Collaborative Testing Services, Inc

Forensic Testing Program

Fibers Analysis Test No. 18-539 Summary Report

Each sample set consisted of one "known" fabric sample and two sets of "questioned" fibers. Participants were requested to compare the items and report their findings. Data were returned from 102 participants and are compiled into the following tables:

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

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

Manufacturer's Information

Each sample pack consisted of one section of known fabric (Item 1) and two sets of questioned fibers (Items 2 and 3). Items 1, 2 and 3 were from the same gold fabric labeled as acetate*. The fabric was purchased from an online fabric store. Participants were requested to examine the fibers, identify the fiber type, and determine if the questioned fibers could have originated from the known fabric.

SAMPLE PREPARATION-
The fabric was laid out and rolled with a lint roller to remove any extraneous debris.

ITEMS 1, 2 AND 3 (ASSOCIATION): For the known fabric (Item 1) and the questioned fibers (Items 2 and 3), a 1/2-yard section of fabric was first cut into swatches. A predetermined number of full swatches were then packaged into glassine bags and prelabeled Item 1 envelopes; the remaining swatches were used to prepare the Items 2 and 3 questioned fibers. For each item in this set, warp and weft fibers were teased from the edges of one fabric swatch, then packaged into a glassine bag and prelabeled envelope.

SAMPLE SET ASSEMBLY: For each sample set, an Item 1, 2 and 3 were placed in a pre-labeled envelope. The sample pack was sealed with invisible tape. This process was repeated until all of the sample sets were prepared. Once predistribution results were obtained, all sample sets were further sealed with a piece of evidence tape and initialed "CTS".

VERIFICATION-
Predistribution laboratories reported the expected association results. All three predistribution laboratories identified the fibers in Items 1, 2, and 3 as "Manufactured, acetate and Manufactured, rayon". The following procedures were used to examine the items: stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, macroscopic exam, IR/FTIR, microspectrophotometry, solubility tests, cross-section, alternate light source, Py-GC/MS, and SEM-EDS.

*Please Note: The fabric was commercially sold as acetate, but results from predistribution testing and a consensus of responding laboratories reported this item as containing acetate and rayon.

Summary Comments

This test was designed to allow participants to assess their proficiency in the examination, identification and comparison of fibers. Participants were provided with a 2" x 2" swatch of known fabric for Item 1, as well as a set of questioned fibers for Items 2 and 3. They were requested to examine the submitted items and determine if either set of questioned fibers could have originated from the known item. Items 1, 2 and 3 were from the same gold fabric labeled as acetate*. (Refer to the Manufacturer's Information for preparation details.)

*Please Note: The Item 1, 2, and 3 fabric was commercially sold as acetate, but results from predistribution and a consensus of responding laboratories reported these items as containing acetate and rayon.

In Table 1 - Association Results, 98 (96.1%) participants reported that Items 2 and 3 could have originated from Item 1. Two participants reported inconclusive results for Item 2 and that Item 3 could have originated from Item 1. Of the remaining participants, one reported that Item 2 could have originated from Item 1, but Item 3 could not have originated from Item 1. The other participant reported that Item 3 could have originated from Item 1, but Item 2 could not have originated from Item 1.

In Table 2 - Fiber Type Determination, it was reported by 91 (89.2%) participants that Items 1, 2, and 3 consisted of acetate and rayon. Of the remaining participants, four reported that the known Item 1 consisted of acetate and rayon, but did not report that both questioned Items 2 and 3 consisted of acetate and rayon. It was reported by three participants that the known Item 1 consisted only of acetate and also did not report that both questioned Items 2 and 3 consisted of acetate and rayon. Four participants reported other fiber types or generic names.

Association Results

Could the questioned fibers from the suspect's suit jacket (Item 2) and/or pants (Item 3) have originated from the victim's dress (Item 1)?

TABLE 1

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
27JTKE	Yes	Yes	DLRHWH	Inconclusive	Yes
2UPCVD	Yes	Yes	E62YJ8	Yes	Yes
3EQNAT	Yes	Yes	E87NQV	Yes	Yes
3FL99X	Yes	Yes	EJKLXK	Yes	Yes
3X64L7	Yes	Yes	EKF4XZ	Yes	Yes
49VDEK	Yes	Yes	EKG33G	Yes	Yes
4EKVVG	Yes	Yes	ET7MDU	Yes	Yes
4J7XDV	Yes	Yes	EVC9WF	Yes	Yes
7A63QV	Yes	Yes	EVYJX9	Yes	Yes
7D3LVF	Yes	Yes	F22AKK	Yes	Yes
7HGZUR	Yes	Yes	FAE23H	Yes	Yes
7MQE6Q	Yes	Yes	FE77X8	Yes	Yes
7QDYAV	Yes	Yes	FXXEUG	Yes	Yes
86PQKR	Yes	Yes	GA97WG	Yes	Yes
893T8N	Yes	Yes	GJXVU6	Yes	Yes
8CPBK3	Yes	Yes	GK84PV	Yes	Yes
8JL7DL	Yes	Yes	GWMUK8	Yes	Yes
8KJFFN	Yes	Yes	HKJYZG	Yes	Yes
8M9MYZ	Yes	Yes	J27XBL	Yes	Yes
8Q6CCD	Yes	Yes	JR3KFR	Yes	Yes
8Y34HM	Yes	Yes	KDD7JH	Yes	Yes
9HAQJK	Yes	Yes	KL7F2D	Yes	Yes
A86ZMN	Yes	Yes	KTPJ7V	Yes	Yes
A92HL6	Yes	Yes	L3AB2D	Yes	Yes
AAAVYR	Yes	No	LNRK9B	Yes	Yes
AHNFHQ	Yes	Yes	MEHAGC	Yes	Yes
ALRTGP	Yes	Yes	MKN72C	Yes	Yes
ATKLCP	Yes	Yes	MPH4GH	Yes	Yes
AVBNCW	Yes	Yes	N4FC8G	Yes	Yes
AZJ894	Yes	Yes	N7K6UF	Yes	Yes
CHFCLH	Yes	Yes	NCCCJN	Yes	Yes
CLFNGH	Yes	Yes	NVNWDY	Yes	Yes
CRPJLR	Yes	Yes	PCP2DF	Yes	Yes
D2NWWC	Yes	Yes	PWT7MF	Yes	Yes
D4YKP9	Yes	Yes	Q7C248	Yes	Yes
			QL3TVY	Yes	Yes

TABLE 1

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
QT8JQL	Yes	Yes			
R2XM6U	No	Yes			
R6XXX9	Yes	Yes			
R89FGE	Yes	Yes			
RH6LDX	Yes	Yes			
RXKM83	Yes	Yes			
TBGFTW	Yes	Yes			
TDTXC2	Yes	Yes			
TQWHHK	Yes	Yes			
TUGBN9	Yes	Yes			
U6R3R9	Yes	Yes			
UDM7V6	Yes	Yes			
UGMCDW	Yes	Yes			
ULUYVC	Yes	Yes			
UZYYY4	Yes	Yes			
V6QNPK	Yes	Yes			
V7ZVRD	Yes	Yes			
VG3VV9	Yes	Yes			
VRDMX9	Yes	Yes			
WTQEQP	Yes	Yes			
Y4Y4F6	Yes	Yes			
Y7QVK9	Yes	Yes			
Y8QETP	Yes	Yes			
YANDRN	Yes	Yes			
YHLBC7	Yes	Yes			
YWGR4P	Inconclusive	Yes			
Z2CJAZ	Yes	Yes			
ZHH2TX	Yes	Yes			
ZHZUW3	Yes	Yes			
ZJBXF7	Yes	Yes			
ZLZ6UN	Yes	Yes			

Response Summary Participants: 102

	Item 2		Item 3	
Yes:	99	*(97.1%)*	101	*(99.0%)*
No:	1	*(1.0%)*	1	*(1.0%)*
Inc:	2	*(2.0%)*	0	*(0.0%)*

Fiber Type Determination

What is the fiber type and generic name of the fiber(s) in each item?

TABLE 2

WebCode	Item 1	Item 2	Item 3
27JTKE	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
2UPCVD	Manufactured, Type 1 Rayon / Type 2 Acetate	Manufactured, Type 1 Rayon / Type 2 Acetate	Manufactured, Type 1 Rayon / Type 2 Acetate
3EQNAT	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
3FL99X	Manufactured, Acetate/Rayon	Manufactured, Acetate/Rayon	Manufactured, Acetate/Rayon
3X64L7	Manufactured, Acetate & Manufactured, Rayon	Manufactured, Acetate & Manufactured, Rayon	Manufactured, Acetate & Manufactured, Rayon
49VDEK	Manufactured,Rayon , Manufactured, Acetat	Manufactured,Rayon , Manufactured, Acetat	Manufactured,Rayon , Manufactured, Acetat
4EKVVG	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon
4J7XDV	Manufactured, regenerated cellulose	Manufactured, regenerated cellulose	Manufactured, regenerated cellulose
7A63QV	Manufactured Rayon and Manufactured Acetate	Manufactured Rayon and Manufactured Acetate	Manufactured Rayon and Manufactured Acetate
7D3LVF	Manufactured, Cellulose Acetate and Rayon	Manufactured, Cellulose Acetate and Rayon	Manufactured, Cellulose Acetate and Rayon
7HGZUR	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
7MQE6Q	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
7QDYAV	Manufactured, Rayon & Acetate	Manufactured, Rayon & Acetate	Manufactured, Rayon & Acetate
86PQKR	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate
893T8N	Manufactured-Rayon and Acetate	Manufactured-Rayon and Acetate	Manufactured-Rayon and Acetate
8CPBK3	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon

TABLE 2

WebCode	Item 1	Item 2	Item 3
8JL7DL	Manufactured, Acetate / Manufactured, Rayon	Manufactured, Acetate / Manufactured, Rayon	Manufactured, Acetate / Manufactured, Rayon / Vegetable and Manufactured-not further categorized
8KJFFN	Manufactured - Acetate & Rayon	Manufactured - Acetate & Rayon	Manufactured - Acetate & Rayon
8M9MYZ	Manufactured: Acetate and Rayon	Manufactured: Acetate and Rayon	Manufactured: Acetate and Rayon
8Q6CCD	Manufactured: Acetate + Rayon	Manufactured: Acetate + Rayon	Manufactured: Acetate + Rayon
8Y34HM	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
9HAQJK	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon
A86ZMN	Manufactured - Acetate, Manufactured - Rayon	Manufactured - Acetate, Manufactured - Rayon	Manufactured - Acetate, Manufactured - Rayon
A92HL6	Manufactured, Acetate and Rayon	Manufacture, Acetate and Rayon	Manufactured, Acetate and Rayon
AAAVYR	Manufactured, Rayon/Acetate	Manufactured, Rayon/Acetate	Manufactured, Rayon
AHNFHQ	Manufactured, Rayon & Acetate	Manufactured, Rayon & Acetate	Manufactured, Rayon & Acetate
ALRTGP	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon
ATKLCP	Manufactured, Rayon and Manufactured, Acetate	Manufactured, Rayon and Manufactured, Acetate	Manufactured, Rayon and Manufactured, Acetate
AVBNCW	Manufactured, Rayon and Manufactured, Acetate	Manufactured, Rayon and Manufactured, Acetate	Manufactured, Rayon and Manufactured, Acetate
AZJ894	Manufactured/Acetate and Manufactured/Rayon	Manufactured/Acetate and Manufactured/Rayon	Manufactured/Acetate and Manufactured/Rayon
CHFCLH	Manufactured, Acetate, Rayon	Manufactured, Acetate, Rayon	Manufactured, Acetate, Rayon
CLFNGH	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
CRPJLR	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon

TABLE 2

WebCode	Item 1	Item 2	Item 3
D2NWWC	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon
D4YKP9	Manufactured, Acetate/ Rayon	Manufactured, Acetate/ Rayon	Manufactured, Acetate/ Rayon
DLRHWH	white Manufactured, Rayon + yellow Manufactured Acetate	white Manufactured, Rayon + yellow Manufactured Acetate	white Manufactured, Rayon + yellow Manufactured Acetate
E62YJ8	Manufactured x 2	Manufactured x 2	Manufactured x 2
E87NQV	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
EJKLXK	Manufactured (Acetate, Rayon)	Manufactured (Acetate, Rayon)	Manufactured (Acetate, Rayon)
EKF4XZ	Manufactured Acetate and Rayon	Manufactured Acetate and Rayon	Manufactured Acetate and Rayon
EKG33G	Manufactured, Acetate / Manufactured, Rayon	Manufactured, Acetate / Manufactured, Rayon	Manufactured, Acetate / Manufactured, Rayon
ET7MDU	Manufactured Rayon and Acetate	Manufactured Rayon and Acetate	Manufactured Rayon and Acetate
EVC9WF	Manufactured - Acetate, Rayon	Manufactured - Acetate, Rayon	Manufactured - Acetate, Rayon
EVYJX9	Manufactured, Rayon. Manufactured, Acetate	Manufactured, Rayon. Manufactured, Acetate	Manufactured, Rayon. Manufactured, Acetate
F22AKK	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
FAE23H	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
FE77X8	Acetate	Acetate	Acetate
FXXEUG	Manufactured Acetate, Manufactured Rayon	Manufactured Acetate, Manufactured Rayon	Manufactured Acetate, Manufactured Rayon
GA97WG	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
GJXVU6	Manufactured Acetate and Rayon	Manufactured Acetate and Rayon	Manufactured Acetate and Rayon
GK84PV	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate

