</p>
HNBAD7	<p>The evidence in items 1 through 5 was analyzed by physical and microscopic examination. The three (3) fired 9mm cartridge cases in items 2, 3, and 5 were determined not to have been fired in the weapon which fired the three (3) reference 9mm cartridge cases in item 1. The fired 9mm cartridge case in item 4 was determined to have been fired in the same weapon which fired the three (3) reference 9mm cartridge cases in item 1. The fired 9mm cartridge case in item 2 was determined to have been fired in a different weapon than the two (2) fired 9mm cartridge cases in items 3 and 5. The two fired 9mm cartridge cases in items 3 and 5 were fired in one weapon. Further analysis of the three (3) fired 9mm cartridge cases in items 2, 3, and 5 is pending submission of two (2) weapons for additional comparison.</p>
HNBH8B	<p>Microscopic examination and comparison of the cartridge cases in Items 1, 2, 3, 4, and 5 revealed that: A. The cartridge case in Item 4 had been fired in the same firearm as the cartridge cases in Item 1. B. The cartridge cases in Items 3 and 5 had been fired in the same firearm as one another. These cartridge cases bear the same class characteristics as the cartridge cases in Items 1 and 4; however, there are insufficient similar individual characteristics to link the cartridge cases in Items 3 and 5 as having been fired in the same firearm as Items 1 and 4. C. The cartridge case in Item 2 bears no marks to link it as having been fired in the same firearms as Items 1 &amp; 4 or Items 3 &amp; 5.</p>



TABLE 2

WebCode	Conclusions
HRD9PJ	Exhibits #1A, #1B, #1C, and #4 were fired in the same firearm. Exhibits #3 and #5 were fired in the same firearm. They were not fired in the same firearm that fired Exhibits #1A, #1B, #1C, and #4. Exhibit #2 was not fired in the same firearm that fired Exhibits #1A, #1B, #1C, and #4. Exhibit #2 was not fired in the same firearm that fired Items #3 and #5.
HUUQPF	The submission 004 casing was identified as having been fired from the submission 001 Ruger pistol, based on the correspondence of individual characteristics. The submissions 003 and 005 fired casings were fired from the same unknown firearm. Although differences in individual characteristics were noted between submission 002 and the submission 001 test fires, there were not enough samples to make an elimination, results are inconclusive. Differences in individual characteristics were noted in the comparison of submissions 003 and 005 to the test fired casings from the submission 001 pistol, however not enough for an elimination, resulting in inconclusive findings.
HXG6HW	Items 1 through 5 were examined and analyzed using microscopy. The Item 4 cartridge case was identified as having been fired in the same firearm as the Item 1 cartridge cases. The Item 3 and 5 cartridge cases were identified as having been fired in a second firearm. The Item 2 cartridge case was identified as having been fired in a third firearm and exhibits microscopic markings that may be suitable for identification with the firearm in which it was fired.
HY4ZPW	Exhibit cartridge case marked Item 4 was discharged from the same firearm as known cartridge cases in Item 1. Exhibit cartridge cases marked Items 3 and 5 were fired from the same firearm and not the same firearm as known cartridge cases in Item 1. Exhibit cartridge case marked Item 2 was fired from another firearm and not the same as Items 1, 3, 4 and 5.
HZYLHN	1) Item 4 is caliber 9mm fired from the Ruger SR9C as the known cartridge cases (item 1). 2) Item 3 and item 5 are caliber 9mm , both are fired from the same firearm but not from the Ruger SR9C. 3) Item 2 is caliber 9mm fired from another firearm.
J2ULXE	The fired cartridge cases in Items 001-02 through 001-05 were microscopically examined in conjunction with each other and with the test fired cartridge cases in Items 001-01. Based on these microscopic comparisons it was determined that: A. Item 001-04 fired cartridge case was identified as having been fired in the same firearm as the Item 001-01 test fired cartridge cases. B. Item 001-03 and 001-05 fired cartridge cases were identified as having been fired in the same firearm and eliminated as having been fired in the same firearm as the Item 001-01 test fired cartridge cases. C. Item 001-02 fired cartridge case was eliminated as having been fired in the same firearm as the Item 001-01 test fired cartridge cases and the Item 001-03 and 001-05 fired cartridge cases.
J9BZZJ	In my opinion, a microscopical comparison has shown that there is significant agreement of class and individual characteristic detail to conclude that item 1 and item 4 were fired in the same weapon.
JBJZ8C	The fired cartridge case of item #4 was microscopically identified as having been fired in the Ruger pistol that fired the cartridge cases of #1 (A-C). The fired cartridge cases of #3 and #5 were microscopically identified as having been fired in the same unknown 9mm Luger firearm. The fired cartridge case of #2 was found to have been fired in a second unknown 9mm Luger firearm.
JDT7RR	Items #1 (three test-fired cartridge cases) and #2, #3, #4, and #5 (four PMC 9mm Luger fired cartridge cases) were examined and microscopically compared on 06/08/2017. Based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics, Item #4 (fired cartridge case) was positively identified as having been fired in the same firearm as Item #1 (test-fired cartridge cases). Based on agreement of all discernible

TABLE 2

WebCode	Conclusions
	<p>class characteristics and sufficient agreement of individual characteristics, Items #3 and #5 (two fired cartridge cases) were positively identified as having been fired in the same firearm. Based on disagreement of class characteristics, Items #3 and #5 were eliminated as having been fired in the same firearm as Item #1 (three test-fired cartridge cases) and Item #4 (fired cartridge case). Based on disagreement of class characteristics, Item #2 (fired cartridge case) was eliminated as having been fired in the same firearm as Items #1 (three test-fired cartridge cases), Item #3 (fired cartridge case), Item #4 (fired cartridge case), and Item #5 (fired cartridge case). No firearm was submitted.</p>
JHGU4P	<p>Items #2-5 were examined and each found to contain one (1) fired PMC brand 9mm Luger cartridge case. Microscopic comparisons of Item #4 with the test fired cartridge cases from Item #1 revealed matching breech face shear marks and firing pin impressions. This finding confirms that Item #4 and the cartridge cases from Item #1 were fired from the same firearm (Ruger pistol). Microscopic comparisons of Item #3 with Item #5 revealed matching breech face shear marks and firing pin impressions. This finding confirms that Items #3 and 5 were fired from the same firearm. Microscopic comparisons of Item #2 with the test fired cartridge cases from Item #1 revealed different class characteristics (breech face and firing pin styles). This finding confirms that Item #2 was not fired from the same firearm as Items #1 and 4. Microscopic comparisons of Item #2 with cartridge cases from Items #3 and 5 revealed different class characteristic (firing pin style). This finding confirms that Item #2 was not fired from the same firearm as Items #3 and 5. Microscopic comparisons of Items #3 and 5 with the test fired cartridge cases from Item #1 revealed different reproducible individual breech face and firing pin characteristics. This finding confirms that Items #3 and 5 were not fired from the same firearm as Items #1 and 4.</p>
JJTR9U	<p>Item 4 was discharged in a Ruger SR9C 9 mm Auto handgun. Item 2, Item 3 and Item 5 were not fired in the suspect's pistol. Item 2 was discharged in the other unknown firearm. Item 3 and Item 5 were discharged in the same unknown firearm.</p>
JKLMV3	<p>Item #2 was examined and was EXCLUDED as having been fired from the submitted weapon test fires in Item #1. This was based upon and agreement of class characteristics but a disagreement of individual characteristics. Item #3 was examined and was EXCLUDED as having been fired from the submitted weapon test fires in Item #1. This is based upon and agreement of class characteristics, but a disagreement of individual characteristics. The weapon was not submitted for examination. Item #4 was examined and was INCLUDED, determined to have been fired from the submitted weapon, a Ruger SR9C 9mm semi-automatic weapon (test fires). This was based upon and agreement of class and individual characteristics. Item #5 was examined and was EXCLUDED as having been fired from the submitted weapon test fires in Item #1. This is based upon and agreement of class but a disagreement of individual characteristics. Items #3 and #5 were fired from the same unrelated firearm not submitted in this case. This determination was based upon an agreement of class and individual characteristics.</p>
JLHTKA	<p>The 9mm cartridge cases (Items 1 and 4) were fired in the same firearm. The 9mm cartridge case (Item 2) was fired in a second firearm. The 9mm cartridge cases (Items 3 and 5) were fired in a third firearm.</p>
JMTMAH	<p>The Items 2 thru 5 cartridge cases were compared to the Item 1 tests. Item 4 was identified as being fired in the same firearm as the Item 1 tests. Items 2, 3, and 5 were eliminated as having been fired in same firearm as Item 1; however, Items 3 and 5 were identified as being fired in the same (unidentified) firearm, and Item 2 was determined to have been fired in a third (unidentified) firearm.</p>



TABLE 2

WebCode	Conclusions
JP7G6A	I conducted a comparative microscopic examination between the three test fired 9mm calibre cartridge cases (Item 1 ) and the four 9mm calibre fired cartridge cases (Items 2, 3, 4 and 5). I compared the size, shape and relative locations of the microscopic characteristics present on the cartridge cases as a result of being discharged; the results of my examination follow. In my opinion - The fired cartridge case (Item 4) was discharged in the same firearm that discharged the cartridge cases (Item 1). The fired cartridge cases (Items 2, 3 and 5) were not discharged in the same firearm that discharged the cartridge cases (Item 1). The two cartridge cases (Items 3 and 5) were discharged in the same firearm.
JUDU2M	Item 4 was identified as having been fired by the same firearm as Item 1 based on agreement of individual and class characteristics. Items 3 and 5 were identified as having been fired by the same unknown firearm based on agreement of individual and class characteristics. Items 3 and 5 were eliminated as having been fired by the same firearm as Item 1 based on disagreement of individual characteristics. Item 2 was eliminated as having been fired by the same firearm as Item 1 and the same unknown firearm as Items 3 and 5 based on disagreement of individual characteristics.
JUJWM2	1. The cartridge cases described in items 1 and 4, are 9mm Luger caliber and were fired from the same firearm. The cartridge case described in item 2, is 9mm Luger caliber and was fired from a firearm. 3. The cartridge case described in item 2, is 9mm Luger caliber and was not fired from the firearm used to fire the cartridge cases described in item 1 and 4. 4. The cartridge case described in item 2, is 9mm Luger caliber and was not fired from the firearm used to fire the cartridge cases described in item 3 and 5. 5. The cartridge cases described in items 3 and 5, are 9mm Luger caliber and were fired from the same firearm.
JYN34C	Item 4 was identified microscopically as having been fired in the same firearm as the test fires, Item 1, based on agreement of the combination of individual characteristics and all discernible class characteristics. Item 2 was eliminated as having been fired in the same firearm as the test fires, Item 1, due to disagreement of individual characteristics. Items 3 and 5 were eliminated as having been fired in the same firearm as the test fires, Item 1, due to disagreement of discernible class characteristics. Items 3 and 5 were identified microscopically as having been fired in the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 3 and 5 were eliminated as having been fired in the same unknown firearm as Item 2 due to disagreement of all discernible class characteristics.
JYYZ4M	1) The cartridge cases marked as "4" and T1-T3 were fired in the same firearm (1st firearm). 2) The cartridge cases marked as "3" and "5" were fired in the same firearm but negative to the cartridge cases mentioned above. (2nd firearm). 3) The cartridge case marked as "2" was not fired in the firearm that fired cartridge cases marked "3-5" and T1-T3.
K2UMRD	Item 4 was identified microscopically as having been fired in the same firearm as the test fires listed as Item 1 based on the agreement of the combination of individual characteristics & all discernible class characteristics. Item 3 & Item 5 were identified microscopically as having been fired in the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 3 & 5 were eliminated as having been fired in the same firearm as the test fires listed as Item 1 due to disagreement of discernible individual characteristics. Item 2 was eliminated as having been fired in the same firearm as the test fires listed as Item 1 and from the same unknown firearm as Items 3 & 5 due to disagreement of discernible class characteristics.
K72G3Z	Items 2, 3, and 5, 9mm Luger cartridge cases, were microscopically compared to the test fired cartridge cases in Item 1. It was determined that Items 2,3, and 5 were not fired in the same

TABLE 2

WebCode	Conclusions
	<p>firearm as the Item 1 test fires. Item 4, 9mm Luger cartridge case, was microscopically compared to the test fired cartridge cases in Item 1. It was determined that Item 4 was fired in the same firearm as the Item 1 test fires. Items 3 and 5 were examined and were identified as having been fired by the same firearm; but different from the test fired firearm in this case. Item 2 was examined and was eliminated as having been fired in the same firearm as Items 3 and 5. Items 2, 3, and 5 can be identified to a particular firearm, should one be submitted for comparison. The above listed evidence is being retained in the firearms section at the laboratory. Findings concurred with by [Name].</p>
K9QTXY	<p>A. The cartridge cases identified E-1 to E-3, described in item 1, are 9mm Luger caliber and were fired by the same firearm used to fire the cartridge case identified E-6, described in item 4. B. The cartridge case identified E-4, described in item 2, is 9mm Luger caliber and was fired by a firearm. C. The cartridge case identified E-4, described in item 2, is 9mm Luger caliber and was not fired by the firearm used to fire the cartridge cases identified E-1 to E-3, described in item 1 and E-6, described in item 4. D. The cartridge case identified E-4, described in item 2, is 9mm Luger caliber and was not fired by the firearm used to fire the cartridge cases identified E-5, described in item 3 and E-7, described in item 5. E. The cartridge case identified E-5, described in item 3, is 9mm Luger caliber and was fired by the same firearm used to fire the cartridge case identified E-7, described in item 5.</p>
KGXF6E	<p>The cartridge cases in Items 001-02 through 001-05 were microscopically examined in conjunction with one another and with the test fired cartridge cases in Item 001-01. Based on these comparative examinations, the following results were determined: Item 001-04 was identified as having been fired in the Ruger firearm said to have produced the test fired cartridge cases in Item 001-01. Items 001-03 and 001-05 were identified as having been fired in the same unknown firearm. Items 001-03 and 001-05 were eliminated as having been fired in the Ruger firearm said to have produced the test fired cartridge cases in Item 001-01. Item 001-02 was eliminated as having been fired in both the Ruger firearm said to have produced the test fired cartridge cases in Item 001-01 and the unknown firearm from which Items 001-03 and 001-05 were fired.</p>
KJNJXL	<p>From the sample that had been received, it can be concluded that one expended cartridge (item 4) that had been recovered from the crime scene have same characteristics as three expended cartridge (item 1) that had been discharged from the firearm (Ruger SR9C 9mm Auto) which had been seized from the suspect. Meanwhile, three expended cartridge (item 2, 3 &amp; 5) did not have same characteristics as three expended cartridge (item 1). On the comparison between three expended cartridge (item 2, 3 &amp; 5) at the crime scene, it can be concluded that item 2 are been discharged from the one firearm while item 3 and 5 from same firearm which both firearm are in 9mm caliber firearm. Therefore, from the comparison and finding, it can be conclude that 3 firearm are been used in the crime scene including the suspect firearm.</p>
KMGAKD	<p>Cartridge Case Analysis : Methodology - Comparison Microscopy: Item 1D, the cartridge case, was fired in the same firearm as Item 1A1, the cartridge case, based upon corresponding class and individual microscopic characteristics. Items 1C and 1E, the cartridge cases, were not fired in the same firearm as Item 1A1, based upon different individual microscopic characteristics. Items 1C and 1E, the cartridge cases, were fired in the same firearm based upon corresponding class and individual microscopic characteristics. Items 1B, the cartridge case, was not fired in the same firearm as Items 1A1, 1C, 1D and 1E based upon different class and individual microscopic characteristics.</p>
KT2CHG	<p>Examinations showed that Item 4 was discharged within the suspect firearm. Examinations showed that Item 2, Item 3, and Item 5 were not discharged within the suspect firearm.</p>