TABLE 2

WebCode	Item 1	Item 2	Item 3
GWMUK8	Manufactured, Rayon, Acetate	Manufactured, Rayon, Acetate	Manufactured, Rayon, Acetate
HKJYZG	Manufactured, Rayon & Manufactured, Acetate	Manufactured, Rayon & Manufactured, Acetate	Manufactured, Rayon & Manufactured, Acetate
J27XBL	Manufactured: Acetate, Rayon	Manufactured: Acetate, Rayon	Manufactured: Acetate, Rayon
JR3KFR	Acetate and Rayon	Acetate and Rayon	Acetate and Rayon
KDD7JH	Manufactured - Acetate Manufactured - Rayon	Manufactured - Acetate Manufactured - Rayon	Manufactured - Acetate Manufactured - Rayon
KL7F2D	Manufactured, Acetate, Rayon	Manufactured, Acetate, Rayon	Manufactured, Acetate, Rayon
KTPJ7V	Manufactured - Acetate and Rayon	Manufactured - Acetate and Rayon	Manufactured - Acetate and Rayon
L3AB2D	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate
LNRK9B	Manufactured, Rayon and Manufactured, Acetate	Manufactured, Rayon and Manufactured, Acetate	Manufactured, Rayon and Manufactured, Acetate
MEHAGC	Two types: Manufactured, Acetate, and Manufactured, Rayon	Two types: Manufactured, Acetate, and Manufactured, Rayon	Two types: Manufactured, Acetate, and Manufactured, Rayon
MKN72C	Man-made: Rayon and Acetate	Man-made: Rayon and Acetate	Man-made: Rayon and Acetate
MPH4GH	Manufactured Rayon and Acetate	Manufactured Rayon and Acetate	Manufactured Rayon and Acetate
N4FC8G	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
N7K6UF	Acetate + Rayon, Manufactured	Acetate + Rayon, Manufactured	Acetate + Rayon, Manufactured
NCCCJN	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
NVNWDY	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon	Manufactured, Acetate and Manufactured, Rayon
PCP2DF	Manufactured, Acetate	Manufactured, Acetate	Manufactured, Acetate/Rayon
PWT7MF	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate

TABLE 2

WebCode	Item 1	Item 2	Item 3
Q7C248	Manufactured, Rayon AND Acetate	Manufactured, Rayon AND Acetate	Manufactured, Rayon AND Acetate
QL3TVY	Manufactured, Acetate+Rayon	Manufactured, Acetate+Rayon	Manufactured, Acetate+Rayon
QT8JQL	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
R2XM6U	Manufactured, Rayon and Acetate	Manufactured, Acetate	Manufactured, Rayon and Acetate
R6XXX9	Manufactured, Acrylic and Rayon	Manufactured, Acrylic	Manufactured, Rayon
R89FGE	Manufactured, Acetate/Rayon	Manufactured, Acetate/Rayon	Manufactured, Acetate/Rayon
RH6LDX	Manufactured, Acetate; Manufactured, Rayon (viscose)	Manufactured, Acetate; Manufactured, Rayon (viscose)	Manufactured, Acetate; Manufactured, Rayon (viscose)
RXKM83	Manufactured: Rayon, Acetate	Manufactured: Rayon, Acetate	Manufactured: Rayon, Acetate
TBGFTW	Manufactured (Di) ACTETATE / Manufactured Rayon	Manufactured (Di) ACTETATE / Manufactured Rayon	Manufactured (Di) ACTETATE / Manufactured Rayon
TDTXC2	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon
TQWHHK	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon	Manufactured, Acetate; Manufactured, Rayon
TUGBN9	Manufactured Acetate and Manufactured Rayon	Manufactured Acetate and Manufactured Rayon	Manufactured Acetate and Manufactured Rayon
U6R3R9	Manufactured: Acetate; Manufactured: Rayon	Manufactured: Acetate; Manufactured: Rayon	Manufactured: Acetate
UDM7V6	Manufactured Acetate and Manufactured Rayon	Manufactured Acetate	Manufactured Acetate and Manufactured Rayon
UGMCDW	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
ULUYVC	Manufactured Acetate and Rayon	Manufactured Acetate and Rayon	Manufactured Acetate and Rayon
UZYYY4	Manufactured - Rayon/Acetate	Manufactured - Rayon/Acetate	Manufactured - Rayon/Acetate
V6QNPK	Manufactured, Rayon / Manufactured, Acetate	Manufactured, Rayon/ Manufactured, Acetate	Manufactured, Rayon/ Manufacutured, Acetate

TABLE 2

WebCode	Item 1	Item 2	Item 3
V7ZVRD	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate	Manufactured, Rayon and Acetate
VG3VV9	Manufactured, Rayon & Acetate fibers	Manufactured, Rayon & Acetate fibers	Manufactured, Rayon & Acetate fibers
VRDMX9	Two Fibres: Fibre 1 Manufactured Acetate; Fibre 2 Manufactured Rayon	Two Fibres: Fibre 1 Manufactured Acetate; Fibre 2 Manufactured Rayon	Two Fibres: Fibre 1 Manufactured Acetate; Fibre 2 Manufactured Rayon
WTQEQP	Manufactured, Acetate and Manufactured, Rayon.	Manufactured, Acetate and Manufactured, Rayon.	Manufactured, Acetate and Manufactured, Rayon.
Y4Y4F6	Manufactured, blend of Acetate & Rayon fibers	Manufactured, blend of Acetate & Rayon fibers	Manufactured, blend of Acetate & Rayon fibers
Y7QVK9	1) Manufactured, Acetate; 2) Manufactured, Rayon	1) Manufactured, Acetate; 2) Manufactured, Rayon	1) Manufactured, Acetate; 2) Manufactured, Rayon
Y8QETP	Manufactured, Acetate ; Manufactured, Rayon	Manufactured, Acetate ; Manufactured, Rayon	Manufactured, Acetate ; Manufactured, Rayon
YANDRN	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
YHLBC7	Manufactured, Acetate + Manufactured, Rayon	Manufactured, Acetate + Manufactured, Rayon	Manufactured, Acetate + Manufactured, Rayon
YWGR4P	Manufactured - Acetate	Manufactured - Acetate and Lyocell/Tencel® Blend	Manufactured - Acetate
Z2CJAZ	Manufactured: Acetate and Rayon	Manufactured: Acetate and Rayon	Manufactured: Acetate and Rayon
ZHH2TX	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon	Manufactured, Acetate and Rayon
ZHZUW3	Manufactured, Acetate Rayon	Manufactured, Acetate Rayon	Manufactured, Acetate Rayon
ZJBXF7	Manufactured (Rayon) / Manufactured (Acetate)	Manufactured (Rayon) / Manufactured (Acetate)	Manufactured (Rayon) / Manufactured (Acetate)
ZLZ6UN	Manufactured - Acetate, Manufactured - Rayon	Manufactured - Acetate, Manufactured - Rayon	Manufactured - Acetate, Manufactured - Rayon

Response Summary Participants: 102

Item 1			Item 2			Item 3		
Acetate & Rayon:	96	*(94.1%)*	Acetate & Rayon:	94	*(92.2%)*	Acetate & Rayon:	94	*(92.2%)*
Other:	6	*(5.9%)*	Other:	8	*(7.8%)*	Other:	8	*(7.8%)*

Examination Methods

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
27JTKE	✓	✓	✓	✓	✓	✓					
2UPCVD	✓	✓	✓	✓		✓	✓				
3EQNAT	✓		✓			✓					
3FL99X	✓		✓	✓		✓	✓		✓		Alternate Light Source (ALS)
3X64L7	✓	✓	✓	✓	✓	✓	✓		✓		TLC (thin layer chromatography)
49VDEK	✓	✓		✓		✓	✓				Raman
4EKVVG	✓	✓	✓	✓	✓	✓			✓	✓	
4J7XDV	✓		✓	✓	✓	✓	✓		✓		
7A63QV	✓		✓			✓					
7D3LVF	✓		✓			✓					
7HGZUR	✓	✓	✓	✓	✓	✓	✓	✓	✓		
7MQE6Q	✓		✓			✓	✓				Raman spectroscopy and Pyrolysis/GC/MS
7QDYAV	✓	✓	✓	✓	✓	✓	✓				
86PQKR	✓	✓	✓	✓	✓	✓	✓	✓	✓		Py-GC/MS
893T8N	✓	✓	✓		✓	✓					SEM-EDS
8CPBK3	✓	✓	✓	✓	✓	✓	✓				
8JL7DL	✓	✓	✓	✓	✓	✓	✓				
8KJFFN	✓	✓	✓	✓	✓	✓			✓		
8M9MYZ	✓	✓	✓	✓		✓		✓			
8Q6CCD	✓		✓			✓					
8Y34HM	✓	✓	✓	✓	✓	✓	✓				
9HAQJK	✓	✓	✓	✓		✓	✓				
A86ZMN	✓		✓			✓			✓		

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
A92HL6	✓	✓	✓	✓		✓			✓	✓	
AAAVYR	✓		✓			✓					
AHNFHQ	✓	✓	✓		✓	✓		✓		✓	
ALRTGP	✓	✓	✓	✓	✓	✓	✓				
ATKLCP	✓	✓	✓		✓	✓	✓		✓		Alternate Light Source
AVBNCW	✓	✓	✓		✓	✓					
AZJ894	✓	✓	✓	✓	✓	✓	✓				
CHFCLH	✓	✓	✓	✓	✓	✓	✓				Optical cross section
CLFNGH	✓		✓			✓					
CRPJLR	✓	✓	✓	✓		✓	✓				Raman, Py-GC/MS
D2NWWC	✓		✓		✓	✓					
D4YKP9	✓	✓	✓		✓	✓			✓		
DLRHWH	✓	✓	✓	✓	✓	✓	✓		✓		
E62YJ8	✓										
E87NQV	✓	✓		✓	✓	✓	✓				
EJKLXK	✓	✓	✓	✓	✓	✓		✓	✓		
EKF4XZ	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EKG33G	✓	✓	✓	✓	✓	✓			✓		
ET7MDU	✓		✓		✓						Morphology
EVC9WF	✓	✓	✓	✓	✓	✓	✓		✓		optical cross-section
EVYJX9	✓	✓	✓			✓					
F22AKK	✓	✓	✓		✓	✓			✓		
FAE23H	✓		✓	✓	✓	✓	✓				
FE77X8	✓	✓	✓			✓					

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
FXXEUG	✓	✓	✓	✓	✓	✓	✓			✓	
GA97WG	✓	✓	✓	✓	✓	✓	✓	✓			
GJXVU6	✓	✓	✓	✓	✓	✓					
GK84PV	✓	✓	✓	✓	✓	✓	✓		✓		
GWMUK8	✓	✓	✓		✓			✓		✓	
HKJYZG	✓	✓	✓		✓	✓	✓		✓		alternate light source
J27XBL	✓	✓	✓	✓	✓	✓	✓	✓			Dichloromethane and 50% Acetic Acid as a test for Di/triacetate
JR3KFR	✓			✓	✓	✓	✓		✓		SEM/EDS, Dye extraction, Compound microscope
KDD7JH	✓	✓	✓	✓	✓	✓	✓		✓		
KL7F2D	✓	✓	✓	✓	✓	✓		✓	✓		
KTPJ7V	✓	✓	✓	✓	✓	✓	✓			✓	
L3AB2D	✓	✓	✓	✓	✓	✓		✓	✓		
LNRK9B	✓	✓	✓		✓	✓	✓		✓		
MEHAGC	✓	✓	✓	✓	✓	✓			✓		
MKN72C	✓	✓	✓	✓	✓	✓		✓			
MPH4GH	✓		✓								
N4FC8G	✓	✓	✓			✓			✓		
N7K6UF	✓	✓	✓	✓	✓	✓		✓	✓		Raman spectroscopy, TLC, Classification of Dyes
NCCCJN	✓	✓	✓			✓				✓	
NVNWDY	✓		✓			✓	✓				
PCP2DF	✓	✓	✓		✓	✓					
PWT7MF	✓	✓	✓	✓	✓	✓	✓				
Q7C248	✓	✓	✓		✓	✓				✓	

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
QL3TVY	✓		✓	✓	✓	✓			✓		GC/MS-Pyrolysis
QT8JQL	✓	✓	✓	✓		✓					optical cross section
R2XM6U	✓	✓	✓			✓		✓		✓	
R6XXX9	✓		✓								
R89FGE	✓	✓			✓	✓					
RH6LDX	✓	✓	✓	✓	✓	✓	✓				UV-MSP
RXKM83	✓	✓	✓	✓		✓	✓		✓		
TBGFTW		✓	✓	✓		✓	✓				UVMSP, First Derivatives
TDTXC2	✓	✓	✓	✓		✓	✓				
TQWHHK	✓	✓	✓	✓	✓	✓	✓				
TUGBN9	✓		✓			✓	✓				raman spectroscope
U6R3R9	✓		✓			✓		✓			Burn Test
UDM7V6	✓	✓	✓	✓	✓	✓			✓		
UGMCDW	✓	✓	✓		✓	✓					
ULUYVC	✓	✓	✓		✓	✓			✓		
UZYYY4	✓	✓	✓			✓					ALS / fluorescence
V6QNPK	✓	✓	✓	✓	✓	✓	✓			✓	
V7ZVRD	✓	✓	✓	✓	✓	✓					HPTLC
VG3VV9	✓	✓	✓	✓		✓	✓				
VRDMX9	✓	✓	✓	✓	✓	✓	✓	✓			
WTQEQP	✓	✓	✓	✓	✓	✓	✓		✓		Raman
Y4Y4F6	✓		✓	✓	✓	✓			✓		VSC 8000, SEM
Y7QVK9	✓		✓	✓	✓	✓	✓		✓		
Y8QETP	✓					✓					

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
YANDRN	✓				✓	✓					PY-GC/MS ; SEM-EDS
YHLBC7	✓		✓			✓		✓		✓	
YWGR4P			✓		✓						
Z2CJAZ	✓	✓	✓	✓	✓	✓		✓	✓		
ZHH2TX	✓	✓	✓	✓	✓	✓	✓	✓	✓		
ZHZUW3	✓	✓	✓		✓	✓			✓		
ZJBXF7	✓		✓	✓	✓	✓			✓	✓	
ZLZ6UN	✓	✓	✓	✓		✓	✓	✓			

Response Summary

Participants	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point
102	100	74	95	61	67	96	47	20	38	12
Percent	*98%*	*73%*	*93%*	*60%*	*66%*	*94%*	*46%*	*20%*	*37%*	*12%*

Conclusions

TABLE 4

WebCode	Conclusions
27JTKE	The questioned fibers from the suspect's suit jacket (Item 2) and the questioned fibers from the suspect's suit pants (Item 3) were macroscopically and microscopically examined and compared to Item 1, the fibers comprising the known sample from the victim's dress. These examinations revealed that the questioned fibers from the suspect's suit jacket (Item 2) and suspect's suit pants (Item 3) were consistent in appearance, fiber types and microscopic characteristics to the fibers comprising the known sample from the victim's dress, and therefore, could have originated from that source. Because textile materials are mass produced, it is not possible to state that a fiber originated from a particular source to the exclusion of all other textile materials composed of fibers which exhibit the same physical, optical, and/or chemical properties.
2UPCVD	1. Exhibit 1 (known section of victim's dress) consists of a section of fabric containing two types of yarns. Yarn type 1 is composed of rayon fibers and yarn type 2 is composed of acetate fibers. 2. Comparative examination of the rayon and acetate fibers from Exhibit 1 with questioned rayon and acetate fibers from Exhibit 2 (questioned fibers from the suspect's suit jacket) disclosed them to be consistent in their microscopic characteristics, optical properties, and chemical properties. As a result of these findings, Exhibit 2 could have originated from the fabric in Exhibit 1 or another source of fibers with the same characteristics. 3. Comparative examination of the rayon and acetate fibers from Exhibit 1 with questioned rayon and acetate fibers from Exhibit 3 (questioned fibers from the suspect's suit pants) disclosed them to be consistent in their microscopic characteristics, optical properties, and chemical properties. As a result of these findings, Exhibit 3 could have originated from the fabric in Exhibit 1 or another source of fibers with the same characteristics. 4. Techniques utilized in this examination include stereo microscopy, polarized light microscopy, comparative microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy. 5. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type. 6. It should be noted that a fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source.
3EQNAT	Fibres from Item 2 and Item 3 are comparable with the fibres from Item 1 regarding the chemical class characteristics, morphological characteristics and generic class and therefore could have originated from the same source.
3FL99X	The fibers in Items 1-3 exhibited no significant differences in optical characteristics, color and chemical composition, therefore the fibers in Items 2 and 3 could have originated from the same source as the fibers in Item 1 or another similar source of gold Acetate and tan Rayon fibers.
3X64L7	The victim's dress (item 1) could not be excluded as a possible source of the gold coloured acetate fibres and the straw coloured rayon fibres from the suspect's jacket and pants (items 2 and 3 respectively). The gold coloured acetate fibres and straw coloured rayon fibres from the suspect's jacket and pants either originate from the victim's dress or originated from another garment(s) with indistinguishable fibres.
49VDEK	Fibers in item 2 and 3 is in all probability the same as the fibers in item 1. Fibers found on the suspects suit jacket and pants may originate from the victims dress.
4EKVVG	The questioned fibers (item #2) from the suspect's jacket and the questioned fibers (item #3) from the suspect's suit pants could have come from the victim's dress (item #1), or any other textile fabric which contains similar fibers. Comparison of questioned fibers to textiles cannot associate a questioned fiber to a specific textile since textiles are commonly mass produced.
4J7XDV	Both the fibre samples of the victim´s dress (item 1) and the questioned fibre samples from the suspect´s suit jacket (item 2) and pants (item 3) consist of pale yellow regenerated cellulose fibres. They match in

TABLE 4

WebCode	Conclusions
	all examined criteria. Therefore it is highly likely that the fibre traces from the suspect´s suit jacket and pants originate from a textile similar to the golden dress that the victim has worn during the incident.
7A63QV	The fibers recovered from the suspects suit jacket and pants were consistent with the fibers in the known section of the victim's dress. It is possible that the fibers found on the suspects suit jacket and pants could have originated from the victim's dress.
7D3LVF	Both item 2 and item 3 contain two types of fibers, Cellulose acetate and Rayon, and they both could be originated from item1.
7HGZUR	Item 1 is composed of light gold acetate fibers and colorless rayon fibers. These fibers were used for comparison purposes. Light gold acetate and colorless rayon fibers were recovered from the suspect's suit jacket (Item 2) and suit pants (Item 3) which are similar in microscopic characteristics, size, shape, fiber type, and/or color to the known light gold acetate fibers and colorless rayon fibers from the victim's dress (Item 1). It is my opinion that these fibers could have originated from the victim's dress or any other source with similar fibers.
7MQE6Q	The fibers of Item-1, item-2 and item-3, have the same caracteristics. Thus the fibers found on the suspect’s suit jacket (item-2) and the suspect’s suit pants (item-3) come from the victim’s dress (Item-1) or from another textile item of indisguishable fibers.
7QDYAV	Results of Fiber Analysis: Microscopic and instrumental examination of the representative fibers in Items 1, 2, and 3 revealed white rayon (A) and tan acetate (B) fibers. Results of Fiber Comparison: The representative white rayon and tan acetate fibers in Items 1 and 2 were found to be similar in microscopic, optical, chemical, and color properties. They could have come from the same source or any other source with the same properties. The representative white rayon and tan acetate fibers in Items 1 and 3 were found to be similar in microscopic, optical, chemical, and color properties. They could have come from the same source or any other source with the same properties.
86PQKR	The gold rayon and acetate fibers from the suspect's suit jacket and pants (Items 2 and 3) either originated from the victim's gold rayon and acetate dress (Item 1) or from another fiber source with the same optical, physical, and chemical properties (Level III Association).
893T8N	Item 1 is a piece of fabric composed of both acetate and rayon. Items 2 and 3 are also composed of fibers having both acetate and rayon. Items 2 and 3 could have originated from item 1.
8CPBK3	The known section of the victim's dress (Item 1) was composed of gold yarns and white yarns. The gold yarns were composed of acetate fibres and the white yarns were composed of rayon fibres. The questioned fibres from the suspect's suit jacket (Item 2) were comprised of two gold yarns and two white yarns. The gold yarns were comprised of acetate fibres, these fibres corresponded in colour, composition and appearance to the gold yarns/fibres from the known section of the victim's dress. The white yarns were comprised of rayon fibres, these fibres corresponded in colour, composition and appearance to the white yarns/fibres from the known section of the victim's dress. The questioned fibres from the suspect's suit pants (Item 3) were comprised of two gold yarns and two white yarns. The gold yarns were comprised of acetate fibres, these fibres corresponded in colour, composition and appearance to the gold yarns/fibres from the known section of the victim's dress. The white yarns were comprised of rayon fibres, these fibres corresponded in colour, composition and appearance to the white yarns/fibres from the known section of the victim's dress.
8JL7DL	Faint yellow rayon and acetate fibers recovered from Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. No other apparent transfer of textile fibers was detected between Item 1 and Items 2 and 3. The specimens were examined visually using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, and

TABLE 4

WebCode	Conclusions
	instrumentally using microspectrophotometry and Fourier transform-infrared spectroscopy, where appropriate.
8KJFFN	The known fibers in item 1 can not be excluded as being a possible source for the fibers in item 2 and item 3.
8M9MYZ	The result of the examination strongly support that the questioned fibers from the suspect´s suit jacket (Item 2) and suit pants (Item 3) originates from of the victim´s dress (Item 1) (Level +3).
8Q6CCD	The fibres from Item 2 and Item 3 are comparable with the fibres from Item 1 regarding the morphology, chemical class characteristics and generic class and could have originated from the same source.
8Y34HM	Off-white acetate fibers recovered from Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the off-white acetate fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. Off-white rayon fibers recovered from Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the off-white rayon fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties.
9HAQJK	Off-white rayon fibers recovered from Items 2 and 3 and tan acetate fibers recovered from Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. No other fibers were recovered from Items 2 and 3. The specimens were examined using the following techniques as appropriate: stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform-infrared spectroscopy.
A86ZMN	Items 1-3 were examined/tested stereoscopically, microscopically and instrumentally using Fourier transform Infrared spectrometry. Known fibers submitted as item 1 and questioned fibers submitted as items 2 and 3 were each consistent with two types of manufactured fibers: acetate and rayon. Using the above testing methods, fibers from 1-3 displayed similar stereoscopic, microscopic and chemical properties. Therefore items 1, 2, and 3 may share a common source of origin.
A92HL6	Comparative examinations of the colorless acetate and rayon fibers that compose Exhibit 1 (known section of the victim's dress) with the microscopically colorless acetate and rayon yarns/fibers recovered from Exhibit 2 (questioned fibers from the suspect's suit jacket) and Exhibit 3 (questioned fibers from the suspect's suit pants) disclosed them to be consistent in their microscopic characteristics, optical properties and chemical properties. As a result of these findings, the acetate and rayon yarns/fibers recovered from Exhibits 2 and 3 could have originated from the same source as the acetate and rayon fibers in Exhibit 1, or another source with the same characteristics. Techniques utilized in these examinations include stereomicroscopy, polarized light microscopy, transmitted light and fluorescence comparison microscopy, hot stage microscopy for melting point, and Fourier transform infrared microspectroscopy. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type.
AAAVYR	The sample, three individually packaged textile specimens, was received with a brwon envelop labeled 'item 1 to 3' respectively. Item 1: Acetate and Rayon. Item 2: Acetate and Rayon. Item 3: Rayon. Item 2 could have originated from the victim's dress (item 1) since they are both of acetate and rayon. [Laboratory] methods: 50-01R4 (AATCC 20), 50-10R3 (ASTM E1252).