TABLE 2

WebCode	Conclusions
KTAWJ	In my opinion Item 4 a spent 9x19mm calibre cartridge case was fired in the same gun, a Ruger SR9C, that produced the test fired cartridge cases item 1. None of the other recovered cartridge cases items 2,3,5 were fired in this gun. Items 3 and 5 had marks indicating they were fired in the same gun. These results show that three guns were used to fire the recovered cartridge cases.
KTUEX6	Group #1: Item 4 and Item 1 (the test fired cartridge cases) were microscopically examined and compared. Based on observed agreement of class characteristics and sufficient agreement of individual characteristics, the cartridge case was identified as having been fired in the same firearm that fired Item 1, the Ruger pistol. Group #2: Items 3 and 5 were microscopically examined and compared. Based on observed agreement of class characteristics and sufficient agreement of individual characteristics, the cartridge cases were identified as having been fired in the same firearm. Group #3: Item 2 was examined and is as described above. Group #1, Group #2, and Group #3 were microscopically examined and compared. Based on observed disagreement of class and individual characteristics, Group #1, Group #2, and Group #3 were eliminated as having been fired in the same firearm.
KVZ7LC	The examination showed that Item N 4 have been discharged from the same firearm as the one known to the suspect.
L4D2VD	Item 4 was identified as having been fired in the same firearm as Item 1 based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 3 and 5 were identified as having been fired in the same unknown firearm based on agreement of the combination of individual characteristics and all discernible class characteristics. Items 3 and 5 were eliminated as having been fired in the same firearm as Item 1 due to disagreement of individual characteristics. Item 2 was eliminated as having been fired in the same firearm as Item 1 due to disagreement of discernible class characteristics. Item 2 was eliminated as having been fired in the same unknown firearm as Items 3 and 5 due to disagreement of discernible class characteristics.
L7JN7W	Item 2 was a fired 9mm Luger cartridge case. Item 2 was microscopically compared to test-fired cartridge cases from the Ruger pistol using a comparison microscope. Differences in class and individual characteristics sufficient for elimination were observed. Item 2 was not fired by the Ruger pistol. Item 3 was a fired 9mm Luger cartridge case. Item 3 was microscopically compared to test-fired cartridge cases from the Ruger pistol using a comparison microscope. All recognizable class characteristics corresponded, however, individual characteristics sufficient for elimination were observed. Item 3 was not fired by the Ruger pistol. Item 4 was a fired 9mm Luger cartridge case. Item 4 was microscopically compared to a test-fired cartridge case from the Ruger pistol using a comparison microscope. Corresponding class characteristics and corresponding individual characteristics sufficient for identification were observed. Item 4 was fired by the Ruger pistol. Item 5 was a fired 9mm Luger cartridge case. Item 5 was microscopically compared to test-fired cartridge cases from the Ruger pistol using a comparison microscope. All recognizable class characteristics corresponded, however, individual characteristics sufficient for elimination were observed. Item 5 was not fired by the Ruger pistol.
LERA3D	Item 4 was identified as having been fired in the known firearm that fired Item 1. Item 2, Item 3 and Item 5 were eliminated as having been fired in the known firearm that fired Item 1. Item 3 and Item 5 were identified as having been fired in the same unknown firearm, but eliminated as having been fired in the unknown firearm that fired Item 2.
LF8GHT	The Items 1, 2, 3, 4 and 5 cartridge cases were microscopically examined and identified as having been fired in three separate firearms, as follows: Items 1 and 4 were fired in one

TABLE 2

WebCode	Conclusions
	firearm; Items 3 and 5 were fired in a second firearm; Item 2 was fired in a third firearm and exhibits microscopic markings that may be suitable for identification with the firearm in which it was fired.
LHDZJA	Comparative microscopic examination of the cartridge cases in Item #1 with the cartridge cases in Item #2, Item #3, Item #4, and Item #5 revealed that: A)The cartridge case in Item #4 had been fired in the same firearm as the cartridge cases in Item #1. B)The cartridge cases in Item #3 and Item #5 had both been fired in the same unknown 9mm caliber firearm. C)The cartridge case in Item #2 had been fired in a second unknown 9mm caliber firearm.
LKHTD9	Items 1 and 4 were fired in the same firearm. This conclusion was verified by Firearms Examiner (name). Items 3 and 5 were fired in the same firearm. This conclusion was verified by Firearms Examiner (name). Items 3 and 5 were not fired in the same firearm as Items 1 and 4. This conclusion was verified by Firearms Examiner (name). Item 2 was not fired in the same firearm as Items 1 and 4 or Items 3 and 5. This conclusion was verified by Firearms Examiner (name).
LLQRLV	The Item 1 and 4 fired cartridge cases were fired in one 9mm Luger caliber firearm. The Item 2 fired cartridge case was fired in a second 9mm Luger caliber firearm. The Item 3 and 5 fired cartridge cases were fired in a third 9mm Luger caliber firearm.
LYFT23	Items 2 through 5 were compared to the known casings from Item 1. This comparison revealed that Items 2, 3 and 5 all bear similar class characteristics to the casings from Item 1, but did not have sufficient corresponding individual microscopic marks to allow an identification with the casings from Item 1. Therefore, no conclusion could be reached as to whether or not these casings were fired in the firearm that fired the casing from Item 1. However, based on macroscopic and microscopic characteristics it was determined that Item 1 and Item 4 were fired in the same firearm. It was also determined that Items 3 and 5 were fired in the same firearm, based on macroscopic and microscopic characteristics.
LYGLZB	Microscopic comparisons of evidence 9MM cartridge case Q3 (item 4) and test fired cartridge cases from the Ruger SR9C 9mm Luger pistol, K1 (item 1) have revealed that sufficient agreement of individual characteristics exists to identify Q3 (item 4) as having been fired with the Ruger SR9C 9mm Luger pistol, K1 (item 1). Microscopic comparisons of evidence 9MM cartridge cases Q2 and Q4 have revealed that sufficient agreement of individual characteristics exists to identify Q2 and Q4 as having been fired with the same unknown firearm. Q2 and Q4 were not fired with the Ruger SR9C pistol due to differences in firing pin and breechface impressions. Evidence 9mm Luger cartridge case Q1 was fired with different firearms than Q2 through Q4 due to differences in firing pin and breechface impressions.
LZ8UYD	1) By performing the micro-comparative study between the 9x19 mm caliber cartridge case, labeled "Item 4" and the 9x19 mm caliber cartridge cases labeled "Item 1", it is determined that all were fired by the 9-millimeter caliber, semiautomatic pistol, of the Ruger brand, Model SR9C. 2) When performing the comparative study between the 9x19 mm caliber cartridge cases, labeled "Item 2", "Item 3" and "Item 5" and the 9x19 mm caliber cartridge cases labeled "Item 1", it is determined that they were not fired by the same firearm.
M23P7M	A microscopic examination and comparison of the evidence described above revealed the following: Cartridge casing (4) and test fires (1.1-1.3) were fired from the above listed firearm, lab item# (1), based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge casings (3 & 5) are identified as having been fired from a SECOND gun based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge casing (2) is identified as having been fired from a THIRD gun based on the observed disagreement of its individual

TABLE 2

WebCode	Conclusions
	characteristics as compared to cartridge casings (1.1 - 1.3, 4) and cartridge casings (3, 5).
M3VLTV	On 06/05/17 I received Items 1, 2, 3, 4, and 5 from QA Manager [Name]. Item 1 contained three (3) fired PMC 9mm LUGER casings said to have been fired by a Ruger SR9C 9mm Auto handgun suspected to have been used in a shooting. Items 2, 3, 4, and 5 each contained one (1) fired PMC 9mm LUGER casing collected at the shooting scene. Items 2, 3, 4, and 5 were microscopically examined and inter-compared. It is my opinion that Items 3 and 5 were fired by the same unknown handgun and that Items 2 and 4 were each fired by two (2) unknown handguns. See photos for areas of comparison. Items 2, 3, 4, and 5 were then microscopically compared to Item 1. It is my opinion that only Item 4 was fired by Item 1 and that Items 2, 3, and 5 were fired by other unknown firearms. See photos for areas of comparison. All evidence was returned to QA Manager [Name] on 06/07/17.
M4CNPW	Based on the agreement of all discernible class characteristics and sufficient agreement of individual characteristics (firing pin aperture shear marks), it was determined that the Item 4 cartridge case was fired from the Item 1 pistol. Based on the agreement of all discernible class characteristics and sufficient agreement of individual characteristics (firing pin aperture shear marks), it was determined that the Items 3 and 5 cartridge cases were fired from the same unknown firearm. Based on significant differences in individual characteristics (firing pin aperture shear marks), it was determined that the Items 3 and 5 cartridge cases were not fired from the submitted pistol (Item 1). Based on significant differences in class characteristics (breechface marks), it was determined that the Item 2 cartridge case was fired from a different firearm than the ones that fired the other cartridge cases. Three different firearms were used.
M7U4LG	From the sample that had been received, it can be concluded that one expended cartridge (item 4) that had been recovered from the crime scene have same characteristics as three expended cartridge (item 1) that had been discharged from the firearm (Ruger SR9C 9mm Auto) which had been seized from the suspect. Meanwhile, three expended cartridge (item 2, 3 & 5) did not have same characteristics as three expended cartridge (item 1). On the comparison between three expended cartridge (item 2, 3 & 5) at the crime scene, it can be concluded that item 2 are been discharged from the one firearm while item 3 and 5 from same firearm which both firearm are in 9mm caliber firearm. Therefore, from the comparison and finding, it can be conclude that 3 firearm are been used in the crime scene including the suspect firearm.
MB8V2A	1. Exhibits 2, 3, 4, and 5 (cartridge cases) were visually examined and microscopically compared to each other and to Exhibit 1 (provided test fired cartridge cases). 2. Exhibit 4 was fired in the same firearm as Exhibit 1. 3. Exhibits 3 and 5 were fired in the same firearm. Exhibits 3 and 5 were not fired in the same firearm as Exhibit 1 based on differences in individual characteristics. 4. Exhibit 2 was not fired in the same firearm as Exhibits 1 and 4 or Exhibits 3 and 5, based on differences in class characteristics.
MDV9KT	The cartridge case marked as Item 4 was discharged by the Ruger SR9C 9mm Auto suspect's handgun.
ME4L4F	Exhibits #1a, #1b, #1c, and #4 were fired in the same unknown firearm. Exhibits #3 and #5 were fired in a second unknown firearm. Exhibit #2 was fired in a third unknown firearm.
MGX6C9	Comparison microscope examination were conducted on the evidence listed above. The findings of this examiner are the followings: 1- Exhibit 4 was fired in the same firearm as exhibit 1 (test fires from suspect's weapon) 2- Exhibits 3 and 5 were fired in a second firearm. 3- Exhibit 2 was eliminated as being fired from the same firearm as exhibits 1, 3, 4 and 5 based on class characteristics. Exhibit 2 was fired in a third firearm.

TABLE 2

WebCode	Conclusions
MLW8QA	<p>The three expended cartridge cases (Item 1) are reported to have been test fired in the suspect's firearm. The expended cartridge case (Item 4) was microscopically compared to the cartridge cases (Item 1) with POSITIVE RESULTS. The expended cartridge cases were identified as having been fired in the same firearm due to the sufficient agreement of individual characteristics. The expended cartridge cases (Items 3 and 5) were microscopically compared to each other with POSITIVE RESULTS. The expended cartridge cases were identified as having been fired in the same firearm due to the sufficient agreement of individual characteristics. The expended cartridge cases (Item 3 and 5) were microscopically compared to the expended cartridge cases (Items 1) with NEGATIVE RESULTS. The two groups of expended cartridge cases were eliminated as having been fired in the same firearm due to differences in breech face marks, firing pin aperture shear marks and firing pin impressions. The expended cartridge case (Item 2) was microscopically compared to the expended cartridge cases (Items 1) with NEGATIVE RESULTS. The two groups of expended cartridge cases were eliminated as having been fired in the same firearm due to differences in breech face marks, firing pin aperture shear marks and firing pin impressions. The expended cartridge case (Item 2) was microscopically compared to the expended cartridge cases (Items 3 and 5) with NEGATIVE RESULTS. The two groups of expended cartridge cases were eliminated as having been fired in the same firearm due to differences in breech face marks, firing pin aperture shear marks and firing pin impressions.</p>
MNVQKV	<p>Laboratory Item 001.B (Item 2) spent brass 9mm Luger cartridge case is eliminated as being fired by the same firearm as Laboratory Item 001.A (Item 1) test fires from the suspect's firearm. Laboratory Item 001.B (Item 2) spent brass 9mm Luger cartridge case is eliminated as being fired by the same firearm as Laboratory Item 001.C (Item 3) and Laboratory Item 001.E (Item 5) two spent 9mm Luger cartridge cases. Laboratory Item 001.B (Item 2) spent brass 9mm Luger cartridge case is eliminated as being fired by the same firearm as Laboratory Item 001.D (Item 4) spent 9mm Luger cartridge case. Laboratory Item 001.C (Item 3) and Laboratory Item 001.E (Item 5) two spent 9mm Luger cartridge cases are identified as being fired by the same firearm. Laboratory Item 001.C (Item 3) and Laboratory Item 001.E (Item 5) two spent 9mm Luger cartridge cases are eliminated as being fired by the same firearm as Laboratory Item 001.A (Item 1) test fires from the suspect's firearm. Laboratory Item 001.C (Item 3) and Laboratory Item 001.E (Item 5) two spent 9mm Luger cartridge cases are eliminated as being fired by the same firearm as Laboratory Item 001.D (Item 4) spent 9mm Luger cartridge case. Laboratory Item 001.D (Item 4) is identified as being fired by the same firearm as Laboratory Item 001.A (Item 1) test fires from the suspect's firearm.</p>
MVAMZ3	<p>The third casing from the parking lot (Ex.4) was determined to have been fired in the Ruger pistol (Ex.1). Results from the other shell casings were inconclusive.</p>
MVBFXA	<p>MICROSCOPIC COMPARISON OF EVIDENCE CALIBER 9MM LUGER CARTRIDGE CASES ITEM 2 THROUGH ITEM 5 WITH TEST FIRED CARTRIDGE CASES FROM ITEM 1 REVEALS THAT SUFFICIENT AGREEMENT OF INDIVIDUAL CHARACTERISTICS EXISTS TO IDENTIFY FOLLOWING: ITEM 4 WAS FIRED WITH ITEM 1 (FIREARM 1). ITEM 3 AND ITEM 5 WERE FIRED WITH THE SAME UNKNOWN FIREARM (FIREARM 2). ITEM 2 WAS FIRED WITH A THIRD UNKNOWN FIREARM (FIREARM 3). ITEM 3 AND ITEM 5, AS WELL AS ITEM 2, WERE FIRED WITH DIFFERENT UNKNOWN FIREARMS AND WITH DIFFERENT FIREARMS THAN ITEM 1, DUE TO DIFFERENCES IN BREECH FACE AND FIRING PIN IMPRESSIONS.</p>
MVE3D3	<p>The below listed spent cartridge case was microscopically examined and compared with test cartridge cases fired by the Ruger SR9C 9mm auto pistol, PR# [number], Lab Evidence# 001-A1. Numerous corresponding individual characteristics were observed. Therefore, it is my opinion that the below listed item was fired by this firearm. Lab Evidence# Property# Item# Item Description 001-A4 [number] 4 Spent PMC 9mm luger cartridge case The below listed</p>



## TABLE 2

WebCode	Conclusions
	<p>spent cartridge case was microscopically examined and compared with test cartridge cases fired by the Ruger SR9C 9mm auto pistol, PR# [number], Lab Evidence# 001-A1. It is my opinion that this item was not fired by this firearm. Lab Evidence# Property# Item# Item Description 001-A2 [number] 2 Spent PMC 9mm luger cartridge case The below listed spent cartridge cases were microscopically examined and compared with test cartridge cases fired by the Ruger SR9C 9mm auto pistol, PR# [number], Lab Evidence# 001-A1, and with the spent 9mm luger cartridge case, PR# [number], Lab Evidence# 001-A2. It is my opinion that the below listed items were not fired by this firearm, or by the same firearm which fired Lab Evidence# 001-A2. Further, the below listed items were microscopically examined and compared with each other. Numerous corresponding individual characteristics were observed. Therefore, it is my opinion that the below listed spent cartridge cases were fired by the same unknown firearm. Lab Evidence# Property# Item# Item Description 001-A3 [number] 3 Spent PMC 9mm luger cartridge case 001-A5 [number] 5 Spent PMC 9mm luger cartridge case. [Participant submitted data in a format that could not be reproduced in this report].</p>
MYUDNL	<p>A microscopic examination and comparison of the evidence described above revealed the following: TEST FIRES (1.1-1.3) and CARTRIDGE CASE (4) are identified as having been discharged in the ABOVE FIREARM based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. CARTRIDGE CASE (3) and CARTRIDGE CASE (5) are identified as having been discharged in A SECOND GUN based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. CARTRIDGE CASE (2) is identified as having been discharged in A THIRD GUN based on the observed disagreement of individual characteristics of TEST FIRES and CARTRIDGE CASE (1.1-1.3, 4) and CARTRIDGE CASES (3, 5).</p>
N4K82D	<p>Exhibit #2 was not fired in the Exhibit #1 pistol or in the same firearm that fired Exhibits #3 and #5. Exhibits #3 and #5 were fired in the same firearm; however, they were not fired in the Exhibit #1 pistol. Exhibit #4 was fired in the Exhibit #1 pistol. Any suspect firearm(s) should be submitted along with the resubmission of Exhibits #2, #3, and #5 for comparison purposes.</p>
NACCUG	<p>Item 2 was not fired in the same firearm as any of the other fired cartridge cases submitted. Item 3 and Item 5 bear marks consistent with having been fired in the same firearm, firearm unknown. Item 3 and Item 5 were not fired in the same firearm as any of the remaining fired cartridge cases submitted. The fired cartridge cases submitted as Item 1 bear marks consistent with having been fired in the same firearm as Item 4.</p>
NEKXKY	<p>We strongly support the hypothesis that item 4 discharged from the same firearm as the known expended cartridge cases (item 1) We strongly support the hypothesis that items 2 , 3 and 5 DID NOT discharge from the same firearm as the known expended cartridge cases (item 1)</p>
NGNUNZ	<p>Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired 9mm caliber cartridge cases from Items 1 and 4 were identified as having been fired in the same firearm. Based on agreement of discernible class characteristics and sufficient corresponding individual detail, the fired 9mm caliber cartridge cases, Items 3 and 5, were identified as having been fired in the same firearm. Based on significant disagreement of class characteristics, the fired 9mm caliber cartridge cases from Items 1 and 4 could not have been fired in the same firearm as the fired 9mm caliber cartridge cases, Items 3 and 5. Based on significant disagreement of class characteristics, the fired 9mm caliber cartridge case, Item 2, could not have been fired in the same firearm as the fired 9mm caliber cartridge cases from Items 1 and 4. Based on significant disagreement of class characteristics, the fired 9mm caliber cartridge case, Item 2, could not have been fired in the same firearm as the fired 9mm caliber cartridge cases, Items 3 and 5.</p>