TABLE 4

WebCode	Conclusions
AHNFHQ	Item 1: The fabric is woven off-white and yellow yarns, which are composed of colorless rayon and yellow acetate fibers. The fibers were compared to submitted questioned samples. Refer to Items 2 and 3 for results of comparisons. Item 2: The yarns are composed of colorless rayon and yellow acetate fibers. These fibers were compared to the known fabric from victim's dress, Item 1. The samples are consistent with each other in color (visual and microscopic), size, cross sectional shape, optical properties, and chemical composition. In addition, the acetate fibers are consistent with each other in solubility and melting point. No discriminating differences were observed between these questioned fibers and fibers composing the known sample. Therefore, these questioned fibers from the suit jacket could have originated from the dress or from another source exhibiting all of the same analyzed characteristics. Item 3: The yarns are composed of colorless rayon and yellow acetate fibers. These fibers were compared to the known fabric from victim's dress, Item 1. The samples are consistent with each other in color (visual and microscopic), size, cross sectional shape, optical properties, and chemical composition. In addition, the acetate fibers are consistent with each other in solubility and melting point. No discriminating differences were observed between these questioned fibers and fibers composing the known sample. Therefore, these questioned fibers from the suit pants could have originated from the dress or from another source exhibiting all of the same analyzed characteristics.
ALRTGP	The victims dress (item 1) is made of a satin weave consisting of a mixture of light brown acetate fibres and white (colourless) rayon fibres. The traces recovered from the suspect'suit jacket (item 2) and suit pants (item 3) cannot be discriminated from these materials by any of the applied methods. These results strongly support the hypothesis that the victim's dress is the source of the traces recovered from the suspect's clothing.
ATKLCP	Items 2 and 3 could have originated from Item 1 as represented by the known submitted exemplar, or from another source exhibiting all of the same analyzed/measured characteristics. Because textile fibers are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit all the same properties.
AVBNCW	The two thread types from item 2 are similar in all examined characteristics to the two thread types that comprise the fabric from item 1. Therefore, the threads from the suspect's suit jacket could have originated from the victim's dress (as represented by the submitted fabric) or another article of clothing of a similarly manufactured fabric. The two thread types from item 3 are similar in all examined characteristics to the two thread types that comprise the fabric from item 1. Therefore, the threads from the suspect's suit pants could have originated from the victim's dress (as represented by the submitted fabric) or another article of clothing of a similarly manufactured fabric.
AZJ894	1. Examination of Exhibit 001 (the known fibers that compose the section of the victim's dress) disclosed the presence of acetate and rayon fibers. Examination of Exhibit 002 (the fibers that composed the threads recovered from the suspect's suit jacket) disclosed the presence of acetate and rayon fibers. Examination of Exhibit 003 (the fibers that composed the threads recovered from the suspect's suit pants) disclosed the presence of acetate and rayon fibers. 2. Comparative examinations of Exhibit 001 (the known fibers that compose the section of the victim's dress) with Exhibit 002 (the fibers that composed the threads recovered from the suspect's suit jacket) and Exhibit 003 (the fibers that composed the threads recovered from the suspect's suit pants) disclosed them to be consistent in their microscopic characteristics, optical properties, and chemical properties. As a result of these findings, Exhibits 002 and 003 could have originated from Exhibit 001, or another source with the same characteristics. 3. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type. 4. Techniques utilized in this examination include stereo microscopy, polarized light microscopy, comparative microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy.
CHFCLH	The light yellow acetate fibers that comprise the gold threads in Items 2 and 3 have the same

TABLE 4

WebCode	Conclusions
	microscopic characteristics and optical properties as the light yellow acetate fibers that comprise the gold threads in Item 1. Accordingly, the light yellow acetate fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. The very light tan rayon fibers that comprise the tan threads in Items 2 and 3 have the same microscopic characteristics and optical properties as the very light tan rayon fibers that comprise the tan threads in Item 1. Accordingly, the very light tan rayon fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. The specimens were examined visually using stereomicroscopy, comparison microscopy, fluorescence microscopy, polarized light microscopy, microspectrophotometry, and infrared spectroscopy, where appropriate.
CLFNGH	Fibers from Item 2 and Item 3 are comparable with the fibers from Item 1, regarding the morphology, chemical class characteristics and generic class and could have originated from the same source.
CRPJLR	Fibers Q1 and Q3 are both physically and optically consistent to fibers K1 with no discriminating differences. Fibers Q1.1 and Q3.1 (subsets of Q1 and Q3, respectively) are both chemically consistent to fibers K1.1 (subset of K1) with no discriminating differences. Fibers Q2 and Q4 are both physically and optically consistent to fibers K2 with no discriminating differences. Fibers Q2.1 and Q4.1 (subsets of Q2 and Q4, respectively) are both chemically consistent to fibers K2.1 (subset of K2) with no discriminating differences. Fibers Q1.1 and Q2.1 (Laboratory item #2) and Fibers Q3.1 and Q4.1 (Laboratory item #3) could have originated from the source (Laboratory item #1) represented by Fibers K1.1 and K2.1 or from another source exhibiting all of the same analyzed characteristics. No conclusions are reached about the remaining Q1, Q2, Q3, Q4, K1, or K2 fibers. Because textile fibers are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit the same physical, optical, and chemical properties.
D2NWWC	Item 2, fibers from suspect's suit jacket, could have originated from Item 1, the victim's dress. Item 3, fibers from suspect's suit pants, could have originated from Item 1, the victim's dress.
D4YKP9	Items 1, 2, and 3 were microscopically examined with a stereomicroscope and a compound microscope. The items corresponded in color, cross-sectional shape, and other microscopic characteristics. Items 1,2 and 3 corresponded in fiber type (FTIR) and were determined to consist of acetate and rayon fibers.
DLRHWH	Questioned fibers from the suspect's suit pants (item 3) are not differentiated from known section of the victim's dress (item 1). Fibers from item 3 can come from the victim's dress (item 1) or from another textile material with the same characteristics. Questioned fibers from the suspect's suit jacket (item 2) present the same characteristics (morphology, fiber type, cross section) than fibers from item 1. Fibers from item 2 are not homogeneous (colour) : it is not possible to determine if they can come from item 1 or not.
E62YJ8	In my opinion, comparisons at low power microscopy show the two distinct fibres recovered from item two (the suspects jacket) and the two distinct fibres recovered from item three (the suspects trousers)are indistinguishable from each other and indistinguishable from the two constituent fibres of item one (the victims dress). In that, the fibres recovered from item two and item three could have originated from item one. In order to establish whether or not the fibres are matching fibres, additional, more discriminatory testing would have to be carried out by an external forensic provider.
E87NQV	The questioned fibres were in agreement with the known fibres by the following techniques: macroscopic and microscopic features, fluorescence, polarised light microscopy, MSP and FTIR. Based on the results of the examinations performed , I am of the opinion that the findings provide very strong support for the proposition that the fibres recovered from the suspect's suit jacket (item 2) and suit pants (item 3), came from the victim's dress (item 1).

TABLE 4

WebCode	Conclusions
EJKLXK	Examination of Item #1 revealed the presence of a small piece of gold fabric comprised of gold acetate warp yarns and pale gold rayon fill yarns. Examination of Item #2 revealed the presence of four yarns: two gold and two pale gold. The two gold yarns were identified as Warp Yarn A and B and the two pale gold yarns as Fill Yarn A and B. Warp Yarns A and B were consistent in color, construction and microscopic characteristics with each other, as well as with the gold warp yarns in Item #1. Fibers from Warp Yarn A were further analyzed and found to be consistent in chemical composition with the acetate fibers from the warp yarns in Item #1. Therefore, Warp Yarn A from Item #2 could have originated from the same source as the fabric in Item #1. Fill Yarns A and B were consistent in color, construction and microscopic characteristics with each other, as well as with the pale gold fill yarns in Item #1. Fibers from Fill Yarn A were further analyzed and found to be consistent in chemical composition with the rayon fibers from the fill yarns in Item #1. Therefore, Fill Yarn A from Item #2 could have originated from the same source as the fabric in Item #1. Examination of Item #3 revealed the presence of four yarns: two gold and two pale gold. The two gold yarns were identified as Warp Yarn A and B and the two pale gold yarns as Fill Yarn A and B. Warp Yarns A and B were consistent in color, construction and microscopic characteristics with each other, as well as with the gold warp yarns in Item #1. Fibers from Warp Yarn A were further analyzed and found to be consistent in chemical composition with the acetate fibers from the warp yarns in Item #1. Therefore, Warp Yarn A from Item #3 could have originated from the same source as the fabric in Item #1. Fill Yarns A and B were consistent in color, construction and microscopic characteristics with each other, as well as with the pale gold fill yarns in Item #1. Fibers from Fill Yarn A were further analyzed and found to be consistent in chemical composition with the rayon fibers from the fill yarns in Item #1. Therefore, Fill Yarn A from Item #3 could have originated from the same source as the fabric in Item #1.
EKF4XZ	Examination of Exhibit 1 (known section of the victim's dress) disclosed the presence of a woven fabric consisting of acetate and rayon fibers. Exhibit 2 (questioned fibers from the suspect's suit jacket) and Exhibit 3 (questioned fibers from the suspect's suit pants) disclosed the presence of loose fibers consisting of acetate and rayon fibers. Comparative examinations of Exhibit 1 with Exhibits 2 and 3 disclosed them to be consistent in their microscopic characteristics, optical properties, and chemical properties. As a result of these findings, Exhibits 2 and 3 could have originated from the fabric in Exhibit 1 or another source with the same characteristics. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type. Techniques utilized in this examination include stereo microscopy, polarized light microscopy, comparative microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy.
EKG33G	Four yarns from Item 2, questioned yarns "from the suspect's suit jacket," were examined and compared visually and microscopically to yarns composing Item 1, known section of the victim's dress, and were found to be consistent in appearance, construction, generic fiber types and microscopic characteristics. Therefore, the four yarns from Item 2 could have come from Item 1. Four yarns from Item 3, questioned yarns "from the suspect's suit pants," were examined and compared visually and microscopically to yarns composing Item 1 and were found to be consistent in appearance, construction, generic fiber types and microscopic characteristics. Therefore, the four yarns from Item 3 could have come from Item 1.
ET7MDU	The questioned fibers from the suspect suit jacquet and pants could have originated from the victim's dress.
EVC9WF	Off-white acetate fibers found in Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the off-white acetate fibers comprising Item 1; accordingly, these fibers are consistent with originating from Item 1 or from another item comprised of textile fibers which exhibit the same microscopic characteristics and optical properties. White rayon fibers found in Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the white rayon fibers comprising Item 1; accordingly, these fibers are consistent with originating from Item 1 or from another item comprised of textile fibers which exhibit the same microscopic characteristics and optical properties. The submitted

TABLE 4

WebCode	Conclusions
	items were examined using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier Transform-Infrared Spectroscopy, where appropriate.
EVYJX9	Items No 2 & 3 match with the reference Item No 1. Therefore, items1, 2 & 3 could have been originated from the same source.
F22AKK	Item 1 consists of fabric composed of two different threads woven together. The loose twisted, regularly spaced crimp threads (1A) are composed of acetate fibers. The tightly twisted, looped threads (1B) are composed of rayon fibers. Item 2 consists of a few regularly spaced crimp threads (2A) composed of acetate fibers and a few tightly twisted, looped threads (2B) composed of rayon fibers. Item 3 consists of a few regularly spaced crimp threads (3A) composed of acetate fibers and a few tightly twisted, looped threads (2B) composed of rayon fibers. FINAL CONCLUSIONS: The threads and fibers from Item 1 (Known sample from victim's dress), Item 2 (Questioned sample from suspect's suit jacket), and Item 3 (Questioned sample from suspect's suit pants) were found to be similar in macroscopic appearance, microscopic characteristics (PLM), and chemical composition (FTIR). The victim's dress or another item composed of the same fabric could be the source of the threads on the suspect's suit.
FAE23H	Questioned fibers found on the suspect's suit jacket (Item 2) and on the suspect's suit paints (Item 3) could have come from the victim's dress (Item 1).
FE77X8	Item 1: Fibers identified as acetate fibers. Item 2: Fibers identified as acetate fibers. Item 3: Fibers identified as acetate fibers. The gold questioned fibers (Item 2) from the suspect's suit jacket and the gold questioned fibers (Item 3) from the suspect's suit pants could have originated from the victim's dress (Item 1) or another similarly manufactured material.
FXXEUG	Item 1 was found to contain two types of yarn, microscopically light yellowish-orange yarns and microscopically colourless yarns. Based on yarn construction, microscopic characteristics, fluorescence, instrumental colour analysis, chemical composition and melting range of fibres, the microscopically light yellowish-orange yarns found in "Item 2" and "Item 3" could have originated from the fabric of the dress marked "Item 1", or from other sources containing yarns of similar characteristics. Based on yarn construction, microscopic characteristics, fluorescence, chemical composition and melting range of fibres, the microscopically colourless yarns found in "Item 2" and "Item 3" could have originated from the fabric of the dress marked "Item 1", or from other sources containing yarns of similar characteristics. Based on microscopic characteristics, fluorescence, chemical composition and melting range of fibres, two microscopically colourless fibres from the clump of fibres found in "Item 3" could not be ruled out as having originated from the fabric of the dress marked "Item 1".
GA97WG	The trace fibers from the suspect`s suit jacket (Item2) and from the suspect`s suit pants (Item 3) could have originated from the victim`S dress (Item 1).
GJXVU6	Items 2 and 3 both contain rayon and acetate fibers that are consistent with the acetate and rayon fibers in Item 1.
GK84PV	1. Examination of Exhibit 1 disclosed the presence of a woven fabric composed of rayon and acetate fibers. 2. Comparative examinations of Exhibit 1 with fibers present in Exhibits 2 and 3 disclosed them to be consistent in their microscopic characteristics, optical properties, and chemical properties. As a result of these findings, Exhibits 2 and 3 could have originated from Exhibit 1, or another source with the same characteristics. 3. Techniques utilized in this examination include stereomicroscopy, polarized light microscopy, comparative microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy. 4. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. 5. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source. 6. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type.

TABLE 4

WebCode	Conclusions
GWMUK8	1.The sample received as the "Known section of the victims dress" (Item 1)is composed by golden rayon and acetate fibers. 2. The sample received as the "Questioned fibers from the suspects suit jacket" (Item 2)is made by golden rayon and acetate fibers. 3. The sample received as the "Questioned fibers from the suspects suit pants" (Item 3)is made by golden rayon and acetate fibers. 4.According with the physical,chemical-properties evaluated, the questioned fibers received as item 2 and item 3 are indistinguishable from the sample received as item 1.
HKJYZG	Item 2 could have originated from Item 1 as represented by the known submitted exemplar or from another source exhibiting all of the same analyzed/measured characteristics. Item 3 could have originated from Item 1 as represented by the known submitted exemplar or from another source exhibiting all of the same analyzed/measured characteristics.
J27XBL	Item 2,3 could have originated from Item 1
JR3KFR	'Item 1' contained a sample of fabric consisting of tightly twisted threads of off-white rayon (viscose) fibres constructing the warp and twisted threads of golden coloured acetate fibres constructing the weft. 'Item 2' contained two threads each of tightly twisted threads of off-white rayon (viscose) fibres and twisted golden coloured threads of acetate fibres. 'Item 3' contained two threads each of tightly twisted threads of off-white rayon (viscose) fibres and twisted golden coloured threads of acetate fibres. No significance differences were detected between the appearance, size, fibre types and dyes present on the threads in 'Item 2' and 'Item 3' and the corresponding threads in the sample of fabric 'Item 1'. It is my opinion that this result provides strong support for the contention that the threads in 'Item 2' and 'Item 1' originated from the same source as the fabric in 'Item 1'
KDD7JH	The gold colored acetate fibers and the white rayon fibers labeled “questioned fibers from the suspect’s suit jacket”, item 2, are consistent in color, physical characteristics, and chemical composition as compared to the gold colored acetate fibers and the white rayon fibers labeled “known section of the victim’s dress”, item 1. Level III Association. The gold colored acetate fibers and the white rayon fibers labeled “questioned fibers from the suspect’s suit pants”, item 3, are consistent in color, physical characteristics, and chemical composition as compared to the gold colored acetate fibers and the white rayon fibers labeled “known section of the victim’s dress”, item 1. Level III Association.
KL7F2D	Examination of Item 1 revealed the presence of a swatch of yellow/gold woven fabric comprised of gold acetate yarns and pale yellow rayon yarns. Examination of Item 2 revealed the presence of two yarns composed of gold fibers and two yarns composed of pale yellow fibers. The gold yarns in Item 2 were found to be consistent in color and construction with the gold yarns in Item 1. Further analysis of a representative fiber from one of the yarns revealed the fiber to be acetate. This gold acetate fiber was chemically consistent with a representative gold fiber from Item 1. Therefore, the gold acetate yarn in Item 2 could have originated from the same source as Item 1. The pale yellow yarns in Item 2 were found to be consistent in color and construction with the pale yellow yarns in Item 1. Further analysis of a representative fiber from one of the yarns revealed the fiber to be rayon. This pale yellow rayon fiber was chemically consistent with a representative pale yellow fiber from Item 1. Therefore, the pale yellow rayon yarn in Item 2 could have originated from the same source as Item 1. Examination of Item 3 revealed the presence of two yarns composed of gold fibers and two yarns composed of pale yellow fibers. The gold yarns in Item 3 were found to be consistent in color and construction with the gold yarns in Item 1. Further analysis of a representative fiber from one of the yarns revealed the fiber to be acetate. This gold acetate fiber was chemically consistent with a representative gold fiber from Item 1. Therefore, the gold acetate yarn in Item 3 could have originated from the same source as Item 1. The pale yellow yarns in Item 3 were found to be consistent in color and construction with the pale yellow yarns in Item 1. Further analysis of a representative fiber from one of the yarns revealed the fiber to be rayon. This pale yellow rayon fiber was chemically consistent with a representative pale yellow fiber from Item 1. Therefore, the pale yellow rayon yarn in Item 3 could have originated from the same source as Item 1.

TABLE 4

WebCode	Conclusions
KTPJ7V	CONCLUSIONS: Questioned fibers identified as from the suspect's jacket (item 2) and pants (item 3) originated from the victim's dress (item 1) or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. RESULTS: The questioned fibers identified as from the suspect's jacket (item 2) and pants (item 3) were examined to determine whether or not there are any fibers present that are consistent with the victim's dress (item 1). Examination of the section of the victim's dress (item 1) reveals it is primarily composed of gold in color acetate and light yellow rayon. Examination of the questioned fibers from the suit jacket (item 2) reveals the presence of several threads. Examination and comparison of questioned threads (item 2) with threads from the victim's dress (item 1) reveals they are consistent in construction. Further examination and comparison of fibers composing the threads from item 2 reveals the presence of gold acetate and light yellow rayon that are consistent in microscopic, optical, and chemical characteristics with the known fibers of the dress item 1. It is therefore concluded the questioned fibers originated from the dress or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. Examination of the questioned fibers from the suit pants (item 3) reveals the presence of several threads. Examination and comparison of questioned threads (item 3) with threads from the victim's dress (item 1) reveals they are consistent in construction. Further examination and comparison of fibers composing the threads from item 3 reveals the presence of gold acetate and light yellow rayon that are consistent in microscopic, optical, and chemical characteristics with the known fibers of the dress item 1. It is therefore concluded the questioned fibers originated from the dress or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. METHODS OF ANALYSIS: Examinations were performed visually, by stereo microscopy, brightfield/polarized light comparison microscopy, fluorescence microscopy, microspectrophotometry, thermal microscopy and Fourier transform infrared microspectroscopy.
L3AB2D	Examinations: Questioned tan threads recovered from a suit jacket (Item 2) and questioned tan threads recovered from suit pants (Item 3) were compared to known fabric from a dress (Item 1) using stereomicroscopy and fluorescence. Fibers from the questioned threads were compared to fibers from the known fabric using polarized light microscopy, fluorescence, infrared spectroscopy, and chemical solubility tests. Thread comparisons: The known fabric was comprised of two types of threads. The tested threads from the textured side of the fabric were identified as rayon fibers; the tested threads from the flat side of the fabric were identified as acetate fibers. Four threads were observed within Item 2. Two threads, comprised of rayon fibers, were similar in physical characteristics and fluorescence to the known threads comprised of rayon fibers; two threads, comprised of acetate fibers, were similar in physical characteristics and fluorescence to the known threads comprised acetate fibers. Four threads were observed within Item 3. Two threads, comprised of rayon fibers, were similar in physical characteristics and fluorescence to the known threads comprised of rayon fibers; two threads, comprised of acetate fibers, were similar in physical characteristics and fluorescence to the known threads comprised acetate fibers. Fiber comparisons: The tested rayon fibers from each questioned sample were similar to the known rayon fibers in all tests performed. The tested acetate fibers from each questioned sample were similar to the known acetate fibers in all tests performed. Conclusions: The dress represented by Item 3 is a possible source of both of the questioned thread types within Item 2 and both of the thread types within Item 3. Because similar threads have been manufactured that would be indistinguishable from the submitted evidence, an individual source cannot be determined. Multiple associations of questioned and known thread types may increase the significance of the fiber evidence.
LNRK9B	Item 1: This item is comprised of two different fiber types and was used for comparison purposes. Item 2: This item contains several threads comprised of two different fiber types. Fibers from a portion of these threads were selected for further analysis and are similar in color, optical properties, and fiber type to both of the known fiber types from the victim's dress (Item 1). It is my opinion that the questioned fibers could have come the victim's dress or any other garment with similar fiber characteristics (Category 2B). No analysis was performed on the remaining fibers or threads. Item 3: This item contains several threads comprised of two different fiber types. Fibers from a portion of these threads were selected for further analysis and are similar in color, optical properties, and fiber type to both of the known fiber types from the victim's dress (Item 1). It is my opinion that the questioned fibers could have

TABLE 4

WebCode	Conclusions
	come the victim's dress or any other garment with similar fiber characteristics (Category 2B). No analysis was performed on the remaining fibers or threads.
MEHAGC	Item 1.1 known fibers from victim. Analysis Result: The Item 1.1 fibers consist of gold acetate fibers and colorless rayon fibers. Item 1.2 questioned fibers from suspect's jacket. Analysis Result: The item 1.2 fibers consist of gold acetate fibers and colorless rayon fibers. The Item 1.2 fibers are similar in microscopic characteristics and chemical composition to the Item 1.1 fibers from the victim. This is a Type III Association as described at the end of this report. Item 1.3 questioned fibers from suspect's pants. Analysis Result: The Item 1.3 fibers consist of gold acetate fibers and colorless rayon fibers. The Item 1.3 fibers are similar in microscopic characteristics and chemical composition to the Item 1.1 fibers from the victim. This is a Type III Association as described at the end of this report. Analysis was conducted by polarized light microscopy, comparison microscopy, and Fourier transform infrared spectroscopy.
MKN72C	The questioned fibers in Item 2 (from the suspect's suit jacket) and Item 3 (from the suspect's suit pants) corresponded in microscopic characteristics (PLM), color (tan), type (rayon, acetate), crimp, fluorescence, solubilities (acetonitrile) and chemical composition (FTIR) to the known fibers in Item 1 (from victim's dress). Therefore, Items 1, 2 and 3 could have a common source (Type III Association). It should be noted that the analytical techniques used allow for a high degree of discrimination between different fibers, however, other textiles containing fibers made to the same specifications (type, color, microscopic characteristics, etc) would be indistinguishable from these fibers. KEY for instrument acronyms: FTIR – Fourier Transform Infrared Spectroscopy; PLM – Polarized Light Microscopy. Interpretation: The following descriptions are meant to provide context to the opinions reached in this report. Every type of conclusion may not be applicable in every case or for every material type. Type I Association: Identification: An association in which items share individual characteristics and/or physically fit together that demonstrate the items were once from the same source. Type II Association: Association with distinct characteristics: An association in which items correspond in all measured physical properties, chemical composition and/or microscopic characteristics and share distinctive characteristic(s) that would not be expected to be found in the population of this evidence type. The distinctive characteristics were not sufficient for a Type I Association. Type III Association: Association with conventional characteristics: An association in which items correspond in all measured physical properties, chemical composition and/or microscopic characteristics and could have originated from the same source. Because it is possible for another sample to be indistinguishable from the submitted evidence, an individual source cannot be determined. Type IV Association: Association with limitations: An association in which items could not be differentiated based on observed and/or measured properties and/or chemical composition. As compared to the categories above, this type of association has decreased evidential value as a result of items that are more commonly encountered in the relevant population, the inability to perform a complete analysis, limited information, or minor variations observed in the data. Inconclusive: No conclusion could be reached regarding an association or an elimination between the items. Dissimilar: The items were dissimilar in physical properties and/or chemical composition, indicating that the items may not have originated from the same source. However, these dissimilarities were insufficient for a definitive Elimination. Elimination: Items exhibit dissimilarities in one or more of the following: physical properties, chemical composition or microscopic characteristics and, therefore, conclusively did not originate from the same source.
MPH4GH	The fibers isolated on items 2 and 3 compare favorably with the fibers isolated from the victim's dress, item 1 and most probably share a common origin.
N4FC8G	Examinations Performed: Visual, Stereomicroscopy, Comparison Light Microscopy, Polarized Light Microscopy, and Fourier Transform Infrared Spectroscopy. Gold acetate and tan rayon fibers recovered from Item 2 exhibit the same microscopic characteristics as the known gold acetate and tan rayon fibers in the swatch in Item 1. Therefore, the questioned gold acetate and tan rayon fibers in Item 2 could have originated from the same source as the known gold acetate and tan rayon fibers in Item 1. Gold acetate and tan rayon fibers recovered from Item 3 exhibit the same microscopic characteristics as the known gold acetate and tan rayon fibers in the swatch in Item 1. Therefore, the questioned gold acetate