TABLE 2

WebCode	Conclusions
NJH8Y8	RESULTS: Items 1, 2, 3, 4, and 5 were physically examined and microscopically compared with each other. From these comparisons, the following conclusions were reached: Matching individual identifying characteristics were found on the three fired cartridge cases submitted as Item 1, and it was concluded that they were fired by the same firearm. Matching individual identifying characteristics were found on Item 1 and Item 4, and it was concluded that these Items were fired by one firearm. Matching individual identifying characteristics were found on Item 3 and Item 5, and it was concluded that these Items were fired by a second firearm. Items 3 and 5 may be suitable for identification. Due to differences in class characteristics, it was concluded that Item 2 was fired by a third firearm. Item 2 may be suitable for identification. Items 1 – 5 were not entered into the Integrated Ballistics Identification System (IBIS) as they did not meet current criteria for entry.
NL6ZMV	Item 4 was identified as having been fired in the same firearm as the Item 1 test fires. Items 3 and 5 were identified as having been fired in the same unknown firearm. (Unknown Firearm #1). Item 2 exhibits marks of value for future comparison microscopy. (Unknown Firearm #2).
NMDBGD	a. Item 4 was fired in the same firearm that fired Item 1. b. Item's 3 and 5 were fired in the same firearm, but they were not fired in the same firearm(s) as Item's 1, 2 or 4. c. Item 2 was not fired in the same firearm(s) as Item's 1, 3, 4 or 5.
NRCG8H	Item 4, a fired cartridge case from the scene, was identified as having been fired from the suspect's Ruger SR9C 9mm Luger caliber semiautomatic pistol.
NUDELQ	The suspect's Ruger pistol, fired the cartridge case from the parking lot, item 4. Items 3 and 5 were fired in the same firearm. Items 3 and 5 were not fired in the suspect's pistol. Item 2 was fired in a different firearm than the firearms that fired items 3, 4, and 5.
NVCNN9	The Item 1, Item 2, Item 3, Item 4, and Item 5 cartridge cases were compared to each other. Item 4 was determined to have been fired in the same firearm as the Item 1 cartridge cases. The Item 3 and Item 5 cartridge cases were determined to have been fired in the same firearm, not the same firearm as the Item 1 and Item 4 cartridge cases. The Item 2 cartridge case was not fired in the same firearm as any of the other submitted cartridge cases.
NYA9B6	Exhibits 1A-1C were microscopically compared to each other and to Exhibits 2-5. Based on an agreement of class characteristics and sufficient agreement of individual characteristics, Exhibit 4 was fired in the Ruger model SR9C 9mm caliber pistol. Based on a disagreement of class characteristics, Exhibits 2, 3 and 5 were not fired in the Ruger model SR9C 9mm caliber pistol. Exhibits 2, 3 and 5 were microscopically compared to each other. Based on an agreement of class characteristics and sufficient agreement of individual characteristics, Exhibits 3 and 5 were fired in the same firearm. Based on a disagreement of class characteristics, Exhibit 2 was not fired in the same firearm as Exhibits 3 and 5.
NYPFQV	By means of cartridge case, microscopic and comparison examinations it was determined that: 1. The cartridge cases marked E-1 to E-3, described in Item 1 and the cartridge case marked E-6, described in Item 4, are 9mm Luger caliber and were fired by the same firearm. 2. The cartridge case marked E-4, described in Item 2, is 9mm Luger caliber and was fired by a firearm. It was not fired by the firearm used to fire the cartridge cases marked E-1 to E-3, E-5, E-6 and E-7, described in Items 1, 3, 4 and 5 respectively. 3. The cartridge case marked E-5, described in Item 3 and the cartridge case marked E-7, described in Item 5, are 9mm Luger caliber and were fired by the same firearm.
P6GXTD	1. Examinations showed the questioned expended cartridge case in Item 4 was discharged within the same firearm as the known expended cartridge cases in Item 1. 2. Examinations showed the questioned expended cartridge cases in Items 2, 3 and 5 were not discharged



TABLE 2

WebCode	Conclusions
	within the same firearm as the known expended cartridge cases in Item 1.
PAPFPK	The 9 mm Luger cartridge case (item 01-04) was fired in the Ruger pistol represented by the test fired cartridge cases (item 01-01). The 9 mm Luger cartridge case (item 01-02) was not fired in the Ruger pistol represented by the test fired 9 mm Luger cartridges cases (item 01-01) nor was it fired in the same firearm as the 9 mm Luger cartridge cases (items 01-03 and 01-05). These eliminations are due to differences in class characteristics. The 9 mm Luger cartridge cases (items 01-03 and 01-05) were not fired in the Ruger pistol represented by the test fired 9 mm Luger cartridges cases (item 01-01). This elimination is due to significant differences in individual characteristics. The 9 mm Luger cartridge cases (items 01-03 and 01-05) were fired in a single unknown firearm.
PLDP6Y	Item #4 was fired in the same firearm as Items #1A, #1B, and #1C. Items #3 and #5 were fired both fired in a second unknown firearm. Item #2 was fired in a third unknown firearm.
PMBVTK	Item 1: The three fired cartridge cases (1-01-AA) were identified as having been fired in the same firearm due to consistent and repeatable marks. These three fired cartridge cases were submitted as known test fires (reportedly created in a 9mm caliber Ruger model SR9C semiautomatic pistol, serial number not provided) and were to be used for comparisons. Item 2: The fired cartridge case was eliminated as having been fired in the same firearm as the three other fired cartridge cases (1-03-AA - 1-05-AA) and from the three fired cartridge cases submitted as test fires (1-01-AA) due to differences in class characteristics. Item 3 and 5: The two fired cartridge cases (1-03-AA and 1-05-AA) were identified as having been fired in the same firearm due to consistent and repeatable marks. The two fired cartridge cases (1-03-AA and 1-05-AA) were not identified or eliminated as having been fired in the same firearm as one of the other fired cartridge cases (1-04-AA) or in the same firearm as the three fired cartridge cases submitted as test fires (1-01-AA) due to agreement in available class characteristics but a lack of consistent and repeatable individual marks. The two fired cartridge cases (1-03-AA and 1-05-AA) were eliminated as having been fired in the same firearm as one of the other fired cartridge cases (1-02-AA) due to differences in class characteristics. Item 4: The fired cartridge case was identified as having been fired in the same firearm as the three fired cartridge cases submitted as test fires (1-01-AA) due to consistent and repeatable marks. The fired cartridge case was not identified or eliminated as having been fired in the same firearm as two of the other submitted fired cartridge cases (1-03-AA and 1-05-AA) due to agreement in available class characteristics but a lack of consistent and repeatable individual marks. The fired cartridge case was eliminated as having been fired in the same one of the other fired cartridge cases (1-02-AA) due to differences in class characteristics.
PMVFEH	A microscopic examination and comparison of the evidence described above revealed the following: Test Fires (1.1-1.3) and Cartridge Casing (4) are identified as having been discharged from the above firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Casing (3) and Cartridge Casing (5) are identified as having been discharged from a second firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Casing (2) is identified as having been discharged from a third firearm based on the observed disagreement of class characteristics, when compared to cartridge casings (1.1-1.3,4) and (3, 5).
PNLQ6B	All cartridge cases are made by PMC in a 9 mm Luger caliber. For comparison between cartridge casings No. 1 and No. 4, embossing marks were observed from a central ignition pin. In firing pin impression, there are several specific concordant details. There is also concordant scrape marks from firing pin and from the hole around the firing pin on two sides of the firing pin impression. On the edge of the hole for the firing pin there are also concordant

TABLE 2

WebCode	Conclusions
	embossing marks. Around the edge of the bottom of the cartridge casings there are concordant parallel lines in two places (across from each other). A concordant gouge mark is also present.
PQB4YF	Item 4 was fired in the same firearm as the item 1 test fires. Item 2 was fired in a second firearm. Items 3 and 5 were fired in a third firearm.
PRA8TQ	The fired cartridge cases from items 1 and 4 were each fired in the same firearm. The fired cartridge cases from items 3 and 5 were both fired in the same firearm as each other but not the same firearm that fired items 1 and 4. The fired cartridge case from item 2 was not fired in either of the firearms used to fire items 1, 3, 4, and 5.
PW39RJ	Item #4 was fired by the firearm in Item #1. Items #3 and #5 were fired in the same firearm. Item #2 is suitable for further microscopic comparison. Item #2 was not fired by the firearm in Item #1 or in the same firearm as Items #3 and #5. Items #3 and #5 were not fired by the firearm in Item #1.
Q2CNYM	The Item 4 fired cartridge case was fired in the same firearm that fired the Item 1 test fired cartridge cases. This identification is based on sufficient agreement of the combination of individual characteristics and all discernible class characteristics. The Item 3 and Item 5 fired cartridge cases were fired in the same unknown firearm. This identification is based on sufficient agreement of the combination of individual characteristics and all discernible class characteristics. Item 3 and Item 5 were not fired in the same firearm that fired Item 1 and Item 4. These eliminations are based on differences in class characteristics (breechface marks and firing pin aperture shape). The Item 2 fired cartridge case was not fired in the same firearm that fired Item 1 and Item 4, and was not fired in the same firearm that fired Item 3 and Item 5. These eliminations are based on differences in class characteristics (breechface marks and firing pin impressions). Note: based on the evidence received, at least three firearms are involved.
Q4XF3C	The Item #2 cartridge case was not fired in the same firearm as the TF1 through TF3 cartridge cases, the Item #4 cartridge case, or the Item #3 and #5 cartridge cases. The Item #3 and Item #5 cartridge cases were fired in the same firearm, but not in the firearm that fired the TF1 through TF3 cartridge cases or the Item #4 cartridge case. The Item #4 cartridge case was fired in the same firearm as the TF1 through TF3 cartridge cases.
Q7W39L	SUMMARY/RESULTS: The four 9mm Luger cartridge cases from the scene (items 2 through 5) were fired in three different firearms. One of the 9mm Luger cartridge cases from the scene (Item 4) was fired in the 9mm Luger pistol seized from the suspect (Item 1). Two of the 9mm Luger cartridge cases from the scene (items 3 and 5) were fired in the same firearm as each other; however, they were not fired in the 9mm Luger pistol seized from the suspect (Item 1), or from the same firearm as the remaining 9mm Luger cartridge case from the scene (Item 2). EXAMINATION: The four 9mm Luger cartridge cases from the scene (items 2 through 5) were microscopically compared to the three cartridge cases fired from the suspect's firearm (Item 1). One of the 9mm Luger cartridge cases from the scene (Item 4) was identified as being fired in the 9mm Luger pistol seized from the suspect (Item 1) based on sufficient corresponding individual characteristics observed in firing pin aperture shear marks. Two of the 9mm Luger cartridge cases from the scene (items 3 and 5) were identified as being fired from the same firearm as each other, based on sufficient corresponding individual characteristics observed in firing pin aperture shear marks. Items 3 and 5 were eliminated from being fired in Item 1 and from being fired in the same firearm that fired Item 2, based on class characteristic differences observed.
QA6784	Items #01.01-#01.05: The three known expended casings and the four questioned expended casings were originally components of PMC brand 9mm caliber cartridges. Microscopic

TABLE 2

WebCode	Conclusions
	<p>examination and comparison of the three submitted known expended casings (Item #01.01) and the four submitted questioned expended casings (Items #01.02, #01.03, #01.04, and #01.05) revealed the following: he three questioned expended casings Items #01.02, #01.03 and #01.05 each revealed sufficient disagreement of individual and class characteristics to conclude that they had not been fired in the suspect weapon that fired Item #01.01. The questioned expended casing Item #01.02 revealed sufficient disagreement of individual and class characteristics to conclude that it had not been fired in the weapon that fired items #01.03, and #01.05; but rather in a second (unknown) weapon. he two questioned expended casings Items #01.03 and #01.05 revealed sufficient agreement of individual characteristics that they had been fired in the same weapon; a third (unknown) weapon. The questioned expended casing Item #01.04 revealed sufficient agreement of individual characteristics to conclude that it had been fired in the suspect weapon that fired Item #01.01.</p>
QC9WF4	<p>Casing O (Item 4) was fired in the same firearm that fired Item 1. Casings N (Item 3) and P (Item 5) were fired in a second firearm. Casing M (Item 2) was fired in a third firearm.</p>
QLC2DM	<p>The c/cases mentioned in 3.1 marked R9CTC1A, R9CTC1B, R9CTC1C and 3.2 marked 300848/17A4 were fired in the same firearm. The c/cases mentioned in 3.2 marked 300848/17A3 and 3000848/17A5 were fired in the second firearm. The c/cases mentioned in 3.2 marked 300848/17A2 was fired in third firearm.</p>
QMQL9H	<p>I microscopically compared Item 1 and Item 4 to each other. I identified Items 1 and 4 as being fired in the same firearm based on sufficient agreement of individual characteristics within the firing pin aperture sheer and firing pin aperture marks. I microscopically compared Item 3 and Item 5 to each other. I identified Items 3 and 5 as being fired in a second firearm based on sufficient agreement of individual characteristics within the firing pin aperture, breech face and chamber marks. Item 2 can be eliminated as being fired in the same firearm as Item 1 and Item 3 based on different class characteristics.</p>
QNLXEJ	<p>The cartridge case in Item #4 was fired in the same firearm as Item #1. The cartridge case in Item #2 was not fired in the same firearm as Item #1. The cartridge cases in Items #3 and #5 could not be identified or eliminated as having been fired in the same firearm as Item #1.</p>
QTFUY4	<p>The three fired cartridge cases (Exhibit 1) were microscopically compared to each other. One of these cartridge cases was compared to the submitted fired cartridge cases (Exhibits 2, 3, 4, and 5). Based on a disagreement of class characteristics, Exhibits 2, 3 and 5 were not fired in the same firearm as Exhibit 1. Based on an agreement of class characteristics and sufficient agreement of individual characteristics, Exhibit 4 was fired in the same firearm as Exhibit 1. Based on an agreement of class characteristics and sufficient agreement of individual characteristics, Exhibit 3 was fired in the same firearm as Exhibit 5. Based on a disagreement of class characteristics, Exhibit 2 was not fired in the same firearm as Exhibits 3 and 5.</p>
QVH2XL	<p>Sufficient agreement of class and individual characteristics confirmed the item 4 expended cartridge case was fired in the same firearm as the item 1 test standards. Sufficient disagreements of class and individual characteristics confirmed the item 2, 3, and 5 expended cartridge cases were not fired in the same firearm as the item 1 test standards.</p>
QX7DWR	<p>After a microscopic comparison we are satisfied that the firing detail present on cartridges 1 and cartridge 4 indicates they were fired from the same weapon. The firing detail present on cartridges 3 and 5 indicates that they were fired in the same weapon, but a different weapon from cartridges 1 and 4. The firing detail present on cartridge 2 indicates it was fired in a third weapon, different form the two weapons above.</p>
QX9ZCK	<p>The four individually packaged cartridge cases (items #2, #3, #4, #5) were microscopically</p>