TABLE 4

WebCode	Conclusions
	and tan rayon fibers in Item 3 could have originated from the same source as the known gold acetate and tan rayon fibers in Item 1. Remarks: It is pointed out that textile fibers do not possess enough individual microscopic characteristics to be positively identified as originating from a particular garment to the exclusion of all other similar garments.
N7K6UF	The questinoned fibers from the suspect's suit jacket (Item 2) and pants (Item 3) could have originated from the victim's dress (Item 1).
NCCCJN	The fibers from Item 2 (loose fibers from suit jacket) and from Item 3 (loose fibers from suit pants) were identified as acetate and rayon fibers. These fibers are similar in physical properties and chemistry to the acetate and rayon fibers identified in Item 1 (fabric from dress). The fibers from Item 2 and Item 3 could have originated from the same fiber source of Item 1 or from another source constructed with similar fibers. Chemical analysis performed includes: Polarized Light Microscopy (PLM) and Fourier Transform Infrared Spectroscopy (FTIR).
NVNWDY	The questioned fibers from the suspect's suit jacket (Item 2) and the questioned fibers from the suspect's suit pants (Item 3) were microscopically examined and compared to Item 1 (the known section of the victim's dress). These examinations revealed that the questioned fibers from the suspect's suit jacket (Item 2) and the questioned fibers from the suspect's suit pants (Item 3) correspond with the Item 1 known sample in appearance, microscopic characteristics, diameter, generic fiber type (acetate and rayon) and chemical composition (FTIR). Therefore, the Item 2 and Item 3 questioned fibers could have originated from the known sample from the victim's dress (Item 1).
PCP2DF	The tan colored fibers recovered from the suspect's suit jacket (Item #2) are similar in color, diameter, optical and chemical properties to the known fibers from the victim's dress (Item #1). The fibers from the victim's dress (Item #1) or another material with similar fiber characteristics could have been the source to the fibers from the suspect's suit jacket (Item #2). The questioned fibers recovered from the suit pants were found to be comprised of two types (3a and 3b): The light tan colored fibers recovered from the suspect's suit pants (Item #3a) are dissimilar in optical and chemical properties to the known fibers from the victim's dress (Item #1). The fibers from the victim's dress (Item #1) were excluded as being a possible source to these fibers from the suspect's suit pants (Item #3a). The remaining tan colored fibers recovered from the suspect's suit pants (Item #3b) are similar in color, diameter, optical, and chemical properties to the known fibers from the victim's dress (Item #1). The fibers from the victim's dress (Item #1) or another material with similar fiber characteristics could have been the source to these fibers from the suspect's suit pants (Item #3b).
PWT7MF	The yellow acetate fibers and white rayon fibers found from suspect's suit jacket (item 2) are consistent with the yellow acetate fibers and white rayon fibers of victim's dress (item 1). Item 2 could be originated from item 1. The yellow acetate fibers and white rayon fibers found from suspect's suit pants (item 3) are consistent with the yellow acetate fibers and white rayon fibers of victim's dress (item 1). Item 3 could also be originated from item 1.
Q7C248	Physical, microscopic, and instrumental comparison of the rayon and acetate fibers recovered from Item 2-subject's jacket, as well as Item 3-subject's pants, with the fibers from Item 1-victim's dress, revealed them to be consistent with respect to optical properties, color, and fiber types. Therefore, the rayon and acetate fibers recovered from the subject's clothing (Items 2 and 3) could have come from the victim's dress (Item 1) or another source consistent with these properties.
QL3TVY	Both questioned fibers from the suspect's suit jacket (Item 2) & the questioned fibers from the suspect's suit pants (Item 3) could have originated from the victim's dress (Item 1). The 3 fibers of the 3 Items are manufactured mixed fibers of acetate and rayon.
QT8JQL	The two types of yellow rayon and pale yellow acetate fibers recovered from the jacket (Item 2) and the pants (Item 3) were determined to be physically (width, color, and crimp spacing), microscopically and chemically (comparison and fluorescence microscopy and Fourier Transform Infrared Spectroscopy)

TABLE 4

WebCode	Conclusions
	consistent with the two types of yellow rayon and pale yellow acetate fibers from the dress (Item 1) and therefore may have once had a common origin.
R2XM6U	The submitted items were examined and analyzed by Stereo Microscope, Comparison Polarized Light Microscope (PLM), Melting point, Solubility Test and FT-IR Spectrometer. The fibers found in Item 1 composed of manufactured, Rayon and Acetate. The fibers found in Item 2 composed of manufactured, Acetate. The fibers found in Item 3 composed of manufactured, Rayon and Acetate. The Rayon and Acetate founded in Item 3 exhibit the same microscopic appearance (color and size), the same melting point and chemical characteristic as Item 1. The Acetate founded in Item 2 exhibit the difference size by microscopic appearance and chemical characteristic as Item 1. Therefore, these fibers from the questioned fibers from the suspect's suit pants could have originated from the known section of the victim's dress.
R6XXX9	Fibers of the Direction 1 yarns of victim's dress match with fibers recovered from suspect's suit jacket. Fibers of the Direction 2 yarns of victim's dress match with fibers recovered from suspect's suit pants.
R89FGE	On analysis, I found the questioned fibers from the suspect's suit jacket (Item 2) and the questioned fibers from the suspect's suit pants (Item 3) to be similar with the known section of the victim's dress (Item 1). Therefore, I am of the opinion that the questioned fibers from the suspect's suit jacket (Item 2) and the questioned fibers from the suspect's suit pants (Item 3) could have come from the known section of the victim's dress (Item 1)
RH6LDX	Item 1 relating to the victim was comprised of yellow and white threads. The yellow threads were comprised of pale yellow acetate fibres and the white threads were comprised of colourless regenerated cellulose fibres. Items 2 and 3 which were recovered from the suspects clothing were also comprised of numerous threads which were of the same construction and appearance as the yellow and white threads comprising Item 1. The yellow threads of Item 2 and 3 were comprised of fibres which were indistinguishable by microscopy and instrumental colour analysis from the pale yellow acetate fibres comprising the threads of Item 1. The white threads of Item 2 and 3 were comprised of fibres which were indistinguishable by microscopy from the colourless regenerated cellulose fibres comprising the threads of Item 1. The following evaluation is based on having established that the dress is damaged such that is is capable of shedding threads of a similar nature to Items 2 and 3. When evaluating the findings I have considered the following two alternatives: Items 2 and 3 originate from the same source as Item 1; Items 2 and 3 do not originate from the same source as Item 1. In my opinion, the findings provide very strong support for Items 2 and 3 originating from the same source as Item 1 rather than from another source or sources.
RXKM83	White rayon fibers and light yellow acetate fibers found in Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the white rayon and light yellow acetate fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1 or another item comprised of fibers with the same microscopic characteristics and optical properties. The specimens were examined using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry and Fourier transform-infrared spectroscopy.
TBGFTW	In my opinion these findings provide at least strong support for the assertion that the fibres found on the suspect's pants and jacket originated from the victim's dress.
TDTXC2	Off-white acetate fibers recovered from Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1 or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. White rayon fibers recovered from Items 2 and 3 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1 or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. The specimens were examined visually using stereomicroscopy, comparison microscopy, polarized light microscopy, and fluorescence microscopy,

TABLE 4

WebCode	Conclusions
	and instrumentally using microspectrophotometry and Fourier transform-infrared spectroscopy.
TQWHHK	Examination of Exhibit 1 (known section of the victim's dress) disclosed the presence of a piece of fabric composed of woven acetate and rayon fibers. Examination of Exhibit 2 (questioned fibers from the suspect's suit jacket) disclosed the presence of acetate and rayon fibers. Comparative examinations of the acetate and rayon fibers in Exhibit 2 to the acetate and rayon fibers that compose the fabric in Exhibit 1 disclosed them to be consistent in their microscopic characteristics, optical properties, and chemical properties. As a result of these findings, these questioned acetate and rayon fibers could have originated from the same source as the fabric in Exhibit 1, or another source with the same characteristics. Examination of Exhibit 3 (questioned fibers from the suspect's suit pants) disclosed the presence of acetate and rayon fibers. Comparative examinations of the acetate and rayon fibers in Exhibit 3 to the acetate and rayon fibers that compose the fabric in Exhibit 1 disclosed them to be consistent in their microscopic characteristics, optical properties, and chemical properties. As a result of these findings, these questioned acetate and rayon fibers could have originated from the same source as the fabric in Exhibit 1, or another source with the same characteristics.
TUGBN9	The constituent fibers form Item 1 were identified as 2 type of light yellow acetate and rayon fibers. The light yellow questioned fibers recovered from both the suspect's suit jacket (Item 2) and the suspect's suit pants (Item 3) were also identified as acetate and rayon, and were indistinguishable from the constituent fibers of Item 1 in microscopic chracteristic (PLM), color (MSP), and chemical composition (FT-IR and Raman). Item 2 and Item 3 could have come from the Item 1.
U6R3R9	Item One, described as a "Known section of the victim's dress," comprises a small swatch of a pale, creamy yellow (color) satin (or satin-like) weave fabric. No selvedge is present. Yarns in both directions (1) and (2) are in filament form, with one more highly twisted than the other. Two fiber species were identified by Fourier Transform Infrared (FT IR) spectroscopy: (1) Manufactured: Acetate and (2) Manufactured: Rayon. Additional confirmatory exams were conducted: solubility, burn test, and (or) observation by polarized light microscope (PLM) and (or) stereomicroscope (low power). Item Two, described as "Questioned fibers from the suspect's suit jacket," comprises scant specimens of pale (colored) fibers. Fiber species identified are the same as those noted for Item One, using FT IR with confirmatory exams as already described. FT IR identification is consistent with results noted for Item One: (1) Manufactured: Acetate and (2) Manufactured: Rayon. Item Three, described as "Questioned fibers from the suspect's suit pants," comprises scant specimens of pale (colored) fibers. Two samples were run by FT IR, with both being identified as Manufactured: Acetate. A solubility and burn test also were conducted as confirmatory exams, along with associated microscopy (PLM and stereo/low Power). Based upon the identification of fiber types for all three items under consideration, it is concluded that the Acetate and Rayon fibers both could have originated both from the victim's dress and have been found on the suspect's garments—both the suit jacket and the suit pants.
UDM7V6	In item 1 we can differentiate two different types of threads formed by different fibers: the warp: acetate and the weft: rayon. In item 2 there is only one type of acetate fibre, similar to that of the warp of item 1. In item 3 there are two types of fibres, to the warp and weft fibers identified in item 1.
UGMCDW	The source of item 1 is included as a possible source of the unknown fibers present in items 2 and 3, based on class characteristics.
ULUYVC	The questioned fibers from both Item 2 and Item 3 are similar in color, diameter, cross-section, optical properties, and chemical composition to the known fibers from the fabric in Item 1. All three Items consisted of two manufactured fibers acetate and rayon. The fibers from Items 2 and 3 could have originated from the fabric in Item 1.
UZYYY4	The questioned samples #2 and #3 could have originated from item #1 or from another source exhibiting all of the same analyzed/measured characteristics.
V6QNPK	CONCLUSIONS: Questioned fibers from the subject's suit jacket (CTS Item 2) and pants (CTS Item 3)

TABLE 4

WebCode	Conclusions
	originated from the victim's dress (CTS Item 1) or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. RESULTS: The questioned fibers from the subject's suit jacket (CTS Item 2) and pants (CTS Item 3) were examined to determine whether or not there are any fibers present that are consistent with the victim's dress (CTS Item 1). The victim's dress (CTS Item 1) is primarily composed of two types of threads. One thread is composed primarily of rayon fibers and one thread is composed primarily of acetate fibers. The sealed package identified as containing fibers from subject's suit jacket (CTS Item 2) contained four threads. Two of these threads are primarily composed of rayon fibers and two of these threads are composed primarily of acetate fibers. These threads are similar in construction to the known threads of the victim's dress (CTS Item 1). The sealed package identified as containing fibers from subject's suit pants (CTS Item 3) contained four threads. Two of these threads are primarily composed of rayon fibers and two of these threads are composed primarily of acetate fibers. These threads are similar in construction to the known threads of the victim's dress (CTS Item 1). Examination and comparison of questioned fibers from the subject's jacket (CTS Item 2) and pants (CTS Item 3) reveals the presence of numerous rayon and acetate fibers that are consistent in microscopic, optical, and chemical characteristics with the known fibers of the victim's dress (CTS Item 1). It is therefore concluded the questioned fibers originated from the dress or another source of textile material possessing fibers with the same distinct microscopic, optical, and chemical characteristics. METHODS OF ANALYSIS: Examinations were performed visually, by stereo microscopy, brightfield/polarized light comparison microscopy, fluorescence microscopy, microspectrophotometry, thermal microscopy and Fourier transform infrared microspectroscopy.
V7ZVRD	I was unable to distinguish between the fibres present in Item 1 (Known section of the victim's dress) and the fibres present in Item 2 (Questioned fibres from the suspect's suit jacket) on the basis of colour, fibre composition, fibre morphologies, fibre diameters, optical properties and fluorescence. I am therefore of the opinion that the fabric in Item 1 could have been the source of the fibres in Item 2. I was unable to distinguish between the fibres present in Item 1 (Known section of the victim's dress) and the fibres present in Item 3 (Questioned fibres from the suspect's suit pants) on the basis of colour, fibre composition, fibre morphologies, fibre diameters, optical properties and fluorescence. I am therefore of the opinion that the fabric in Item 1 could have been the source of the fibres in Item 3. I also cannot exclude the possibility that the fibres in items 2 and 3 could have originated from another piece of fabric of the same type, from the same manufacturer as the fabric in Item 1.
VG3VV9	Fibers Q1.1,Q1.2,Q2.1,Q2.2,Q3.1,and Q3.2(from Laboratory item #2) and Q4.1,Q4.2,Q5.1,and Q5.2 (from Laboratory item #3) could have originated from the source (Laboratory item #1) represented by K1.1, K1.2, K2.1, K2.2, K3.1 and K3.2. No conclusions can be reached about the remaining fibers collected from Laboratory items #1 through #3.
VRDMX9	The questioned fibres recovered from the suspect´s suit jacket and pants could come from the victim's gold dress because Item 1, Item 2 and Item 3 are all of them composed by two different type of fibres which have the same morphological characteristics, the same chemical composition and the same colour.
WTQEQP	1- Questioned fibers from the suspect's suit jacket (Item 2) were consistent (Indistinguishable) with the known section of the victim's dress (Item 1) in macroscopic characteristics, microscopic characteristics, color (MSP), infrared spectra (FTIR) and Raman spectra. The Questioned fibers from the suspect's suit jacket (Item 2) could have come from the victim's dress (Item 1) or another source of fibers with similar macroscopic, microscopic, color (MSP) and spectral (FTIR and Raman) characteristics. 2- Questioned fibers from the suspect's suit pants (Item 3) were consistent (Indistinguishable) with the known section of the victim's dress (Item 1) in macroscopic characteristics, microscopic characteristics, color (MSP), infrared spectra (FTIR) and Raman spectra. The Questioned fibers from the suspect's suit pants (Item 3) could have come from the victim's dress (Item 1) or another source of fibers with similar macroscopic, microscopic, color (MSP) and spectral (FTIR and Raman) characteristics.
Y4Y4F6	Item-1, Item-2 and Item-3 consists of a blend of synthetic fibers manufactured from acetate and rayon fibers. Analysis indicated that Item-1, Item-2 and Item-3 shared all the class characters observed,