TABLE 2

WebCode	Conclusions
	compared to one another and to the test fired cartridge cases in item #1. Item #4 was identified as having been fired from the firearm used to produce the test fired cases in item #1. Items #2, #3, and #5 were all eliminated as having been fired from this firearm based on dissimilarities in the markings. An intercomparison of items #2, #3, and #5 identified items #3 and #5 as having been fired from a second unknown firearm, and item #2 fired from a third unknown firearm.
QY84A2	[No Conclusions Reported.]
QYLUT7	On the basis of the trace conformities of the reference ammunition supplied under "Item 1" in the investigation, the cartridge case, which is marked with "Item 4", is certain that the supplied cartridge case, which was found at the scene and marked "Item 4", was fired in the suspect's weapon. The cartridge cases marked with "Item 2", "Item 3" and "Item 5" have characteristics that exclude firing from the suspect's weapon. The cartridge cases marked "Item 3" and "Item 5" are components of cartridge ammunition that has been fired from a pistol with similar system tracks, but not from the suspect's. The cartridge case marked "Item 2" was fired in another pistol; it has different system tracks.
R2PPBM	The bullet cases marked as Item 2, Item 3 and Item 5 are not uniprocidents with questioned bullet case marked as Item 1. The bullet case marked as Item 4 is uniprocident with questioned bullet case marked as Item 1.
R3F2VE	The cartridge cases Exhibits 1 and 4 were identified as having been fired in a single firearm. The cartridge cases Exhibits 3 and 5 were identified as having been fired in a single firearm. They were not fired in the same firearm as Exhibits 1 and 4. The cartridge case Exhibit 2 was not fired in the same firearm as Exhibits 1 and 4 nor was it fired in the same firearm as Exhibits 3 and 5.
R48WNP	a) The test cartridge cases marked 926TC1A to 926TC1C are positive to cartridge case marked 300926/17 (4), or were fired in the first firearm. b) The cartridge cases marked 300926/17 (3) and 300926/17 (5) were fired in a second firearm. c) The cartridge case marked 300926/17 (2) was fired in a third firearm.
RD33EA	1. Examinations showed Item 4 was discharged within the same firearm as Item 1. 2. Examinations showed Items 2, 3, and 5 were not discharged within the same firearm as Item 1.
RECWAA	The Exhibit #2, #3, #4 and #5 cartridge cases were microscopically compared to each other and to the Exhibit #TF1, #TF2 and #TF3 test fires. Exhibit #4 was fired in the same firearm as Exhibits #TF1, #TF2 and #TF3. Exhibit #2 was fired in an unknown firearm. Exhibits #3 and #5 were fired in a second unknown firearm.
RHFVEZ	As a result of my examination, I formed the following opinions: 1. The discharged cartridge case listed as item 4 had been discharged in the exhibit Ruger pistol. 2. The discharged cartridge cases listed as items 2, 3 and 5 had not been discharged in the exhibit Ruger pistol. 3. The discharged cartridge cases listed as items 3 and 5 had been discharged in the same firearm. 4. The discharged cartridge case listed as item 2 had not been discharged in the same firearm that discharged the cartridge cases listed as items 3 and 5.
RKHJ8	Comparison microscope examinations were conducted on the evidence listed above. The findings of this examiner are the following: 1. Item 4 was found to have been fired from the same firearm as Item 1 based on class and individual characteristics. 2. Item 3 and Item 5 were fired in a second firearm based on class and individual characteristics. Suspect weapons include 9mm Ruger pistols; however, any suspect weapon should be submitted to the laboratory for analysis. 3. Item 2 was fired in a third firearm based on differences in class

TABLE 2

WebCode	Conclusions
	characteristics. Suspect weapons include 9mm Hi-Point pistols; however, any suspect weapon should be submitted to the laboratory for analysis.
RM66VZ	Tests from Item 1 and Item 4, fired cartridge case, were compared microscopically with each other. There is agreement of all discernable class characteristics and sufficient agreement of individual characteristics for identification. Item 4 was fired in Item 1. Items 3 and 5, fired cartridge cases, were compared microscopically with each other. There is agreement of all discernable class characteristics and sufficient agreement of individual characteristics for identification. They were fired in the same firearm. They are eliminated as having been fired in Item 1 due to differing class characteristics. Item 2 eliminated as having been fired in Item 1 and the same firearm as Item 3 due to differing class characteristics.
RUMQN6	Item 4 was identified microscopically as having been fired in the same firearm as the test fires retained under this case number, referencing Item 1, based on agreement of the combination of individual characteristics and all class characteristics. Items 3 and 5 were identified microscopically as having been fired in the same unknown firearm based on agreement of the combination of individual char. and all discernible class char. Items 3 and 5 were eliminated as having been fired in the same firearm as the test fires retained under this case number, referencing Item 1, due to disagreement of individual char. Item 2 was eliminated as having been fired in the same firearm as the test fires retained under this case number, referencing Item 1, or from the same unknown firearm as Items 3 and 5, due to disagreement of discernible class characteristics.
T23U9C	Item 4 was fired in the same firearm as the item 1 test fires. Item 2 was fired in a second firearm. Items 3 and 5 were fired in a third firearm.
T2GA7L	C/c marked 316625/17 4 was fired with tests marked TC1A, TC1B and TC1C. #B/F. C/c marked 316625/17 2 was fired in the second firearm. C/cs marked 316625/17 3 & 5 were fired in the third firearm. #B/F.
T4LYBF	2.1 The cartridge cases marked 713TC1-TC3 (Item 1) were fired in the same firearm with cartridge case Item 4 marked by me 339713/17A3 & A4 breech face marks correspond. (1st firearm). 2.2 The cartridge cases marked by me 339713/17A3 & A5 (Item 3 & Item 5) were fired in the same firearm breech face marks correspond (2nd firearm). 2.3 Cartridge case marked by me 339713/17A2 (Item 2) was fired in a 3rd firearm.
T86TVV	The one (1) fired 9mm Luger cartridge case, item 4, was microscopically compared to the cartridge cases reported as having been previously test fired in the Ruger pistol, item 1. These comparisons revealed matching individual breechface characteristics, confirming that the one (1) fired 9mm Luger cartridge case, item 4, was fired in the Ruger pistol, item 1. The one (1) fired 9mm Luger cartridge case, item 2, was microscopically compared to the cartridge cases reported as having been previously test fired in the Ruger pistol, item 1. These comparisons revealed dissimilar class characteristics (breechface and firing pin styles), confirming that the one (1) fired 9mm Luger cartridge case, item 2, is excluded as having been fired in the Ruger pistol, item 1. The two (2) fired 9mm Luger cartridge cases, items 3 and 5, were microscopically compared to the cartridge cases reported as having been previously test fired in the Ruger pistol, item 1. These comparisons revealed grossly dissimilar individual characteristics, confirming that the two (2) fired 9mm Luger cartridge cases, items 3 and 5, are excluded as having been fired in the Ruger pistol, item 1. The two (2) fired 9mm Luger cartridge cases, items 3 and 5, were microscopically compared to each other. These comparisons revealed matching individual breechface characteristics, confirming that the two (2) fired 9mm Luger cartridge cases, items 3 and 5, were fired in the same firearm. The one (1) fired 9mm Luger cartridge case, item 2, was microscopically compared to the two (2) fired

TABLE 2

WebCode	Conclusions
	9mm Luger cartridge cases, items 3 and 5. These comparisons revealed dissimilar class characteristics (breachface and firing pin styles), confirming that the one (1) fired 9mm Luger cartridge case, item 2, is excluded as having been fired in the same firearm as the two (2) fired 9mm Luger cartridge cases, items 3 and 5.
T8R9UX	[No Conclusions Reported.]
T9HCN6	RESULTS OF FIREARMS / TOOLMARKS EXAMINATION BY: [Name]: 1 vs. 4: The one (1) fired PMC 9mm Luger cartridge case (Item 4) was identified as having been fired in the same firearm as the test fired cartridge cases (Item 1). 3 vs. 5: The two (2) fired PMC 9mm Luger cartridge cases (Items 3 and 5) were identified as having been fired in the same firearm. The cartridge cases (Items 3 and 5) were not fired in the same firearm as the test fired cartridge cases (Item 1). 2 vs. 1,3,4,5: The one (1) fired PMC 9mm Luger cartridge case (Item 2) was not fired in the same firearm as the cartridge cases (Items 1, 3, 4 and 5).
T9JCGD	A microscopic examination and comparison of the evidence described above revealed the following: Cartridge Casing (4) and Cartridge Casings Test Fires (1.1 - 1.3) are identified as having been fired from the ABOVE firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Casing (3) and Cartridge Casing (5) are identified as having been fired from a SECOND firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Casing (2) is identified as having been fired from a THIRD firearm based on the observed disagreement of class characteristics, when compared to Cartridge Casing (3) and Cartridge Casings (1.1 - 1.3), and Cartridge Casing (4).
T9L2NV	Items 1 and 4 were fired in the same firearm based on matching class and individual characteristics, including matching aperture shearing and firing pin impression marks. Items 3 and 5 were fired in the same firearm based on matching class and individual characteristics, including matching aperture shearing and breachface impression marks. Items 3 and 5 were not fired in the same firearm as Items 1 and 4 based on significant differences of individual characteristics, including differences in breachface impression marks, aperture shearing and firing pin impression marks. Item 2 was not fired in the same firearm as Items 1, 3, 4 and 5 based on differences in class characteristics, including differences in breachface impression marks and firing pin impression marks.
TB2HVE	The cartridge cases marked as 1,1,1 and 4 were fired in one firearm. The cartridge cases marked as 3 and 5 were fired in a second firearm. The cartridge case marked 2 was fired in a third firearm.
TFQPU4	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 expended cartridge case was discharged from the firearm at the source of the control expended cases as opposed to another unknown firearm. In the present case, we reached the following conclusions: The observations provide strong support for the view that both the expended cartridge case under Item 3 and Item 5 were discharged from another unknown firearm, rather than by the firearm at the source of the control expended cases under Item 1. By strong support, we mean that the observations are about 4000 times more likely if the cartridge cases were discharged from another unknown firearm. Regarding the expended cartridge case under Item 4, the observations provide extremely strong support for the view that this expended cartridge was discharged from the firearm at the source of the control expended cases under Item 1, rather than by another unknown firearm. The observations are then about 1'700'000 times more likely if the cartridge cases were discharged from the same firearms as the cases under Item 1, rather than by another unknown firearm. The expended cartridge case



TABLE 2

WebCode	Conclusions
	under Item 2 cannot have been discharged from the same firearm as the one under Item 1 due to differences observed in terms of class characteristics (breech face and firing pin shapes).
TJMHH8	The cartridge case in Item 4 was found upon microscopic comparison to have been discharged in the same firearm as the cartridge cases in Item 1 based on an agreement of class and individual characteristics. The cartridge cases in Items 2, 3 and 5 were found upon microscopic comparison to have not been discharged in the same firearm as the cartridge cases in Item 1 based on differences of class and individual characteristics. The cartridge cases in Items 3 and 5 were found upon microscopic comparison to have been discharged in the same firearm based on an agreement of class and individual characteristics.
TQ24QB	Item 1 - Three spent 9mm caliber "PMC" cartridge cases, reportedly discharged by a 9mm caliber Ruger SR9C pistol. Item 4 - One spent 9mm caliber "PMC" cartridge case. The cartridge cases matched each other and were discharged by the same firearm. Item 3 - One spent 9mm caliber "PMC" cartridge case. Item 5 - One spent 9mm caliber "PMC" cartridge case. The cartridge cases matched each other and were discharged by the same firearm. The cartridge cases were eliminated as having been discharged by the same firearm that discharged the Item 1 and 4 cartridge cases. 2 One spent 9mm caliber "PMC" cartridge case. The cartridge case was eliminated as having been discharged by the same firearms that discharged the Item 1, 3, 4, and 5 cartridge cases. NOTE: The identifications in this report were based on the agreement of individual characteristics observed during the microscopic comparisons. The eliminations were based on the disagreement of class and/or individual characteristics observed during the microscopic comparisons.
TQL3LN	The four 9mm Luger caliber cartridge cases recovered from the scene (Items 2, 3, 4, 5) were examined and found to have been fired by three firearms. I compared the test fired cartridge cases from the Ruger SR9C pistol (Item 1) to the cartridge case (Item 4) and the same class of firearm produced marks and sufficient corresponding individual microscopic marks were found. The Ruger pistol (Item 1) fired the cartridge case (Item 4). Items 3 and 5 had the same class of firearm produced marks and sufficient individual microscopic marks to conclude that they were fired by a single firearm, but eliminated from having been fired by the Ruger pistol (Item 1). Item 2 had different class marks than the other items 1, 3, 4, 5 and was fired by a different firearm.
TQXXV9	Only item 4 expended cartridge case were fired from the firearm(A) which was used to fire item 1 expended cartridge cases. Item 2, 3, 5 expended cartridge cases were not fired from that pistol. Besides, item 3, 5 expended cartridge cases were fired from the same firearm(B) which was different from that used to fire item 1 expended cartridge cases. Item 2 expended cartridge case were fired from the other firearm(C) which was different from item 3, 5.
TQZDE2	The fired cartridge case, item #4, was microscopically identified as having been fired in the test fired firearm which fired item #1. The fired cartridge cases; items #3 and #5, were microscopically identified as having been fired in the same unknown 9mm Luger firearm. These cartridge cases can be eliminated from having been fired in the firearm which fired item #1 and item #4. The fired cartridge case, item #2, can be eliminated from having been fired in the same unknown firearm which fired items #3 and #5 and the firearm which fired items #1 and #4.
TTFC3	Cartridge Case Analysis: Methodology - Comparison Microscopy: Item 4, the cartridge case, was fired in the same firearm as Items 1A, 1B and 1C, the cartridge cases identified to test fired in the suspect's firearm, based upon corresponding class and individual microscopic characteristics. A reference from this group will be entered into NIBIN. Items 3 and 5, the cartridge cases, were fired in the same firearm based upon corresponding class and individual

TABLE 2

WebCode	Conclusions
	microscopic characteristics. A reference from this group will be entered into NIBIN. Items 1A, 1B, 1C and 4, the cartridge cases, were not fired in same firearm as Item 2, the cartridge case, based upon different individual microscopic characteristics. Items 1A, 1B, 1C and 4, the cartridge cases, were not fired in same firearm as Items 3 and 5, the cartridge cases, based upon different class and individual microscopic characteristics. Items 3 and 5, the cartridge cases, were not fired in same firearm as Item 2, the cartridge case, based upon different individual microscopic characteristics. NIBIN: Item 2, the cartridge case, will be entered into NIBIN. The results of NIBIN entries and searches will be the subject of a separate report.
U6XY8A	Three firearms were used to fire the recovered cartridge cases: One of the recovered cartridge cases, CTS Item 4 (Lab Item 1-4), was fired from the suspect's pistol, CTS Item 1 (Lab Items 1-1A through 1-1C). Two of the recovered cartridge cases, CTS Items 3 and 5 (Lab Items 1-3 and 1-5), were fired from the same unknown firearm.
U8KDWK	Item 4 was fired from the gun that fired Item 1. Items 3 and 5 were fired from a second gun. Item 2 was fired by a third gun.
UCTWVC	I examined cartridge cases marked Item 1-5 and compared the individual and class characteristics markings on them using comparison microscope and found that there were fired in different firearms as follows: 2.1 The cartridge cases marked Item 4 (questioned) was fired in the same firearm with cartridge cases marked Item 1 (fired from suspect weapon). 2.2 The cartridge cases marked Item (3 and 5) were fired in the same firearm (2nd firearm). 2.3 The cartridge case marked Item 2 was not fired in the same firearms with cartridge cases mentioned in 2.1 and 2.2.
UE6HZ7	Items 1 through 5 are seven (7) fired 9mm Luger caliber cartridge cases, PMC brand. Item 1 and 4 were identified as having been fired in the same firearm. Item 3 and Item 5 were identified as having been fired in the same firearm, firearm not submitted. Item 2 was eliminated as having been fired in the same firearm as the Item 1 group and the Item 3 group firearms.
UEZGJD	2.1 The cartridge cases marked 3 & 5 were fired in the same firearm (1st firearm). 2.2 The cartridge cases marked 4,T1-T3 were fired in the same firearm (2nd firearm). 2.3 The cartridge case marked 2 was not fired in the firearm that fired the cartridge cases mentioned in 2.1 & 2.2.
UFFGWZ	Item 4 was fired in the same firearm as Item 1 (identification). This conclusion was verified by Firearms Examiner [name]. Items 2, 3 and 5 were not fired in the same firearm as Item 1 (elimination). This conclusion was verified by Firearms Examiner [name]. Items 3 and 5 were fired in the same firearm (identification). This conclusion was verified by Firearms Examiner [name]. Item 2 was not fired in the same firearm as Items 3 and 5 (elimination). This conclusion was verified by Firearms Examiner [name]. For additional clarification regarding conclusion statements, please contact the Firearms Section or go to [website]. Items 2, 3 and 5 could have been fired in two 9mm Luger firearms of the following manufacture: (Manufacturers List). Manufacturers lists are investigative tools and are not intended to be all-inclusive. Any suspect firearms should be submitted for comparison.
UHMPFT	The cartridge case, item # 4, has been fired from the suspect's weapon. The cartridge cases, items # 2,3 and 5, have not been fired from the suspect's weapon. The cartridge cases, items # 3 and 5, have been fired from the same weapon.
UJHA3R	Item #4 was fired by the 9mm Luger cal Ruger pistol based on the agreement of class characteristics and pattern of sufficient corresponding individual characteristics. Item #3 & 5 were both fired by one gun not the 9mm Luger cal Ruger pistol based on the agreement of