TABLE 4

WebCode	Conclusions
	therefore Item-2 and Item-3 cannot be excluded from sharing a common provenance with Item-1.
Y7QVK9	Item 1 was a piece of fabric from the known section of the victim's dress. The fabric was made up of golden acetate fibres (Z-twist yarn) and pale golden rayon fibres (both S- and Z- twisted yarn). The pale golden rayon fibres from the S-twisted and Z-twisted yarn were found to agree in colour, fibre type, cross-section* [See Table 5 - Additional Comments] and microscopic appearance under various lighting conditions with each other. The questioned fibers in item 2 from the suspect's suit jacket comprised two golden (Z-twisted) and two pale golden yarns (S-twisted), made up of golden acetate fibres and pale golden rayon fibres respectively. The golden acetate and pale golden rayon fibers were found to agree in colour, fibre type, cross-section* [See Table 5 - Additional Comments] and microscopic appearance under various lighting conditions with the control golden acetate and pale golden rayon fibres of the corresponding yarns from item 1 respectively, indicating the respective fibres could have originated from the same source. The questioned fibers in item 3 from the suspect's suit pants comprised two golden (Z-twisted) and two pale golden yarns (Z-twisted), made up of golden acetate fibres and pale golden rayon fibres respectively. The golden acetate and pale golden rayon fibres were found to agree in colour, fibre type, cross-section* [See Table 5 - Additional Comments], and microscopic appearance under various lighting conditions with the control golden acetate and pale golden rayon fibres of the corresponding yarns from item 1 respectively, indicating that the respective fibres could have originated from the same source.
Y8QETP	The submitted samples were examined by stereomicroscope and FTIR spectroscopy. It was established that the known section of the victim’s dress (Item 1) consists of two types of manufactured fibers: acetate fibers and rayon fibers. The questioned fibers from the suspect’s suit jacket (Item 2) are acetate fibers and rayon fibers, too. Moreover, the questioned fibers from the suspect’s suit pants (Item 3) also proved to be acetate fibers and rayon fibers. On the basis of the examinations it was concluded that the fibers from the suspect’s suit jacket (Item 2) and suit pants (Item 3) could have originated from the victim’s dress (Item 1).
YANDRN	According to the results of the microscopic exam, FTIR, PY-GC/MS and SEM-EDS, the compositions of Item2 and Item3 are similar to those of Item1.
YHLBC7	Items 2 and 3 are consistent with Item 1. In all cases the Items are composed of a mixture of regenerated fibers (Acetate + Rayon)
YWGR4P	The polarized light microscopic features (PLM) of Item 1 (reference fibres from the victim's dress) were consistent with the PLM features of the acetate fibre. Item 3 also displayed characteristics solely consistent with those of the acetate fibre. Item 2 was a blend of fibres. One of the fibres was consistent with being that of acetate while the other was consistent with that of Lyocell/Tencel®. For this reason, it is possible to state that Items 1 and 3 originated from the same source, that being from the victim's dress. Item 2 has proven to be inconclusive as will be explained below in the additional comments (#5) [See Table 5 - Additional Comments].
Z2CJAZ	Questioned fibers from the suspect's suit jacket (Item 2) and questioned fibers from the suspect's suit pants (Item 3) were compared to a known section of the victim's dress (Item 1). The known material consisted of a portion of gold-colored woven fabric. Microscopic examination of representative samples from the dress (known), suit jacket (questioned), and suit pants (questioned) revealed two different types of fibers present in each clothing item. Both of the types of fibers from the known fiber sample from the dress were compared to the two different fiber types observed in the questioned fiber samples from the jacket and the pants. The two types of fibers (acetate and rayon) from the jacket and pants were similar in all tests performed (polarized light microscopy, fluorescence microscopy, solubility, cross-section, and infrared spectroscopy) to the two different types of fibers (acetate and rayon) from the dress. The fibers from the suspect’s suit pants and jacket could have originated from the victim’s dress (Level 3 Association, see Association scale below [See Table 5 - Additional Comments]). The number of similar components between the questioned and known samples increases the significance of the association; however, other items may have been manufactured that could be indistinguishable from the submitted

TABLE 4

WebCode	Conclusions
	evidence, so an individual source cannot be determined.
ZHH2TX	The victim's dress (Item 1) consists of light yellow acetate fibers and colorless rayon fibers which were used for comparison purposes. Light yellow acetate fibers were recovered from the suspect's suit jacket (Item 2) which are similar in size, shape, color, fiber type, and optical properties to the known light yellow acetate fibers from the victim's dress (Item 1). It is our opinion that these fibers could have come from the victim's dress, or any other item of similar construction. Additionally, colorless rayon fibers were recovered from the suspect's suit jacket which are similar in size, shape, fiber type, and optical properties to the known colorless rayon fibers from the victim's dress (Item 1). It is our opinion that these fibers could have come from the victim's dress, or any other item of similar construction. Light yellow acetate fibers were recovered from the suspect's pants (Item 3) which are similar in size, shape, color, fiber type, and optical properties to the known light yellow acetate fibers from the victim's dress (Item 1). It is our opinion that these fibers could have come from the victim's dress, or any other item of similar construction. Additionally, colorless rayon fibers were recovered from the suspect's pants which are similar in size, shape, fiber type, and optical properties to the known colorless rayon fibers from the victim's dress (Item 1). It is our opinion that these fibers could have come from the victim's dress, or any other item of similar construction.
ZHZUW3	Item Description Finding Conclusion #2 Questioned Fibers Questioned gold Acetate yarns & gold Rayon yarns. Same as known fibers from Item #1 with respect to color, general yarn construction, physical characteristics, optical characteristics and chemical composition. Could have originated from the same source, but not exclusively since other manufactured fibers in this class might be indistinguishable from the submitted evidence. #3 Questioned Fibers Questioned gold Acetate yarns & gold Rayon yarns. Same as known fibers from Item #1 with respect to color, general yarn construction, physical characteristics, optical characteristics and chemical composition. Could have originated from the same source, but not exclusively since other manufactured fibers in this class might be indistinguishable from the submitted evidence. Remarks - The evidence is being returned to your department for retention. Analytical Detail - These findings were determined using microscopic examination techniques and instrumental analyses [Participant submitted data in a format that could not be reproduced in this report.]
ZJBXF7	The questioned fibers (Item 2) from the suspect’s suit jacket and questioned fibers (Item 3)from the suspect’s suit pants were similar to the reference sample (Item 1) of the victim’s dress or any other textile with the same physical and chemical characteristics.
ZLZ6UN	Item 1, the known section of the victim's dress, was found to be a woven piece of fabric constructed from threads of gold coloured acetate fibres and threads of pale gold coloured rayon fibres. Items 2 and 3, from the suspect's suit jacket and pants, respectively, were found to contain threads of gold coloured acetate fibres and threads of pale gold coloured rayon fibres that were found to be indistinguishable from those constituting item 1 in colour, microscopic appearance, in the results of instrumental colour comparisons (where possible) and in the results of chemical analysis. In my opinion items 2 and 3,the gold coloured acetate and pale gold coloured rayon fibres recovered from the suspect's jacket and pants, could have originated from the victim's dress (as represented by the known section of fabric, item 1).

Additional Comments

TABLE 5

WebCode	Additional Comments
86PQKR	Association Level Definitions: Level I Association: A physical match; items physically fit and/or align one another by way of corresponding surface characteristics. The associated items were once joined together to form a single item. Level II Association: Items correspond in all tested properties and share atypical characteristic(s) that would not be expected to be readily available in the population of this evidence type. No meaningful differences are detected. Level III Association: Items correspond in all tested properties and, therefore, could have originated from the same source. Other items have been manufactured and/or are naturally occurring that would also correspond to the submitted evidence. No meaningful differences are detected. Level IV Association: Items correspond in tested properties and, therefore, could have originated from the same source. The items share typical characteristics expected to be readily available in the population of this evidence type. No meaningful differences are detected. Alternatively, an association between items could be categorized as a Level IV Association if a limited analysis is performed. The extent of limited analysis varies and is specified in the report.
8JL7DL	If the questioned evidence is to be treated as fibers only, please provide loose fibers. It creates inconsistency right off the bat if some people conduct a cordage examination prior to the fiber exam.
A86ZMN	Testing is limited to available laboratory techniques.
AHNFHQ	Note: Because textile fibers are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit the same chemical and optical properties. Methods of Analysis: The items were analyzed using a combination of visual examination and stereomicroscopy; high power, polarized (PLM), and comparison light microscopy; ultraviolet (UV) light examination, chemical solubility tests, melting point determination, and Fourier Transform Infrared Spectroscopy (FTIR), which is a standard instrumental technique.
CHFCLH	Items 1 and 2 are described as fibers but are intact threads. This then causes a quandary for examiners, should they treat it like they would an actual case or not? For several years in a row the fiber samples provided have had little color microscopically which means that little or no information is available when visible microspectrophotometry is conducted, and in some instances, there has also been no information of value with UV microspectrophotometry. I don't believe that makes a good test of examiner proficiency.
DLRHWH	We observe that fibers are pale and not round.
E62YJ8	Constituent fibres plucked from the warp and weft of the control sample (item one): 1) appears gold when clustered in a thread and almost colourless when separated with a slight gold / yellow hue. Long manufactured fibres 2) appears silver / gold when clustered in a thread and colourless when separated. Long manufactured fibres
EKG33G	Due to the fact that textile materials are mass produced, it is not possible to state that the questioned yarns and their constituent fibers in this case originated from a particular source to the exclusion of all other textile materials composed of yarns and constituent fibers which exhibit the same physical, optical, and/or chemical properties.
EVC9WF	Darker fibers would be a better choice in order to fully capture an examiner's proficiency at utilizing the instrumental techniques.
FAE23H	The fabric of the victim's dress (Item 1) is composed of two yarns. One of them consists of manufactured acetate fibers and second consists of manufactured Rayon fibers. Every type of such yarns was found in Item 2 and Item 3, and they matched with Item 1 in the range of examined features.
FE77X8	FTIR SNR for the ATR objective <25,000. Monitor for comparison microscope not working so no photos included in the case file

TABLE 5

WebCode	Additional Comments
GA97WG	Some IR measurements of rayon fibers in Item 1 revealed bands at 1596 cm-1 and from 840-930 cm-1. These infrared bands don`t appears in IR measurments of rayon fibers in Item 2 and Item 3.
HKJYZG	Because textile materials are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other textile materials composed of fibers which exhibit the same chemical and optical properties.
J27XBL	Where possible an issue in a case is normally addressed at activity level. And if not at source level. Where possible an evaluation is carried out and a strength of evidence given based on the Likelihood ratio assigned. Scales have not been included here as per instructions. The samples in this exercise consisted of colourless fibres. Generally, in this laboratory we do not examine colourless fibres. However as the samples in this case were in the form of threads they were examined.
MEHAGC	Each sample consists of 2 different manufactured fiber types-acetate and rayon.
MPH4GH	The morphology of the fibers and they way there were either in loose strands in the case of the acetate fibers or tight bundles in the case of the rayon fibers was consistent among all three items. the color and pigmentation was also consistent among all three items
RH6LDX	In a normal case, activity level evaluation would be addressed but to do this further information such as the suspects version of events, circumstances etc would need to be obtained. Not included in the report would be that we identified the fibre types further to viscose and cellulose diacetate (rather than triacetate).
RXKM83	Fibers can differ as to type (e.g., rayon, cotton), color, shape, size, microscopic features (e.g., delustrant, voids) and optical properties (e.g., refractive index, sign of elongation). These are characteristics that may associate fibers with a group of items, but never to a single item to the exclusion of all others. However, even fibers with many similar properties may be excluded as originating from the same source by using the identified analytical methods. The characteristics and optical properties of the fiber(s) are used as comparison criteria. When the characteristics and optical properties of a recovered fiber(s) are the same as a known sample, the recovered fibers are consistent with originating from the source of the known sample, or from another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. However, due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a fiber selected at random to be consistent with a particular item. The inability to associate persons/items through a microscopic hair/fiber examination does not necessarily mean the persons/items of interest had no contact. A number of factors can produce this result, including: 1) Hair/fiber evidence may not have transferred. 2) Hairs/fibers that did transfer may have been lost prior to submission to the laboratory. 3) The hairs/fibers transferred or the known sample submitted may not be representative of the source. 4) The hairs/fibers may be from a different source.
TBGFTW	Further contextual details of the incident would be required to address the significance of these findings. For example whether the suspect and victim had attended the same party or whether the victim's dress was damaged. Insufficient space in boxes for multiple fibre types Manufactured (Di)ACETATE/ Manufactured RAYON
TQWHHK	A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type. Techniques utilized in these examinations include stereomicroscopy, polarized light microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy.
V7ZVRD	Our laboratory does not have access to a microspectrophotometer. Dye extraction was attempted for HPTLC analysis, however this was unsuccessful. Therefore, no dye comparison has been undertaken.

TABLE 5

WebCode	Additional Comments
VG3VV9	Because textile fibers are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit the same physical, optical and chemical properties.
Y7QVK9	* The cross-section of the golden acetate fibre bore multi-lobal appearance (about 4-5 lobes). The cross-section of the pale golden rayon fibre (for both S- and Z-twisted yarn) bore irregular appearance. Striation lines running along the longitudinal surface of these fibres were noted through SEM examination.
YWGR4P	The reason "inconclusive" was chosen for the source of Item 2 was due to the fact that various explanations may exist. The acetate/lyocell blend could be from a difference source completely, other than the victim's dress. The acetate fibre may have been from the victim's dress though, while the lyocell fibre was from a different source, at a different time, including the fibres from the suspect's clothing itself. For this reason, "inconclusive" was chosen as the possible source of the fibre.
Z2CJAZ	An Association Scale would also be added to the report: Association Scale for Trace Evidence: The following descriptions are meant to provide context to the levels of opinions reached in this report. Every level of conclusion may not be applicable in every case nor for every material type. Level 1 - Identification: A physical match or fracture match; items physically fit back to one another, indicating that the items were once a single object or from the same source. Level 2 - High Degree of Association: Items are consistent in observed and measured physical properties and/or chemical composition and share atypical characteristic(s) that would not be expected to be readily available in the population of this evidence type. Level 3 - Association: Items are consistent in observed and measured physical properties and/or chemical composition and, therefore, could have originated from the same source. Because other items have been manufactured that would also be indistinguishable from the submitted evidence, an individual source cannot be determined. Level 4 - Limited Association: Items are consistent in observed and measured physical properties and/or chemical composition and, therefore, could have originated from the same source. As compared to a Level 3 association, items categorized within a Level 4 share characteristics that are more common amongst these kinds of manufactured products or are commonly encountered in the environment. Alternatively, an association between items would be categorized as a Level 4 if a limited analysis was performed due to characteristics or size of the specimen(s). Level 5 - Inconclusive Association: Items are consistent in some, but not all, physical properties and/or chemical composition. Some minor variation(s) exists between the known and questioned items and could be due to factors such as sample heterogeneity, contamination of the sample(s), or having a sample of insufficient size to adequately assess homogeneity of the entity from which it was derived. Unsuitable for comparison: No conclusion could be reached regarding an association/elimination between the items. Elimination (Non-association): The items were dissimilar in physical properties and/or chemical composition, indicating that they did not originate from the same source. Inconclusive Non-association: The items appear to exhibit some dissimilarities; however, there are significant limiting factors in the samples (such as lacking in quantity, quality and/or detail) that do not permit an elimination.
ZHH2TX	For this test and the past several CTS fiber proficiency tests, the fibers provided for examination have been very lightly colored. This affects the ability to interpret and compare spectra from microspectrophotometry which is typically a major part of fiber analysis. Providing fibers that are more dyed or pigmented is more of an accurate reflection of a typical fiber case.
ZLZ6UN	The pale coloured rayon fibres within items 1,2 and 3 were found to be too pale for any critical comparison by MSP.

Appendix: Data Sheet

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Collaborative Testing Services ~ Forensic Testing Program

Test No. 18-539: Fibers Analysis

DATA MUST BE RECEIVED BY ***March 12, 2018*** TO BE INCLUDED IN THE REPORT

Participant Code: WebCode:

Accreditation Release Statement

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

☐ This participant's data is intended for submission to ASCLD/LAB, ANAB, and/or A2LA.
(Accreditation Release section on the last page must be completed and submitted.)

☐ This participant's data is NOT intended for submission to ASCLD/LAB, ANAB or A2LA.

Scenario:

Police are investigating the sexual assault of a woman wearing a gold dress at a New Year's Eve party. The following day, a suspect was apprehended. Police searched the suspect's home and collected clothes that met the victim's description. Fibers were recovered from the suspect's suit jacket and pants. Police are requesting that you examine the fibers, report their identification(s), and determine if the fibers found on the suspect's suit jacket and/or pants could have come from the victim's dress.

CTS will not reproduce Interpretation Scales, Scale of Conclusions or Terminology Keys in the final report, please do not submit with the participant's data sheet.

Items Submitted (Sample Pack FIBR):

Item 1: Known section of the victim's dress

Item 2: Questioned fibers from the suspect's suit jacket

Item 3: Questioned fibers from the suspect's suit pants

Please return all pages of this data sheet.

Participant Code:
WebCode:

1.) Could the questioned fibers from the suspect's suit jacket (Item 2) and/or pants (Item 3) have originated from the victim's dress (Item 1)?

Item 2:	Yes ☐		No ☐		Inconclusive ☐
Item 3:	Yes ☐		No ☐		Inconclusive ☐

2.) Fiber Type Determination.

Please enter the fiber type (Manufactured, Animal, or Vegetable) and generic name in the blank provided for each Item. For Manufactured fibers please use the terminology in the appendix provided.
(*Example:* Item 1 Vegetable, Cotton)

Item 1 _____

Item 2 _____

Item 3 _____

3.) Indicate the procedure(s) used to examine the submitted items:

Microscopic Exams:

☐ Stereomicroscope	☐ Comparison	
☐ Polarized Light	☐ Fluorescence	

☐ Macroscopic Exam	☐ IR/FTIR	☐ Microspectrophotometry
☐ Solubility Tests	☐ Cross-Section	☐ Melting Point

☐ Other (specify): _____

Please return all pages of this data sheet.

Participant Code:
WebCode:

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

5.) Additional Comments

Return Instructions: Data must be received via online data entry, fax (please include a cover sheet), or mail by ***March 12, 2018*** to be included in the report. Emailed data sheets are not accepted.

QUESTIONS?
TEL: +1-571-434-1925 (8 am - 4:30 pm EST)
EMAIL: forensics@cts-interlab.com
www.ctsforensics.com

Participant Code:

ONLINE DATA ENTRY: www.cts-portal.com

FAX: +1-571-434-1937

MAIL: Collaborative Testing Services, Inc.
P.O. Box 650820
Sterling, VA 20165-0820 USA

Please return all pages of this data sheet.

Collaborative Testing Services ~ Forensic Testing Program

RELEASE OF DATA TO ACCREDITATION BODIES

The following Accreditation Releases will apply only to:

Participant Code: WebCode:

for Test No. **18-539: Fibers Analysis**

This release page must be completed and received by ***March 12, 2018*** to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

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

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

ANAB Certificate No. _____
(Include ASCLD/LAB Certificate here)

A2LA Certificate No. _____

Step 2: Complete the Laboratory Identifying Information in its entirety

Signature and Title _____

Laboratory Name _____

Location (City/State) _____

Accreditation Release

Return Instructions

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

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

Please return all pages of this data sheet.

Appendix: Manufactured Fibers - Names & Definitions

Federal Trade Commision

Rules and Regulations Under the Textile Fiber Products Identification Act

16 CFR Part 303

§303.7 Generic Names and Definitions for Manufactured Fibers

Pursuant to the provisions of Section 7(c) of the Act, the Commission hereby establishes the generic names for manufactured fibers, together with their respective definitions, set forth in this section, and the generic names for manufactured fibers, together with their respective definitions, set forth in International Organization for Standardization ISO 2076: 2010(E), "Textiles – Man-made fibres – Generic names."

(a) **Acrylic**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of acrylonitrile units.

(b) **Modacrylic**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of less than 85% but at least 35% by weight of acrylonitrile units, except fibers qualifying under paragraph (j)(2) of this section and fibers qualifying under paragraph (q) of this section.

(c) **Polyester**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of a substituted aromatic carboxylic acid, including but not restricted to substituted terephthalate units, and para substituted hydroxy-benzoate units. (1) Where the fiber is formed by the interaction of two or more chemically distinct polymers (of which none exceeds 85% by weight), and contains ester groups as the dominant functional unit (at least 85% by weight of the total polymer content of the fiber), and which, if stretched at least 100%, durably and rapidly reverts substantially to its unstretched length when the tension is removed, the term elasterell-p may be used as a generic description of the fiber. (2) Where the glycol used to form the ester consists of at least ninety mole percent 1,3-propanediol, the term "triexta" may be used as a generic description of the fiber.

(d) **Rayon**

A manufactured fiber composed of regenerated cellulose, as well as manufactured fibers composed of regenerated cellulose in which substituents have replaced not more than 15% of the hydrogens of the hydroxyl groups. Where the fiber is composed of cellulose precipitated from an organic solution in which no substitution of the hydroxyl groups takes place and no chemical intermediates are formed, the term lyocell may be used as a generic description of the fiber.

(e) **Acetate**

A manufactured fiber in which the fiber-forming substance is cellulose acetate. Where not less than 92% of the hydroxyl groups are acetylated, the term triacetate may be used as a generic description of the fiber.

(f) **Saran**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 80% by weight of vinylidene chloride units.

(g) **Azlon**

A manufactured fiber in which the fiber-forming substance is composed of any regenerated naturally occurring proteins.

(h) **Nytril**

A manufactured fiber containing at least 85% of a long chain polymer of vinylidene dinitrile where the vinylidene dinitrile content is no less than every other unit in the polymer chain.

(i) **Nylon**

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polyamide in which less than 85% of the amide linkages are attached directly to two aromatic rings.

(j) **Rubber**

A manufactured fiber in which the fiber-forming substance is comprised of natural or synthetic rubber, including the following categories: (1) A manufactured fiber in which the fiber-forming substance is a hydrocarbon such as natural rubber, polyisoprene, polybutadiene, copolymers of dienes and hydrocarbons, or amorphous (noncrystalline) polyolefins. (2) A manufactured fiber in which the fiber-forming substance is a copolymer of acrylonitrile and a diene (such as butadiene) composed of not more than 50% but at least 10% by weight of acrylonitrile units. The term lastrile may be used as a generic description for fibers falling within this category. (3) A manufactured fiber in which the fiber-forming substance is a polychloroprene or a copolymer of chloroprene in which at least 35% by weight of the

fiber-forming substance is composed of chloroprene units.

(k) **Spandex**

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polymer comprised of at least 85% of a segmented polyurethane.

(l) **Vinal**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50% by weight of vinyl alcohol units, and in which the total of the vinyl alcohol units and any one or more of the various acetal units is at least 85% by weight of the fiber.

(m) **Olefin**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of ethylene, propylene, or other olefin units, except amorphous (noncrystalline) polyolefins qualifying under paragraph (j)(1) of this section. Where the fiber-forming substance is a cross-linked synthetic polymer, with low but significant crystallinity, composed of at least 95% by weight of ethylene and at least one other olefin unit, and the fiber is substantially elastic and heat resistant, the term lastol may be used as a generic description of the fiber.

(n) **Vinyon**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of vinyl chloride units.

(o) **Metallic**

A manufactured fiber composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal.

(p) **Glass**

A manufactured fiber in which the fiber-forming substance is glass.

(q) **Anidex**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50% by weight of one or more esters of a monohydric alcohol and acrylic acid.

(r) **Novoloid**

A manufactured fiber containing at least 85% by weight of a cross-linked novolac.

(s) **Aramid**

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polyamide in which at least 85% of the amide linkages are attached directly to two aromatic rings.

(t) **Sulfar**

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polysulfide in which at least 85% of the sulfide linkages are attached directly to two (2) aromatic rings.

(u) **PBI**

A manufactured fiber in which the fiber-forming substance is a long chain aromatic polymer having reoccurring imidazole groups as an integral part of the polymer chain.

(v) **Elastoester**

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polymer composed of at least 50% by weight of aliphatic polyether and at least 35% by weight of polyester, as defined in 16 CFR 303.7(c).

(w) **Melamine**

A manufactured fiber in which the fiber-forming substance is a synthetic polymer composed of at least 50% by weight of a cross-linked melamine polymer.

(x) **Fluoropolymer**

A manufactured fiber containing at least 95% of a long-chain polymer synthesized from aliphatic fluorocarbon monomers.

(y) **PLA**

A manufactured fiber in which the fiber-forming substance is composed of at least 85% by weight of lactic acid ester units derived from naturally occurring sugars.