TABLE 2

WebCode	Conclusions
	class characteristics and patterns of sufficient corresponding individual characteristics. Item #2, 3 & 5 are eliminated from being fired from the 9mm Ruger pistol based on the disagreement of individual characteristics
UL2N7T	The evidence in items 1 through 5 was analyzed by physical and microscopic examination. The fired 9mm cartridge case in item 4 was determined to have been fired in the same weapon as the three (3) known fired 9mm cartridge cases in item 1. The three (3) fired 9mm cartridge cases in items 2, 3, and 5 were determined not to have been fired in the same weapon as the three (3) known fired 9mm cartridge cases in item 1. The two (2) fired 9mm cartridge cases in items 3 and 5 were fired in one weapon, and the fired 9mm cartridge case in item 2 was fired in a different weapon than the two (2) fired 9mm cartridge cases in items 3 and 5. Further analysis of the three (3) fired 9mm cartridge cases in items 2, 3, and 5 is pending submission of two (2) weapons for additional comparison.
UNCGA8	Examinations showed that Item 4 was discharged within the same firearm as Item 1. Examinations showed that Items 2,3, and 5 were not discharged within the same firearm as Item 1.
UV874Q	A- The cartridge cases described in items 1 and 4, are 9mm Luger caliber and were fired by the same firearm. B- The cartridge case described in item 2, is 9mm Luger caliber and was fired by a firearm. C- The cartridge case described in item 2, is 9mm Luger caliber and was not fired by the firearm used to fire the cartridge cases described in items 1 and 4. D- The cartridge case described in item 2, is 9mm Luger caliber and was not fired by the firearm used to fire the cartridge cases described in items 3 and 5. E- The cartridge cases described in items 3 and 5, are 9mm Luger caliber and were fired by the same firearm.
UZ4TXE	A microscopic examination and comparison of evidence described above revealed the following: Cartridge casing(4)and test fires (1.1 - 1.3) are identified as having been discharged in the SAME firearm based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge casings (3, 5) are identified as having been discharged in a SECOND gun based on the observed agreement of their individual characteristics. Cartridge casing (2) is identified as having been discharged in a THIRD gun based on the observed disagreement of class and individual characteristics as compared to the test fires (1.1 - 1.3), cartridge casings (4) and cartridge casings (3, 5).
V4KJT2	The results of the examination extremely strongly support that Item 4 have been fired in the same firearm as the known cartridge cases (Item 1), (Level +4). The results of the examination extremely strongly support that Item 2, Item 3 and Item 5 was not fired in the same firearm (Level -4).
V6EFVF	Opinions and Interpretations: Item #1(three PMC 9mm Luger fired cartridge cases from Ruger pistol) was examined and microscopically compared on 06/07/2017. Based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics, Item #4 (one PMC 9mm Luger fired cartridge case) was positively identified as having been fired in Item #1 (Ruger pistol). Item #2 (one PMC 9mm Luger fired cartridge case) was examined and microscopically compared on 06/07/2017. Based upon significant disagreement of discernible class characteristics and individual characteristics, Item #2 (fired cartridge case) was eliminated as having been fired in Item #1 (Ruger pistol). Based upon significant disagreement of discernible class characteristics and individual characteristics, Item #2 (fired cartridge case) was eliminated as having been fired in the same firearm as Item #5 (fired cartridge case). Item #3 (one PMC 9mm Luger fired cartridge case) was examined and microscopically compared on 06/07/2017. Based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics, Item #3 (fired cartridge case) was positively identified

TABLE 2

WebCode	Conclusions
	<p>as having been fired in the same firearm as Item #5 (fired cartridge case). Item #4 (one PMC 9mm Luger fired cartridge case) was examined and microscopically compared on 06/07/2017. Based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics, Item #4 (one PMC 9mm Luger fired cartridge case) was positively identified as having been fired in Item #1 (Ruger pistol). Item #5 (one PMC 9mm Luger fired cartridge case) was examined and microscopically compared on 06/07/2017. Based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics, Item #5 (fired cartridge case) was positively identified as having been fired in the same firearm as Item #3 (fired cartridge case).</p>
V6PC88	<p>I examined item 1, the three test-fired cartridge cases from the Ruger pistol, and found the individual marks to be reproducible and sufficient for identification. I microscopically compared item 2, a fired cartridge case, to a test-fired cartridge case. I found a class difference in the type of firing pin marks and breechface marks. I concluded item 2 was not fired in the same firearm as the test-fired cartridge cases (item 1). I microscopically compared items 3 and 5, two fired cartridge cases, to a test-fired cartridge case. I found sufficient disagreement in the individual characteristics of the firing pin aperture shear marks and the firing pin impression marks to conclude that items 3 and 5 were not fired in the same firearm as the test-fired cartridge cases (item 1). I microscopically compared items 3 and 5 to each other and found sufficient agreement for identification in the individual marks, including firing pin aperture shear marks. I concluded that the same, unknown firearm fired both items 3 and 5. I microscopically compared item 4, a fired cartridge case, to a test-fired cartridge case. I found sufficient agreement in the individual characteristics of the firing pin aperture shear marks and the firing pin impression marks to conclude that item 4 was fired in the same firearm as the test-fired cartridge cases (item 1). Strength of Associations Made in the Identification of Firearm-Produced Toolmarks: The identification of the cartridge cases described above 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 likelihood another firearm could have made the questioned mark is so remote as to be considered a practical impossibility.</p>
V797ZV	<p>Exhibits 2 through 5 are 9mm Luger caliber cartridge cases. Exhibits 1 through 5 were microscopically examined with the following results: Exhibit 4 was identified as having been fired in the Exhibit 1 firearm. Exhibits 3 and 5 were identified as having been fired in the same firearm, but not in the Exhibit 1 firearm. Exhibit 2 was eliminated as having been fired in both the Exhibit 1 firearm and the firearm that fired Exhibits 3 and 5.</p>
V8GBL7	<p>The cartridge cases, Items 1 to 5, inclusive, had been fired in three (3) different firearms. 1. The cartridge cases, Items 1 and 4, had been fired in the same firearm. 2. The cartridge cases, Items 3 and 5, had been fired in a second firearm. 3. The cartridge case, Item 2, had been fired in a third firearm.</p>
VA7MB4	<p>1. Exhibits 2, 3, 4 and 5 (four 9mm Luger PMC brand cartridge cases) were visually examined and microscopically compared to Exhibit 1 (three test-fired cartridge cases, from a Ruger SR9C 9mm caliber pistol). 2. Microscopic comparison disclosed the following: a. Exhibit 4 was fired in the same firearm as Exhibit 1 (test fires). b. Exhibit 3 and Exhibit 5 were fired in the same firearm, however they were not fired in the same firearm as Exhibit 1 (test fires). c. Exhibit 2 was not fired in the same firearm as Exhibit 1 (test fires) nor the same firearm as Exhibits 3 and 5.</p>
VGHVMD	<p>Item 2, 3, 4 and 5 were marked by the lab number 339624/17 A (2, 3, 4 &amp; 5) as on exhibits and the tests were marked as TB1, TC1 &amp; TA1 which were Item 1. Therefore Item 4 marked as 339624/17 A4 was fired in the firearm with serial number SR9C Ruger (which has the tests</p>

TABLE 2

WebCode	Conclusions
	<p>marked (TA1, TB1 and TC1) breech face marks corresponds. Item 3 &amp; Item 5 (marked 339624/17 A3 &amp; A5) were fired in the same firearm (2nd firearm) and Item 2 marked 339624/17 A2 was fired in different f/a which is 3rd firearm.</p>
VHF7K2	<p>Item 001-04 was identified as having been fired from the same firearm as the test fired cartridge cases from item 001-01. Item 001-03 and 001-05 were identified as having been fired from the same unknown firearm, therefore eliminating them from being fired from the firearm used to create test fires in Item 001-01. Item 001-02 has similar class characteristics but no Individual characteristics similar to the firearm in 001-01/001-04 or the unknown firearm in 001-03/001-05; therefore eliminating it from being fired in either of those firearms.</p>
VJVFJU	<p>The below listed spent cartridge case was microscopically examined and compared with test cartridge cases fired by the Ruger 9mm luger pistol, Item# 1, PR# [number], Lab Evidence # 001-A1. Numerous corresponding individual characteristics were observed. Therefore, it is my opinion that the below listed spent cartridge case was fired by this firearm. Lab Evidence # Property # Item # Item Description 001-A4 [number] 4 Spent PMC 9mm luger cartridge case The below listed spent cartridge cases were microscopically examined and compared with test cartridge cases fired by the Ruger 9mm luger pistol, Item# 1, PR# [number], Lab Evidence # 001-A1. It is my opinion that these items were not fired by this firearm. These spent cartridge cases were further microscopically examined and compared with each other. Numerous corresponding individual characteristics were observed. Therefore, it is my opinion that the below listed spent cartridge cases were fired by the same unknown firearm. Lab Evidence # Property # Item # Item Description 001-A3 [number] 3 Spent PMC 9mm luger cartridge case 001-A5 [number] 5 Spent PMC 9mm luger cartridge case The below listed spent cartridge case was microscopically examined and compared with test cartridge cases fired by the Ruger 9mm luger pistol, Item# 1, PR# [number], Lab Evidence # 001-A1 and also the aforementioned spent cartridge cases, Lab Evidence# 001-A3 and 001-A5. It is my opinion that this spent cartridge case was not fired by the Ruger 9mm luger pistol, Lab Evidence# 001-A1, nor the same firearm that fired the spent cartridge cases, Lab Evidence# 001-A3 and 001-A5. Lab Evidence # Property # Item # Item Description 001-A2 [number] 2 Spent PMC 9mm luger cartridge case. [Participant submitted data in a format that could not be reproduced in this report].</p>
VQFA47	<p>The scene cartridge cases (Lab Items 2, 3, 4 and 5) were examined and microscopically inter-compared to each other and to the test fired cartridge cases from the suspect's firearm (Lab Item 1). Based on these examinations, the following was determined: One cartridge case (Lab Item 4) was identified as having been fired in the suspect's firearm. Two cartridge cases (3 and 5) were identified as having been fired in the same firearm, but eliminated as having been fired in the suspect's firearm. One cartridge case (Lab Item 2) was eliminated as having been fired in the same firearm as items 3 and 5, as well as the suspect's firearm. The scene cartridge cases represent three guns.</p>
VR6MGH	<p>The Exhibit 4 cartridge case was identified as having been fired in the same firearm as the Exhibit 1C cartridge case. The Exhibit 2 cartridge case was not fired in the same firearm as Exhibits 1 and 4. The Exhibit 3 and 5 cartridge cases were identified as having been fired in the same unknown firearm. Exhibits 3 and 5 were not fired in the same firearm as Exhibits 1 or 4, or from the same unknown firearm as Exhibit 2.</p>
VRCPF3	<p>Item 4 was fired in the same firearm as Item 1 (identification). This conclusion was verified by Firearms Examiner (name). Item 3 and Item 5 were not fired in the same firearm as Item 1 (elimination). This conclusion was verified by Firearms Examiner (name). Item 3 and Item 5 were fired in the same firearm (identification). This conclusion was verified by Firearms Examiner (name). Item 2 was not fired in the same firearm as Item 1 or as Items 3 &amp; 5</p>

TABLE 2

WebCode	Conclusions
	(elimination). This conclusion was verified by Firearms Examiner (name).
WMUVJ	Based on microscopic comparison of the four cartridge cases recovered at the scene, three firearms were used. One of the cartridge cases collected at the scene (Item 4) was fired in the Ruger SR9C pistol; two cartridge cases (Items 3 and 5) were fired in a second gun; and the fourth cartridge (Item 2) was fired in a third gun.
VXBC3W	Item 1 (three 9mm Luger caliber cartridge case) and Item 4 (one 9mm Luger caliber cartridge case) were fired by the same firearm. Item 1 was fired by a different firearm than Items 2, 3 and 5 (three 9mm Luger caliber cartridge cases). Items 3 and 5 were fired by the same firearm. Items 3 and 5 were fired by a different firearm than Item 2.
VZZPLE	I microscopically compared Items 1A, 1B, and 1C to Item 4. I identified Item 4 as having been fired in the same firearm as Items 1A, 1B, and 1C based on sufficient agreement of individual characteristics within the firing pin impression as well as the firing pin aperture shear, ejector, and chamber marks. I microscopically compared Items 3 and 5 to each other. I identified Items 3 and 5 as having been fired in a second firearm based on sufficient agreement within the firing pin impression, as well as the firing pin aperture shear and breech face marks. I identified Item 2 as having been fired in a third firearm based on significant differences within the breech face marks, firing pin aperture shear, and firing pin impression.
W24ZUN	The forensic laboratory, of the [agency], section of physics (firearm laboratory) performed the investigations of the items (sent by CTS) and came to the following results. The forensic material consists of in total 7 cartridge cases (9 mm Luger) with following description: Items 2-5: Four cartridge cases recovered at the crime scene (questioned). Item 1: Three cartridge cases fired using the suspect's handgun (known). Two of the cartridge cases (items 3 & 5) show matching coarse traces, they are caliber-identical. They don't show any matching detailed traces to item 1. The fired cartridge case item 4 shows correlating traces to the fired cartridge cases fired with the seized firearm (item 1). In conclusion, the carried out investigations showed, that cartridge case (item 4) was fired from the seized firearm (item 1). The cartridge cases (item 3&5) are matching but don't match the seized pistol. Item 2 shows different firearms characteristics and don't match the seized gun or item 3&5. Finally three different weapons were involved.
W2R23Z	Item 4 (001-4) was fired in the 9mm Ruger pistol, model SR9C, Item 1 (001-1 Test fires). Items 3 (001-3) and 5 (001-5) were fired in a second 9mm pistol. Item 2 (001-2) was fired in a third 9mm pistol.
W4Z3DY	I made an examination of the three test fired cartridge cases using a comparison microscope. This type of examination allows two objects to be viewed simultaneously so that microscopic marks left behind on the fired cartridge cases during discharge can be compared and assessed. This was done to determine which marks on the test fired cartridge cases replicates. I then performed a similar comparison between these test fired cartridge cases and the question fired cartridge cases, Item 2 to Item 5. As a result of this examination I formed the following opinion: Item 4 was discharged by the same firearm that discharged the test fired cartridge cases, Item 1. Item 3 and Item 5 were discharged by the same firearm however this firearm was a different firearm that discharged the test fired cartridge cases, Item 1. Item 2 was discharged by a third firearm.
W97UAP	1. The cartridge cases described in the Item 1 and the cartridge case described in the Item 4, are 9 mm Luger caliber and were fired by the same firearm. 2. The cartridge case described in the Item 3 and the cartridge case described in the item 5, are 9 mm Luger caliber and were fired by the same firearm. 3. The cartridge case described in the Item 2 is 9 mm Luger caliber and was fired by a firearm; it was not fired by the firearms that fired the cartridge cases described in the Items 1 and 4; 3 and 5.

TABLE 2

WebCode	Conclusions
WAGZ46	Items 1 and 4 were fired from the same firearm (9mm x19mm Ruger, model SR9C, weapon #1). Items 2, 3, and 5 were not fired from the same firearm as items 1, and 4. Items 3 and 5 were fired from the same firearm (9x19mm firearm, weapon #2 with similar class characteristic of weapon #1). Item 2 was not fired from the same firearm as items 3, and 5. Item 2 was fired from another firearm (9x19mm firearm, weapon #3).
WDBBEZ	Cartridge Case Analysis: Methodology - Comparison Microscopy: Item 4, the cartridge case, was fired in Item 1, the Ruger pistol, based upon corresponding class and individual microscopic characteristics. Items 3 and 5, the cartridge cases, were not fired in Item 1, the Ruger pistol, based upon different class and individual microscopic characteristics. Items 3 and 5, the cartridge cases, were fired in the same firearm based upon corresponding class and individual microscopic characteristics. A reference from this group will be entered into NIBIN. Item 2, the cartridge case, was not fired in Item 1, the Ruger pistol, based upon different class and individual microscopic characteristics. Item 2, the cartridge case, was not fired in the same firearm as Items 3 and 5, the cartridge cases, based upon different class and individual microscopic characteristics. Item 2, the cartridge case, will be entered into NIBIN.
WBHKKE	The Item 4 cartridge case was compared to the Item 1 test cartridge cases fired in the suspect firearm and was determined to have been fired in that firearm. The Item 3 and Item 5 cartridge cases were compared to each other and were determined to have been fired in the same firearm. Markings present on these cartridge cases are typical of those produced by semi-automatic firearms. The make and model of firearm that they were fired in could not be determined. The Item 3 and Item 5 cartridge cases were not fired in the firearm that fired the Item 1 cartridge cases, nor were they fired in the firearm that fired the Item 2 cartridge case due to differences in class and/or individual characteristics. The Item 2 cartridge case was not fired in the firearm that fired the Item 1 cartridge cases, nor was it fired in the firearm that fired the Item 3 and Item 5 cartridge cases due to differences in class and/or individual characteristics.
WCCBQT	[No Conclusions Reported.]
WEVKG7	Examinations showed Item 4 was discharged within the same firearm as Item 1. Examinations showed Item 2, Item 3, and Item 5 were not discharged within the same firearm as Item 1.
WGJY4V	[No Conclusions Reported.]
WK7LNV	1. The exhibit fired cartridge case listed as item 4 and was identified within the limits of practical certainty as having been fired in the same firearm as item 1, the exhibit Ruger SR9C 9mm Auto calibre pistol. 2. The exhibit fired cartridge cases listed as item 2, 3 and 5 were eliminated as having been fired in the same firearm as item 1, the exhibit Ruger SR9C 9mm Auto calibre pistol. 3. The exhibit fired cartridge cases listed as item 3 and item 5 were identified as having been fired in the same firearm that has not been recovered. 4. The exhibit fired cartridge case listed as item 2 has been fired in another firearm, also not recovered.
WLHB7L	Items #1A, #4: The Item #4 cartridge case was microscopically identified as having been fired in the Item #1A (test fire) firearm. Item #2: The cartridge case was not fired in the Item #1A (test fire) firearm. Item #3, #5: The cartridge cases were microscopically identified as having been fired in the same unknown firearm, but different firearms than the firearms that fired Item 1A (test fires) and Item #2.
WMMUX3	The cartridge cases in items 001-02 through 001-05 were examined in conjunction with each other and with the test fired cartridge cases in item 001-01. Based on these microscopic comparisons it was determined that: The cartridge case in item 001-04 was identified as

TABLE 2

WebCode	Conclusions
	having been fired in the same firearm as the cartridge cases in item 001-01. The cartridge cases in items 001-02, 001-03, and 001-05 were eliminated as having been fired in the same firearm as the cartridge cases in item 001-01. The cartridge cases in items 001-03 and 001-05 were identified as having been fired in the same unknown firearm. The cartridge case in item 001-02 was eliminated as having been fired in the same firearm as the cartridge cases in items 001-03 and 001-05.
WMVXN2	Item #1 was used for comparison purposes with Items #2, #3, #4, and #5. Item #2 was not fired in the firearm that fired Item #1. Items #3 and #5 were fired in the same firearm, which is not the same firearm that fired Items #1 (test dccc), #2, or #4. Item #4 was fired in the same firearm that fired Item #1.
WPCDKL	1. The fired cartridge cases marked from E-1 to E-3, described in Item 1 and the fired cartridge case marked E-6, described in Item 4, are 9mm caliber and were fired by the same firearm. 2. The fired cartridge case marked E-4, described in Item 2, is 9mm caliber and was fired by a firearm. 3. The fired cartridge case marked E-4, described in Item 2, is 9mm caliber and was not fired by the firearm used to discharge the fired cartridge cases marked from E-1 to E-3, described in Item 1, the fired cartridge case marked E-5, described in Item 3, the fired cartridge case marked E-6, described in Item 4 and the fired cartridge case marked E-7, described in Item 5. 4. The fired cartridge case marked E-5, described in Item 3 and the fired cartridge cases marked from E-7, described in Item 5, are 9mm caliber and were fired by the same firearm.
WTZLFG	The cartridge case in Submission 4 was fired in the gun that produced the test fires in Submission 1. The cartridge cases in Submissions 2, 3 and 5 were not fired in the gun that produced the test fires in Submission 1.
WU86WP	The Item 4 cartridge case is identified as having been fired in the same firearm in which the Item 1 cartridge cases were fired. The Item 3 and 5 cartridge cases are eliminated as having been fired in the same firearm in which the Item 1 cartridge cases were fired. The Item 3 and 5 cartridge cases are identified as having been fired in the same unknown firearm (a 2nd firearm). The Item 2 cartridge case is eliminated as having been fired in the same firearm in which the Item 1 and 4 cartridge cases were fired. Item 2 is also eliminated as having been fired in the same firearm in which the Item 3 and 5 cartridge cases were fired. Item 2 was fired in an unknown firearm (a 3rd firearm).
WV4MUK	Cartridge cases collected at the crime scene originate from three weapons. Cartridge case no. 4 originates from the suspect's weapon which discharged cartridge case no. 1. Cartridge cases no. 3 and no. 5 originate from the second weapon. Cartridge case no. 2 originates from the third weapon.
WVG2F9	The Ruger test fired cartridge cases, specimen #1, were microscopically compared to the 9mm caliber fired cartridge cases, specimens #2 through #5. It was determined that specimens #2 through #5 were fired in three separate weapons, due to differences in the markings from the breech faces, firing pins, and apertures. Further examination revealed the following: Specimen #4 was fired in the Ruger pistol, specimen #1. Specimen #2 was fired in a second weapon. Specimens #3 and #5 were fired in a third weapon.
WVJQHK	Exhi. c/cases marked Item 4 was fired in the same firearm as tests mentioned as Item 1 (breech face marks). Exhi. c/cases mrkd Item 3 & 5 were fired in the second firearm. #Breech Face marks. Exhi. c/case mrkd Item 2 was fired in the third firearm.
WXA2KY	Casing O (Item 4) was fired in the submitted 9mm Ruger SR9C (Item 1). Casings N and P (Items 3 and 5) were fired in a second 9mm firearm. The specific brand of the suspect weapon



TABLE 2

WebCode	Conclusions
	is unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis. Casing M (Item 2) was fired in a third 9mm firearm. The specific brand of the suspect weapon is unknown at this time; however, any suspect weapon should be submitted to the laboratory for analysis.
WXNJCJ	I examined the fired cartridge cases marked Item 1 to Item 5 and compared the individual and class characteristics markings on them using a comparison microscope and found that the cartridge cases marked Item 1 to Item 5 were fired in different firearms as follows: 2.1 The cartridge cases marked Item 1 and Item 4 were fired in the same firearm. 2.2 The cartridge cases mentioned in Item 3 and Item 5 were fired in a second firearm. 2.3 The cartridge case mentioned in Item 2 was fired in a third firearm.
X2BFVW	I observed an excellent correspondence of firing pin shape and microscopic detail on the firing pin surface, an excellent correspondence of firing pin aperture shear marks and a correspondence of an aperture defect between the cartridge cases discharged in the suspect's firearm (item 1) and the third expended cartridge case from the parking lot (item 4). In my opinion, these correspondences mean that item 4 was fired in the suspect's firearm. There were no correspondences observed between the cartridge cases of item 1 and the cartridge cases of items 2, 3 and 5. In my opinion, this means that the cartridge cases of items 2, 3 and 5 had not been fired in the suspect's firearm. I observed an excellent correspondence of firing pin shape and microscopic detail on the firing pin surface, and an excellent correspondence of firing pin aperture shear marks between the second expended cartridge case from the parking lot (item 3) and the expended cartridge case from the grassed area near the parking lot (item 5). In my opinion, these correspondences mean that items 3 and 5 were fired in the same firearm.
X4D6AW	Item 4 (casing O) was fired in the same 9mm firearm as Item 1 (tests). Item 3 (casing N) and Item 5 (casing P) were fired in a second 9mm firearm. Suspect weapons include 9mm Ruger pistols; however, any suspect weapon should be submitted for examination. Item 2 (casing M) was fired in a third 9mm firearm. The specific brand of the suspect weapon is unknown at this time; however, any suspect weapon should be submitted for examination.
X6MGL8	Item 1 through Item 5 are 9mm Luger (9x19mm) cartridge cases that bear the headstamp of PMC ammunition. The Item 4 cartridge case was identified as having been fired in the Item 1 pistol. The Item 3 and Item 5 cartridge cases were identified as having been fired in the same firearm. The Item 2 cartridge case was excluded as having been fired in the same firearms as the Item 1, 3, 4, and 5 cartridge cases. The Item 1 and 4 cartridge cases were excluded as having been fired in the same firearm as the Item 3 and 5 cartridge cases.
X73JTF	Items 1 and 4 were identified as having been fired in the same firearm. Items 3 and 5 were identified as having been fired in the same unknown firearm. Items 1 and 4 were not fired in the same firearms as Items 3 and 5. Item 2 was not fired in the same firearms as Items 1 and 4 and Items 3 and 5.
X99WKF	Items 2 through 5 were examined microscopically. These items exhibit markings that may be suitable for identification with the firearms in which they were fired and for entry into the NIBIN system. Due to differences in class and individual characteristics, Items 2 through 5 represent three (3) firearms. Item 4, a PMC brand caliber 9mm Luger cartridge case, was identified as having been fired in the firearm represented by Item 1. Items 3 and 5, each a PMC brand caliber 9mm Luger cartridge case, were identified as having been fired in the same firearm. Due to differences in class or individual characteristics, the Item 2, 3 and 5 cartridge cases were eliminated as having been fired in the firearm represented by Item 1. Due to differences in class characteristics, Item 2, a PMC brand caliber 9mm Luger cartridge case, was eliminated

TABLE 2

WebCode	Conclusions
	as having been fired in the same firearm as Items 3 and 5.
XDZBYN	After microscopic comparison, it was determined that Item #1 cartridge case (known) and Item #4 cartridge case (questioned) were fired from the same firearm based on sufficient agreement of class and individual characteristics of the firing pin marks and the aperture shear marks. Items# 2, 3, and 5 cartridge cases (questioned) were not fired from the same firearm as Items# 1 and 4 based on differences of individual characteristics. After microscopic comparison, it was determined that Items# 3 and 5 cartridge cases (questioned) were fired from the same firearm based on sufficient agreement of class and individual characteristics of the aperture shear marks. Item #2 (questioned) was not fired from any of the firearms as Items# 1, 3, 4, and 5 based on differences of individual characteristics.
XGV38K	1. The cartridges cases marked E-1 to E-3, described in item 1 and the cartridge case marked E-6, described in item 4, are 9mm caliber and were fired by the same firearm. 2. The cartridge case marked E-4, described in item 2, is 9mm caliber and was fired by a firearm. 4. The cartridge case marked E-4, described in item 2 was not fired by the firearm used to fire the cartridges cases marked E-1 to E-3, described in item 1, the cartridge case marked E-5, described in item 3, the cartridge case marked E-6, described in item 4 and the cartridge case marked E-7, described in item 5. 3. The cartridge case marked E-5, described in item 3 and the cartridge case marked E-7, described in item 5, are 9mm caliber and were fired by the same firearm.
XHRMRY	The test fired casings from Item 1, Ruger SR9C 9mm Auto handgun, were microscopically compared to Item 2-Item 5. Item 4 was identified as having been fired in Item 1 based on agreement of the combination of individual characteristics and all discernible class characteristics. Item 2 was eliminated as having been fired in Item 1 due to disagreement of discernible individual characteristics. Item 3 and Item 5 were eliminated as having been fired in Item 1 due to disagreement of discernible individual characteristics. However, Item 3 and Item 5 were fired in the same firearm based on agreement of the combination of individual characteristics and all discernible class characteristics.
XJKJ97	Item 4 was fired in the same firearm as the item 1 test fires. Items 3 and 5 were fired in a second firearm. Item 2 was fired in a third firearm.
XNKCKP	The item 4 cartridge case is identified as having been fired in the same firearm that fired the item 1 cartridge cases. The item 2, 3 and 5 cartridge cases are eliminated as having been fired in the same firearm that fired the item 1 cartridge cases. The item 3 and the item 5 cartridge cases are identified as having been fired in a second unknown firearm. The item 2 cartridge case was fired in a third unknown firearm.
XREGAM	1) The cartridge cases described in Items 1 and 4, are 9mm Luger caliber and were fired by the same firearm. 2) The cartridge cases described in Items 3 and 5, are 9mm Luger caliber and were fired by the same firearm. 3) The cartridge case described in item 2, is 9mm Luger caliber, was fired by a firearm, was not fired by the firearms described in the results 1 and 2, mentioned above.
XXMQMB	1. PISTOL RUGER SR9C 9MM AUTO SERIAL NUMBER ????? FIRED CARTRIDGE CASE THAT INSCRIBED ITEM #4. 2. PISTOL RUGER SR9C 9MM AUTO SERIAL NUMBER ????? DID NOT FIRED CARTRIDGE CASES THAT INSCRIBED ITEM #2 ITEM #3 AND ITEM #5.
Y2VLD6	Items 1, 2, 3, 4, and 5 were microscopically compared to each other. Based on the quantity and quality of the individualizing characteristics present, it was determined that Item 4 was fired from the same firearm that fired Item 1 (test fires). Items 2, 3, and 5 were not fired from the Item 1 firearm. It was also determined that based on the quantity and quality of the



TABLE 2

WebCode	Conclusions
	individualizing characteristics present that Items 3 and 5 were fired from the same undetermined firearm.
Y6YB28	Test Fires (1.1-1.3) and Cartridge case (4) are identified as having been discharged from the SAME FIREARM based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Cases (3 and 5) are identified as having been discharged from the SAME FIREARM based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics. Cartridge Case (2) is ELIMINATED as having been discharged from the same firearm as Cartridge Cases (3 and 5) and Test Fires (1.1-1.3) and Cartridge Case(4)based on the observed disagreement of their class characteristics.
Y9GHE9	3. On 2017-06-13 during the performance of my official duties I received a sealed evidence bag with number PA4001476924 from Case Administration of the Ballistics Section, containing the following: 3.1 One (1) white jewel box which is sealed with a red Evidence seal tape, containing the following: 3.1.1 One (1) smaller white jewel box marked with "Test No. 17-526" and "Item 1", containing the following: 3.1.1.1 Three (3) 9 mm Parabellum calibre fired cartridge cases representing the tests of the seized 9 mm Parabellum calibre Ruger SR9C semi-automatic pistol, already marked with a "1" each. I would have marked the cartridge cases with "1TC1", "1TC2" and "1TC3" respectively. 3.1.2 One (1) smaller white jewel box marked with "Test No. 17-526" and "Item 2" containing the following: 3.1.2.1 One (1) 9 mm Parabellum calibre fired cartridge case, already marked with "2". I would marked the cartridge case with "295361/17 2". 3.1.3 One (1) smaller white jewel box marked with "Test No. 17-526" and "Item 3", containing the following: 3.1.3.1 One (1) 9 mm Parabellum calibre fired cartridge case, already marked with "3". I would marked the cartridge case with "295361/17 3". 3.1.4 One (1) smaller white jewel box marked with "Test No. 17-526" and "Item 4", containing the following: 3.1.4.1 One (1) 9 mm Parabellum calibre fired cartridge case, already marked with "4". I would marked the cartridge case with "295361/17 4". 3.1.5 One (1) smaller white jewel box marked with "Test No. 17-526" and "Item 5" containing the following: 3.1.5.1 One (1) 9 mm Parabellum calibre fired cartridge case, already marked with "5". I would marked the cartridge case with "295361/17 5". 4. The intention and scope of this forensic examination comprise the following: 4.1 The examination and identification of fired cartridge cases. 4.2 Microscopic individualization of fired cartridge cases. 5. I examined the fired cartridge cases mentioned in paragraphs 3.1.2.1, 3.1.3.1, 3.1.4.1 and 3.1.5.1 and compared the individual and class characteristics markings on them using a comparison microscope and found that the cartridge cases were fired in different firearms as follows: 5.1 The fired cartridge cases mentioned in paragraphs 3.1.3.1 and 3.1.5.1 were fired in the same firearm, a first weapon. 5.2 The fired cartridge case mentioned in paragraph 3.1.2.1 was fired in a second firearm. 5.3 The fired cartridge case mentioned in paragraph 3.1.4.1 was fired in a third firearm. 6. I examined the fired cartridge cases 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: 6.1 The cartridge case mentioned in paragraph 3.1.4.1 was fired in the firearm referred to in paragraph 3.1.1.1 and represented by the tests mentioned in paragraph 3.1.1.1. 6.2 The cartridge cases mentioned in paragraphs 3.1.2.1, 3.1.3.1 and 3.1.5.1 were not fired in the firearm referred to in paragraph 3.1.1.1 and represented by the tests as mentioned in paragraph 3.1.1.1.
YGVANA	Item #4 was fired in the firearm in Item #1. Items #3 and #5 were fired in the same firearm. Items #3 and #5 were not fired in the firearm in Item #1. Item #2 was not fired in the firearm in Item #1. Item #2 was not fired in the same firearm as Items #3 and #5. Item #2 is suitable for further microscopic comparison.

TABLE 2

WebCode	Conclusions
YNG6ZA	The cartridge cases Item 1 were visually inspected. The cartridge cases Items 2 through 5 were compared microscopically with each other and with the cartridge cases Item 1. The cartridge case Item 4 was identified as having been fired in the same firearm as the cartridge cases Item 1. The cartridge cases Items 3 and 5 were identified as having been fired in the same firearm; however, they were not fired in the same firearm as Items 1 and 4. The cartridge case Item 2 was not fired in the same firearms as Items 1, 3, 4, and 5.
YP8DZC	Item 4 was identified as having been fired in the same firearm as the Item 1 cartridge cases. Items 3 and 5 were identified as having been fired in the same unknown firearm; they were not fired in the same firearm as Items 1 and 4. Item 2 was not fired in the same firearm as Items 1 and 4 nor was it fired in the same unknown firearm as Items 3 and 5.
Z2DXR4	There are 3 different firearms in the scene. FIREARM N° 1: The suspect seized (Ruger SR9C 9 mm. auto). This firearm has fired the case n° 4. FIREARM N° 2: Unknown firearm. This firearm has fired the case n° 2. FIREARM N° 3: This firearm has fired the cases n° 3 and 5.
Z7REFZ	The item #4 cartridge case was fired in the same firearm as the item #1 cartridge cases. The item #2 cartridge case was not fired in the same firearm as any of the other cartridge cases. The items #3 and #5 cartridge cases were fired in the same unknown firearm; however, they were not fired in the same firearm as the items #1,2 or 4 cartridge cases.
ZD7JVD	Comparison of TF (1-3) (your agency Item 1: test fires of Ruger SR9C) disclosed that Exhibit Q-3 (your agency Item 4) was fired in the Ruger SR9C 9mm handgun.
ZGU24Q	The four "PMC" 9mm Luger caliber cartridge cases (items 2-5) were microscopically compared to the test fired cartridge cases from the Ruger, model SR9C, 9mm Luger caliber pistol (item 1). Based on sufficient corresponding individual markings observed, the 9mm Luger caliber cartridge case in item 4 was identified as having been fired in the Ruger pistol (item 1). Because of observed differences, the three 9mm Luger caliber cartridge cases in items 2, 3, and 5 could not have been fired in the Ruger pistol (item 1).
ZKPKFW	The items 1 and 4 cartridge cases were identified as having been fired in the same firearm.
ZNAHZ8	Cartridge Case Evidence: Item 4 was fired in the same firearm as the item 1 test fires. Items 3 and 5 were fired in a second firearm. Item 2 was fired in a third firearm.
ZV9AWG	There was sufficient agreement of class and individual characteristic markings to determine that the cartridge cases, Item 4, had been discharged in the same firearm as the cartridge cases Item 1. There was sufficient disagreement of class and individual characteristic markings to determine that the cartridge cases Items 2, 3 and 5 had not been discharged in the same firearm as the cartridge cases Item 1. The cartridge cases Item 3 and 5 had been discharged in the same firearm.
ZW26KB	The cartridge case marked as item 2 was not fired by the Ruger SR9C 9mm Auto handgun (questioned firearm). The cartridges cases marked as item 3 and item 5 were fired by the same firearm but were not fired by the Ruger SR9C 9mm Auto handgun (questioned firearm). The cartridge case marked as item 4 WAS fired by the Ruger SR9C 9mm Auto handgun (questioned firearm).

# Additional Comments

## TABLE 3

WebCode	Additional Comments
22RRXW	4. Any suspect firearm should be submitted for microscopic comparison to Exhibits 2, 3, and 5.
26E8QC	The cartridge cases in Items 3 and 5 were fired in the same gun.
2BNDEV	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.
2CU3BD	Three firearms of 9mm luger caliber were involved in this incident.
38WVJN	Current policy does not allow for an elimination when class characteristics are the same but individual characteristics appear different.
3HVT63	Methods: Cartridge Cases: Two cartridge cases, either two evidence items or one evidence item and one cartridge case test fired in the Laboratory, undergo two stages of comparison. First, the cartridge cases are examined to determine and compare their class characteristics. The class characteristics of fired cartridge cases include caliber, shape of firing pin impression, shape and orientation of breech face marks, and relative locations of extractor and ejector marks. If the class characteristics of the two cartridge cases 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 toolmarks present on two cartridge cases to determine if patterns of similarity exist. At the completion of these examinations, one of the following three opinions is issued: 1) Exclusion (Elimination): If two cartridge cases have clearly different class characteristics, an Exclusion opinion is rendered. Exclusion opinions based on a measured class difference or the physical comparison of a discernible difference in class characteristics cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 2) Identification: If the following conditions are met during the comparison of microscopic marks, an opinion of Identification is rendered: a) The degree of similarity is greater than the Examiner has ever observed in previous evaluations of cartridge cases known to have been fired in different firearms. b) The degree of similarity is equivalent to that normally observed in cartridge cases known to have been fired in the same firearm. When these conditions are met the likelihood another tool (firearm) could have produced the same mark is so remote as to be considered a practical impossibility. An Identification opinion cannot be reported unless a second qualified firearms/toolmarks examiner has examined the items in question and reached the same conclusion. 3) Inconclusive (No Conclusion): If the conditions required for an Exclusion or Identification are not observed, one of two types of inconclusive results can be reported. An opinion of No Conclusion is rendered if the impressed and/or striated toolmarks present in either or both of the specimens are of poor quality, have limited microscopic marks of value, lack any observed microscopic similarity, or microscopic similarity that is present but too limited to meet the criteria for Identification. An opinion of Nothing Found to Indicate is rendered if the microscopic marks of value on both specimens are of good quality but lack correspondence in the impressed and/or striated marks. Limitations: Cartridge Cases: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of

TABLE 3

WebCode	Additional Comments
	value. Due to possible changes in firearm operating surfaces from wear, corrosion, and ordinary fouling and differences in ammunition design and construction, cartridge cases fired in the same firearm are sometimes not identifiable as such. Additionally, some firearm manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value on fired cartridge cases.
4GYNAU	Items 3 and 5 were fired in the same firearm. Items 3 and 5 were not fired in the same firearm as Items 1 and 4. Item 2 was not fired in the same firearms as Items 1 and 4 or Items 3 and 5.
4HQTJT	Three 9mm Luger chambered firearms are represented by the recovered expended cartridge cases from the scene. Item 2 represents one firearm, Items 3 & 5 represent a second firearm, and Item 4 was fired by the seized Ruger SR9C semiautomatic pistol.
4MM9DA	Lab policy does not allow for eliminations based on individual characteristics.
4Q4HKM	Item 5 shares class characteristics with Item 4 and the test shots from Item 1 such as the firing pin impression shape, firing pin aperture shape and manufactured toolmarks. There were differences in the individuality of the firing pin aperture shape and the firing pin aperture sheer marks, however, it is not our policy to eliminate on differences in individual characteristics. Therefore, Item 5 is inconclusive to Item 1.
69GN6G	Item #4 - Fired from Ruger SRC 9mm pistol Item #s 3 + 5 - Fired from 2nd unknown firearm Item #2 - Fired from 3rd unknown firearm
6HP36X	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 items 3 & 5 were fired in the same firearm.
6T7XBP	Exhibits 3 and 5 had an agreement of all discernable class characteristics but insufficient agreement of individual characteristics to identify or eliminate them as having been fired in the same firearm as the Exhibit 1 test fired cartridge cases. There were multiple areas of some corresponding stria, although it was not sufficient to make an identification or elimination.
6WRPFZ	Methods: Cartridge Cases: Two cartridge cases, either two evidence items or one evidence item and one cartridge case test fired in the Laboratory, undergo two stages of comparison. First, the cartridge cases are examined to determine and compare their class characteristics. The class characteristics of fired cartridge cases include caliber, shape of firing pin impression, shape and orientation of breech face marks, and relative locations of extractor and ejector marks. If the class characteristics of the two cartridge cases 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 toolmarks present on two cartridge cases to determine if patterns of similarity exist. At the completion of these examinations, one of the following three opinions is issued: 1) Exclusion (Elimination): If two cartridge cases have clearly different class characteristics, an Exclusion opinion is rendered. Exclusion opinions based on a measured class difference or the physical comparison of a discernible difference in class characteristics cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 2) Identification: If the following conditions are met during the comparison of microscopic marks, an opinion of Identification is rendered: a) The degree of similarity is greater than the Examiner has ever observed in previous evaluations of cartridge cases known to have been fired in different firearms. b) The degree of similarity is equivalent to that normally observed in cartridge cases known to have been fired in the same firearm. When these conditions are met the likelihood another tool (firearm) could have produced the

TABLE 3

WebCode	Additional Comments
	<p>same mark is so remote as to be considered a practical impossibility. An Identification opinion cannot be reported unless a second qualified firearms/toolmarks examiner has examined the items in question and reached the same conclusion. 3) Inconclusive (No Conclusion): If the conditions required for an Exclusion or Identification are not observed, one of two types of inconclusive results can be reported. An opinion of No Conclusion is rendered if the impressed and/or striated toolmarks present in either or both of the specimens are of poor quality, have limited microscopic marks of value, lack any observed microscopic similarity, or microscopic similarity that is present but too limited to meet the criteria for Identification. An opinion of Nothing Found to Indicate is rendered if the microscopic marks of value on both specimens are of good quality but lack correspondence in the impressed and/or striated marks. Limitations: Cartridge Cases: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to possible changes in firearm operating surfaces from wear, corrosion, and ordinary fouling and differences in ammunition design and construction, cartridge cases fired in the same firearm are sometimes not identifiable as such. Additionally, some firearm manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value on fired cartridge cases.</p>
7TJWY7	A total of three firearms are represented by the Item 1 though 5 cartridge cases.
86WFV9	In this case were used three different firearms.
8F28WN	The four fired cartridge cases recovered from the crime scene were discharged in three different firearms. The fired cartridge case (Item 2) was discharged in a 9MMLUGER calibre semi-automatic pistol of unknown make and model. The fired cartridge cases (Items 3 & 5) were both discharged in a third 9MLUGER calibre semi-automatic pistol of unknown make and model.
8KLL2G	Microscopic examination and comparison of the two fired cartridge cases (items # 3 and 5) revealed sufficient microscopic evidence to conclude that these two fired cartridge cases were fired in the same firearm (NOT Item # 1). Microscopic examination and comparison of the fired cartridge case (item # 2) with the other fired cartridge cases (item # 1, 3, 4 and 5) reveals sufficient microscopic evidence to conclude that it was fired from a different firearm than that which fired the cartridge cases (item # 1, 3, 4 and 5).
8KMHCC	The two cartridge cases marked #3 and #5 were discharged in the same firearm.
8MQC9V	SUFFICIENT AGREEMENT: Sufficient agreement is related to the significant duplication of random toolmarks as evidence by a pattern or combination of patterns of surface contours. "Sufficient agreement" exists between two toolmarks means that the agreement is of a quantity and quality that the likelihood another tool could have made the mark is so remote as to be considered a practical impossibility.
9D76A7	3.1.) The seized firearm should be sent to this lab for firearm examination. 3.2.) Item 3 evidence is equal to Item 5 evidence.
9XTQVF	The characteristic marks on the questioned expended cartridge cases Item 3 and Item 5 are similar and they were fired from the same 9mm firearm.
A46C8Q	Annex to the analyzes performed, it was determined that the cartridge cases marked as Item 3 and Item 5 were fired by a firearm different than the one that was sent. The cartridge case marked as Item 2 does not coincide with any of the cartridge cases tested.
AYEUZ7	Items 1 and 4 were discharged in the same known/recovered firearm. Item 2 was discharged in a second firearm. Items 3 and 5 were discharged in a third firearm.

TABLE 3

WebCode	Additional Comments
B2H69E	The [Laboratory] policy only allows for elimination when class characteristics are different. Due to the testing nature of this CTS test, only test fired cartridge cases were submitted for examination. However, numerous factors emerged during this examination which necessitates further examination of the firearm. First, the firearm would be needed to verify the firing pin is smooth, as it could be possible that a firing pin with concentric rings may not impart concentric rings in the firing pin impression. (Concentric rings in the firing pin impression were observed on Item #2.) Second, the firearm would be needed to determine if the BF marks are arched, and if those marks extend beyond the primer to the case head. The arched marks observed on the heads of Items #1A, #1B, #1C, and #4 could be BF marks produced by a firearm, or they could just as easily be bunter marks produced during case manufacture, or even from a reloading die.
BH6AVM	The positive identification of items # 1 and # 4, was made based on the match of class characteristics and individual characteristics such as the trigger mark, ejection, extraction, and closing plate, which demonstrate that they were produced by the mechanisms of a single firearm. Same case for items # 3 and # 5
BHBLRJ	Three individual firearm involved.
BJLH6B	Based on the agreement of class characteristics and sufficient agreement of individual characteristics, the questioned cartridge case marked "Item 3" was fired from the same firearm as the questioned cartridge case marked "Item 5".
CJDXUD	Item 3 and Item 5 are fired by the same firearm, but different than Items 1 and 4; and different than item 2. --> 3 firearms different.
CKWPZG	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.
CMZE9R	Methods: Cartridge Cases: Two cartridge cases, either two evidence items or one evidence item and one cartridge case test fired in the Laboratory, undergo two stages of comparison. First, the cartridge cases are examined to determine and compare their class characteristics. The class characteristics of fired cartridge cases include caliber, shape of firing pin impression, shape and orientation of breech face marks, and relative locations of extractor and ejector marks. If the class characteristics of the two cartridge cases 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 toolmarks present on two cartridge cases to determine if patterns of similarity exist. At the completion of these examinations, one of the following three opinions is issued: 1) Exclusion (Elimination): If two cartridge cases have clearly different class characteristics, an Exclusion opinion is rendered. Exclusion opinions based on a measured class difference or the physical comparison of a discernible difference in class characteristics cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 2) Identification: If the following conditions are met during the comparison of microscopic marks, an opinion of Identification is rendered: a) The degree of similarity is greater than the Examiner has ever observed in previous evaluations of cartridge cases known to have been fired in different firearms. b) The degree of similarity is equivalent to that normally observed in cartridge cases known to have been fired in the same firearm.



TABLE 3

WebCode	Additional Comments
	<p>When these conditions are met the likelihood another tool (firearm) could have produced the same mark is so remote as to be considered a practical impossibility. An Identification opinion cannot be reported unless a second qualified firearms/toolmarks examiner has examined the items in question and reached the same conclusion. 3) Inconclusive (No Conclusion): If the conditions required for an Exclusion or Identification are not observed, one of two types of inconclusive results can be reported. An opinion of No Conclusion is rendered if the impressed and/or striated toolmarks present in either or both of the specimens are of poor quality, have limited microscopic marks of value, lack any observed microscopic similarity, or microscopic similarity that is present but too limited to meet the criteria for Identification. An opinion of Nothing Found to Indicate is rendered if the microscopic marks of value on both specimens are of good quality but lack correspondence in the impressed and/or striated marks. Limitations: Cartridge Cases: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to possible changes in firearm operating surfaces from wear, corrosion, and ordinary fouling and differences in ammunition design and construction, cartridge cases fired in the same firearm are sometimes not identifiable as such. Additionally, some firearm manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value on fired cartridge cases.</p>
CP3BXL	Items 003 and 005 could not be identified or eliminated as having been fired by Item 001 because microscopic examination of individual characteristics did not reveal enough information.
D2V94H	Items 3 and 5 bear the same size, shape, and contour firing pin impressions as Items 1 and 4. Although there are no similar individual characteristics present to link Items 3 and 5 to Items 1 and 4, they aren't marked differently enough for me to exclude them.
DA7MX8	The conclusion are based in cartridge cases, microscopic and microscopic comparison examinations.
DMQAYT	Microscopic Comparison made between four discharged 9mm LUGER Cartridge Cases (Item 2 thru Item 5) with the following results: Item 3 and Item 5 were discharged from the same (second) Weapon. Item 2 was discharged from a (third) Weapon.
EBCMCD	Item 2 exhibits parallel breech face marks and concentric circles in a hemispherical firing pin impression (FPI). Items 1A, 1B, 1C, 3, 4, and 5 are void of identifiable breech face marks and have a hemispherical shaped FPI with identifiable individual characteristics, without concentric circles.
ECRQ76	(1st firearm): #1 vs #1A - Pos(+) Identification: FPAS, FP drag, FP Imp, BF, CM (Ruger SR9C). #1 vs #4 - Pos(+) Identification: FPAS, FP drag, FP Imp, BF, CM (Ruger SR9C). (2nd firearm): #3 vs #5 - Pos(+) FPAS, FP Imp, FP drag, BF (different firearm). (3rd firearm): #2 vs #1, #3, #4 & #5 - Neg(-)Elimination. Three separate firearms involved in this case.
EPRPU2	The cartridges Item 3 and Item 5 were fired in a same unknown handgun. The cartridge Item 2 was fired in an other unknown handgun.
EVM9KZ	Therefore, three firearms are associated with the submitted evidence.
EYMJCU	Similarities have been found between the markings in Item 3 and Item 5. This resulted in the following conclusion: Item 3 and 5: The findings are extremely more probable when H1 is true than when H2 is true. Where H1: The questioned cartridge cases are fired by one firearm. H2: The questioned cartridge cases are fired by two firearms of the same caliber and with the same class characteristics. Comment: The translation from a Bayesian conclusion to a categorical conclusion is not straightforward because differences in the overall approach of



TABLE 3

WebCode	Additional Comments
	the evidential strength of markings. To translate our Bayesian conclusion to a yes/no/inconclusive conclusion a leap of faith has been made. For this test, conclusion are matched as follows: 'findings extremely more probable under H1 than H2' = Yes ; 'findings extremely more probable under H2 than H1' = No
FNECP6	Item 3 and Item 5 were discharged by an unknown, however very likely the by same weapon.
G9D63M	Item 3 and item 5 were fired in the same firearm. Need item 1 more than three expanded cartridge cases.
GJJXLF	The cartridge cases in Exhibits 1 and 4 could not be identified or eliminated as having been fired in the same firearm as the cartridge cases in Exhibits 3 and 5. Exhibits 1, 3, 4, and 5 were microscopically compared, and there is agreement of class characteristics but there is insufficient agreement of individual characteristic observed for an identification finding.
HGPJKJ	Items # 3 and Item # 5 fired by the same pistol based on agreement of class and individual characteristics.
HNBH8B	The differences in individual characteristics between Items 3 & 5 and Item 1 are not sufficient enough to exclude.
HUUQPF	If I had a firearms to compare to sub 002 and also 003 and 005, I may have been able to note reproducibility.
HY4ZPW	There are three firearms involved.
J9BZZJ	Item 3 and item 5 were fired in the same weapon (but different weapon to items 1 and 4)
JKLMV3	Item #2, and Items #3 and # 5, were fired from two different firearms not submitted for examination in this case.
JUDU2M	Potential subclass noted on Item 2; used chop for comparisons and conclusions.
K2UMRD	Items 1, 2 & 5 will be imaged into the Integrated Ballistics Identification System (IBIS)/ Brasstrax database & any identifications made from these entries will be supplemented.
KTUEX6	Item 1 Test fired cartridges cases reproduce marks sufficient for identification.
KVZ7LC	Additionally, we would like to state that Item N3 and Item N5 are fired from one and the same firearm , but not the one of the suspect.
MDV9KT	The cartridge cases marked as Item 3 and 5 were discharged by the same type pistol firearm but different to the Ruger SR9C 9mm Auto suspect's handgun.
MVAMZ3	Inconclusive results were based on the casings having similar class characteristics and dissimilar individual characteristics without a way to conclusively determine the cause of those differences.
NEKXKY	We strongly support the hypothesis that items 3 and 5 discharged from the same firearm.
NRCG8H	Items 3 and 5, two fired cartridge cases from the scene, were identified as having been fired from the same firearm but not the suspect's Ruger SR9C 9mm Luger caliber pistol. Item 2, a fired cartridge case from the scene, was eliminated as having been fired from the suspect's Ruger SR9C pistol and from the firearm that fired Items 3 and 5.
NUDELQ	All of the fired cartridges cases were 9mm Luger and PMC brand. The test fired cartridge cases item 1, had a firing pin hole shear marks that was used for the identification with item 4. Firing pin hole shear mark were used for the identification of items 3 and 5. Items 3 and 5

TABLE 3

WebCode	Additional Comments
	had different class characteristics than items 1 and 4. Item 2 had different class characteristics than the other items.
NVCNN9	The make and model of firearm that the Item 2, Item 3, or Item 5 cartridge cases were fired in could not be determined.
PMBVTK	One of the fired cartridge cases (1-02-AA) was fired in a firearm capable of chambering and firing a 9mm Luger caliber cartridge. A list of possible firearms in which the cartridge case could have been fired would include, but should not be limited to: 9mm Luger caliber firearms marketed by Astra, Beretta, Heckler & Koch, Kahr Arms, Luger, Ruger, SigArms, Smith & Wesson, Star, and Taurus. Two of the fired cartridge cases (1-03-AA and 1-05-AA) were fired in a firearm capable of chambering and firing a 9mm Luger caliber cartridge. A list of possible firearms in which the cartridge cases could have been fired would include, but should not be limited to: 9mm Luger caliber firearms marketed by Astra, Beretta, Heckler & Koch, Kahr Arms, Luger, Ruger, SigArms, Smith & Wesson, Star, and Taurus. One of the fired cartridge cases submitted as a known test fire (1-01-AA), and two of the fired cartridge cases (1-02-AA and 1-03-AA) were forwarded for NIBIN analysis. A report will be issued by that laboratory upon completion of the analysis. One of the three fired cartridge cases submitted as known test fires (1-01-AA) and two of the remaining fired cartridge cases (1-02-AA and 1-03-AA) were forwarded for NIBIN analysis. A report will be issued upon completion of that analysis.
PNLQ6B	If the weapon had been on hand to look at during this test, it would have been easier to tell what in the weapon has caused the parallel lines on the bottom of the cartridges casings No. 1 and No. 4. Pictures are archived whom substantiate the above track as observed in the comparison between cartridge casings from suspected weapon (No. 1) and casing No. 4. The cartridge casings No. 2, 3, 4 and 5 have had been fired from three different weapons. The cartridge casing No. 4 has had been fired from the suspected weapon (cartridge cases No.1). Cartridge case No. 3 and No. 5 have been fired from one and the same weapon and No. 2 from another weapon. Cartridge case No. 2 has different traces and deviate completely compared to the others. Cartridge No. 3 and No. 5 have among other things, same breechface marks, scrape- and embossing marks on the bottom of the cartridge casings even outside the hole for the firing pin and scrape marks, from the hole of the firing pin.
QNLXEJ	A microscopic comparison was performed; however, there is insufficient detail of the class and/or individual characteristics present on Items #3 and #5 for an identification or elimination finding to Item #1.
QX7DWR	A total of three guns have been utilised in this incident
T4LYBF	Three firearms were used during a scene shooting outside of a nightclub. The PMC Bronze 9mm Luger 115 grain FMJ ammunition three cartridge cases found at the scene were positive with only one cartridge case that was recovered at the scene, two were positive with each other & one was negative with all cartridge cases different class & individual marks.
T86TVV	Summary: item 4 was fired in item 1 item 2 was excluded on class from being fired in item 1 items 3 and 5 were excluded on individual characteristics from being fired in item 1 items 3 and 5 were fired in the same firearm item 2 was excluded on class characteristics from being fired in the same firearm that items 3 and 5 were fired in.
U6XY8A	Three test-fired cartridge cases from the suspect's firearm, CTS Item 1 (Lab Items 1-1A through 1-1C), and four cartridge cases recovered from the scene were submitted for examination. All of the fired 9mm Luger caliber cartridge cases, CTS Items 2 through 5 (Lab Items 1-2 through 1-5), were marketed by PMC and had hemispherical firing pin impressions. I microscopically

TABLE 3

WebCode	Additional Comments
	<p>compared the recovered cartridge cases to test-fired cartridge cases from the suspect's pistol, CTS Item 1 (Lab Items 1-1A through 1-1C). I found sufficient agreement in the individual firearm-produced characteristics, including the firing pin impressions and firing pin aperture shear marks, to conclude that one of these cartridge cases, CTS Item 4 (Lab Item 1-4) was fired from the suspect's pistol. I found sufficient disagreement in the individual firearm-produced characteristics, including the breechface impressions and firing pin aperture shear marks, to conclude that three of the recovered cartridge cases, CTS Items 2, 3, and 5 (Lab Items 1-2, 1-3, and 1-5) were not fired from the suspect's pistol. I found sufficient agreement in the individual firearm-produced characteristics, including the firing pin aperture shear marks, to conclude that two of the recovered cartridge cases, CTS Items 3 and 5 (Lab Item 1-3 and 1-5) were fired from the same unknown firearm. CTS Item 2 (Lab Item 1-2) was fired from a different unknown firearm. Therefore, three firearms were used to fire the recovered cartridge cases. The examinations and comparisons were documented with a series of 30 digital images. Strength of Associations Made in the Identification of Firearm-Produced Toolmarks: The identification of firearm-produced toolmarks 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 likelihood another firearm could have made the questioned mark is so remote as to be considered a practical impossibility.</p>
UCTWVC	<p>Even though the above conclusions are rephrased but are still based on the AFTE Theory of Identification, which defines identification, for example, as agreement of a combination of individual characteristics and all discernible class characteristics where the extent of agreement exceeds that which can occur in the comparison in the comparison of toolmarks made by different tool, and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool.</p>
WAGZ46	<p>Item 2 has different class characteristics of FP than the firearms (weapons 1 and 2)</p>
WMVXN2	<p>The elimination of Item #2 to tests (Item #1) was made using significant differences in the breechface marks (coarse parallel straight lines - Item #2 versus pebbly - Item #1). The cross-identification of Items #3 and #5 was made using sheared primer orifice crater striae. The elimination of Items #3 and #5 to tests (Item #1) and #4 was made using differences in the primer orifice crater striae. The elimination of Item #3 and #5 to Item #2 was made using significant differences in the breechface marks (pebbly - Items #3 and #5 versus coarse parallel straight lines - Item #2). The identification of Item #4 to tests (Item #1) was made using sheared primer orifice crater striae.</p>
WPCDKL	<p>1. The fired cartridge cases marked E-1 and E-2, described in Item 1, the fired cartridge case marked E-4, described in Item 2, the fired cartridge case marked E-5, described in Item 3 and the fired cartridge cases marked from E-7, described in Item 5, were submitted to the Integrated Ballistic Information System (IBIS).</p>
WTZLFG	<p>The cartridge cases in Submissions 3 and 5 were fired in the same gun.</p>
X2BFVW	<p>In interpreting firearms evidence, I have considered the probability of the comparison evidence given the cartridge cases were fired in the same firearm. I have also considered the probability of the comparison evidence given the cartridge cases were fired in the different firearms.</p>
X6MGL8	<p>Methods: Cartridge Cases: Two cartridge cases, either two evidence items or one evidence item and one cartridge case test fired in the Laboratory, undergo two stages of comparison. First, the cartridge cases are examined to determine and compare their class characteristics.</p>

TABLE 3

WebCode	Additional Comments
	<p>The class characteristics of fired cartridge cases include caliber, shape of firing pin impression, shape and orientation of breech face marks, and relative locations of extractor and ejector marks. If the class characteristics of the two cartridge cases 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 toolmarks present on two cartridge cases to determine if patterns of similarity exist. At the completion of these examinations, one of the following three opinions is issued: 1) Exclusion (Elimination): If two cartridge cases have clearly different class characteristics, an Exclusion opinion is rendered. Exclusion opinions based on a measured class difference or the physical comparison of a discernible difference in class characteristics cannot be reported unless a second qualified firearms/toolmarks Examiner has examined the items in question and reached the same conclusion. 2) Identification: If the following conditions are met during the comparison of microscopic marks, an opinion of Identification is rendered: a) The degree of similarity is greater than the Examiner has ever observed in previous evaluations of cartridge cases known to have been fired in different firearms. b) The degree of similarity is equivalent to that normally observed in cartridge cases known to have been fired in the same firearm. When these conditions are met the likelihood another tool (firearm) could have produced the same mark is so remote as to be considered a practical impossibility. An Identification opinion cannot be reported unless a second qualified firearms/toolmarks examiner has examined the items in question and reached the same conclusion. 3) Inconclusive (No Conclusion): If the conditions required for an Exclusion or Identification are not observed, one of two types of inconclusive results can be reported. An opinion of No Conclusion is rendered if the impressed and/or striated toolmarks present in either or both of the specimens are of poor quality, have limited microscopic marks of value, lack any observed microscopic similarity, or microscopic similarity that is present but too limited to meet the criteria for Identification. An opinion of Nothing Found to Indicate is rendered if the microscopic marks of value on both specimens are of good quality but lack correspondence in the impressed and/or striated marks. Limitations: Cartridge Cases: Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to possible changes in firearm operating surfaces from wear, corrosion, and ordinary fouling and differences in ammunition design and construction, cartridge cases fired in the same firearm are sometimes not identifiable as such. Additionally, some firearm manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value on fired cartridge cases.</p>
XREGAM	1. This determination is based on the following methodologies: cartridge cases, microscopic and comparison microscopic.
XXMQMB	1. CARTRIDGECASES INSCRIBED ITEM #3 AND ITEM #5 WERE FIRED FROM ONE PISTOL BUT DIFFERENT FROM THE ONE SHOOT CARTRIDGECASE INSCRIBED ITEM #5 .
ZD7JVD	Comparison of Exhibits Q-(1-4) disclosed that Exhibits Q-2 (your agency Item 3) and Q-4 (your agency Item 5) were fired in the same firearm. Exhibit Q-1 (your agency Item 2) was fired in a different firearm than Q-(2-4).
ZGU24Q	The three 9mm Luger caliber cartridge cases (items 2, 3, and 5) were microscopically compared to one another. Based on sufficient corresponding individual markings observed, items 3 and 5 were identified as having been fired in the same firearm. Because of observed differences in class characteristics, the 9mm Luger caliber cartridge case in item 2 could not have been fired from the same firearm as items 3 and 5.

# Appendix: Data Sheet

## Collaborative Testing Services - Forensic Testing Program Test No. 17-526: Firearms Examination

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DATA MUST BE RECEIVED BY July 24, 2017 TO BE INCLUDED IN THE REPORT

Participant Code:

WebCode:

### Accreditation Release Statement

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

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

Scenario:

Police are investigating a shooting outside of a nightclub. Investigators recovered four expended cartridge cases at the scene - three from the parking lot and one from the grass area near the parking lot. A suspect was apprehended later that day and police seized a Ruger SR9C 9mm Auto handgun from his possession. Three rounds of PMC Bronze 9mm Luger 115 grain FMJ ammunition (which were consistent with the cartridge cases found at the scene) were fired with the suspect firearm and the cartridge cases collected. Investigators are asking you to compare the recovered cartridge cases from the scene with those test fired from the suspect's weapon and report your findings.

*Please note the following:*

*- Each Item is in a labeled jewel box, it is suggested that when the items are removed from their labeled boxes, they be marked according to your laboratory procedure. However, in case the items are separated from their boxes before labeling has occurred, each item has been inscribed with its item number.*

Items Submitted (Sample Pack F1):

- Item 1: Three expended cartridge cases discharged from the suspect's weapon (known).
- Item 2: First expended cartridge case recovered from the parking lot (questioned).
- Item 3: Second expended cartridge case recovered from the parking lot (questioned).
- Item 4: Third expended cartridge case recovered from the parking lot (questioned).
- Item 5: One expended cartridge case recovered from the grass area near the parking lot (questioned).

1.) Were any of the questioned expended cartridge cases (Items 2-5) discharged from the same firearm as the known expended cartridge cases (Item 1)?

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

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

**Please return all pages of this data sheet.**

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## Collaborative Testing Services ~ Forensic Testing Program

**RELEASE OF DATA TO ACCREDITATION BODIES**

The following Accreditation Releases will apply only to:

Participant Code:

WebCode:

for Test No. **17-526: Firearms Examination**

This release page must be completed and received by **July 24, 2017** to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

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

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

ASCLD/LAB Certificate No. \_\_\_\_\_

ANAB Certificate No. \_\_\_\_\_

A2LA Certificate No. \_\_\_\_\_

**Step 2: Complete the Laboratory Identifying Information in its entirety**

Signature and Title \_\_\_\_\_

Laboratory Name \_\_\_\_\_

Location (City/State) \_\_\_\_\_

## Accreditation Release

**Return Instructions**

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

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

**Please return all pages of this data sheet.**

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