
FORENSIC AUTHENTICITY REPORT

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October 6, 2010

REF:	<u>CD ROM Strubbe Tape from Yale Copy 4-23-10</u> (Q-1) <i>Exhibit A</i>
Re:	Yale Archive Id: "Kent State University, May 4, 1970" Kent State Collection: (MS 804 accn. 1989-M-804, box 59)
SUB:	Forensic Audio Enhancement and Authenticity Report

Dear Sir:

I have performed a comprehensive forensic authenticity examination and subsequent forensic enhancement of the audio content of the CD ROM identified as Q-1 submitted to our forensic laboratory by John Mangels, via **Federal Express 869425149117** on or about May 05, 2010. *See Exhibit B*

The following is our final report with regard to the above captioned forensic authenticity examination and enhancement.

EXAMINATION FOCUS:

The focus of the forensic examination requested was limited to determine the following:

1. Is the recording contained on Q-1 whole and complete?
2. Has the audio content contained on Q-1 been edited, altered or manipulated in any way?
3. Is the recording on Q-1 authentic?

The purpose of the forensic enhancement requested was to understand the events taking place recorded therein as they pertained to the shooting deaths of four (4) students at Kent State University (KSU) on May 4, 1970. To determine if there was a clear order to fire given to the Ohio National Guard (ONG) and if there was any indication of sniper fire observed immediately preceding the volley of rifle fire by the ONG resulting in the four fatalities and nine others wounded.

Historical Perspective and the Rules of Evidence:

On the day of the KSU shooting, Terry Strubbe placed a Campus Pet reel to reel recorder on the windowsill to record the events taking place on campus. It is the only known recording of events preceding the Ohio National Guard shooting, the gunfire itself, and the aftermath. The recorder used 4" reels and recorded 15 minutes on each side. The recording device is no longer available. The whereabouts and the condition of the original tape recording made that day are also unknown. The Strubbe tape was found in the portion of the Kent State collection (MS 804 accn. 1989-M-804, box 59) that was donated by David E. Engdahl, Esquire, and attorney on the legal team for plaintiffs in the civil suits that arose from the shooting incidents at Kent State University, May 4, 1970. The tape was included in the materials that Mr. Engdahl donated to Yale and was used as part of the May 4th trials. We have no idea how the audio cassette was made at the time. The Yale Archive CD ROM was a 1:1 direct copy from the original audio cassette in the Yale collection. A direct 1:1 clone was purchased by Alan Canfora for \$20.00, who provided his Yale copy to John Mangels, who then produced a 1:1 clone there from which we received and downloaded into our forensic workstation for processing. In absence of the original recording, in accordance with the accepted rules of evidence, we are treating the audio cassette clone we are examining as "next best evidence", since it was submitted and accepted by the courts as Plaintiff's Exhibit#38.

THE EXAMINATION with FINDINGS:

Equipment calibration and background electrical interference exemplars:

On May 5, 2010 a comprehensive authenticity examination of Q-1 was performed. All the equipment associated with the forensic examination was calibrated and exemplars of the electronic digital signatures were recorded. In addition exemplars of the existing background electrical interference in the room were also recorded.

The forensic examination of Q-1:

Q-1 is a PHILIPS CD-R Compact Disc 700 mb 52x capacity and was processed into evidence in accordance with standard forensic procedure. The recording contained 2 recorded audio files:

1. **“Strubbe Tape Side 1 May 4, 1970” 00:14:21.924**
2. **“Strubbe Tape Side 1 May 4, 1970” 00:14:20.973**

Statistics were taken from the recording contained therein using Sony Sound Forge Software.

Each recorded file was assigned a unique SHA-1 identifier* produced by a SHA-1 hash generator* to preserve the content of each file examined. The CD ROM scan and download was unremarkable.

The questioned recording Q1 was subjected to a number of forensic examinations, including critical listening, narrow band spectrum, spectrographic, long-term spectral averaging, stationary harmonics, phase continuity and high resolution waveform analyses using highly specialized forensic software, including but not limited to Sound Forge, DC Forensics Live, M-Audio Pro-Tools, SpectraLab, and STC Corporation's SIS EdiTracker forensic software lab.

About SHA-1 Identifiers:

In cryptography, **SHA-1** is a cryptographic hash function designed by the National Security Agency (NSA) and published by the NIST as a U.S. Federal Information Processing Standard. SHA stands for **Secure Hash Algorithm**. SHA-1 and SHA-2 are the secure hash algorithms required by law for use in certain U.S. Government applications, including use within other cryptographic algorithms and protocols, for the protection of sensitive unclassified information. FIPS PUB 180-1 also encouraged adoption and use of SHA-1 by private and commercial organizations. Thus the SHA-1 Algorithm generated for a specific file is unique to that file and any change whatsoever to that file would change the value of the algorithm immediately indicating that the file has been altered in some fashion. A duplication error would produce a mismatch in the SHA-1 Algorithm indicating that an error had occurred or the recorded file had been tampered with.

The findings:

The CD ROM and the 2 audio files recorded therein, identified as Q1, is a copy and not an original recorded simultaneously with the events taking place. The recording was sampled at a rate of 44.1. This is entirely consistent with the recording history of the proffered recordings.

The CD ROM identified as Q-1 was examined using critical listening and no deformations in speech were noted. Standard waveform analysis was unremarkable. The examination using **Speech Technology Center's EdiTracker** forensic software, which was designed to detect interruptions in the stationary harmonics present in all sound, was also unremarkable.

CONCLUSIONS:

It is my professional opinion to a high degree of scientific certainty, after careful forensic examination and review of the evidence herein and above, that Q-1 is authentic and the content thereof can be trusted and relied upon as a true representation of the events taking place therein. The two (2) recorded audio files therein are whole and complete and there are no indicators of alteration or manipulation whatsoever.

FORENSIC ENHANCE MENT:

On May 5, 2010 a deep forensic enhancement was performed using Sound Forge and STC Corporation's SIS Sound Cleaner forensic enhancement module to recover the aural record to determine if an order to fire was given. The section of the recording containing the ONG opening fire on the KSU students was located at 00:09:37.108 on side 2 of the recording. During this process an altercation of unknown origin was observed and noted for future study, 70 seconds prior to the order to fire and subsequent ONG gunfire.

On October 4, 2010 another deep forensic enhancement was performed to recover the precise nature of the altercation and gunshots located at 00:06:52.293. At 00:07:49.809 what appears to be a gunshot was fired. At 00:08:03:067 another shot was fired. At precisely 00:08:09.615 and 00:08:13.581 two additional shots can be heard producing an acoustic echo. The spectrographs of the last two shots at 08:09.615 and 08:13.581 were then compared to exemplars in our forensic ballistic gunshot library using Multi-Speech by Kay Telemetrics and SIS forensic software. Using biometric technology similar to that used for voice recognition the spectrographs closely matched those of .38 caliber spectrographs within a reasonable degree of scientific certainty.

The findings:

Base on the enhanced audio, it is my professional opinion to a high degree of scientific certainty, that a clear order to prepare to fire followed by an order to fire was issued. No sniper fire can be heard immediately preceding the order to fire. However, a violent altercation followed by four (4) low velocity gunshots can be observed 70 seconds before the order to fire is given.

	Name	Start	End	Length
1	03	00:01:22.721		
2	01 SIDE 2 00:06:52.293 STUDENTS HEARD CHASING SOME...	00:06:52.293		
3	02 (00:07:29.489) THEY 9 (sic students) GOT SOME BODY	00:07:29.489		
4	03 (00:07:39.598) STUDENTS CAUGHT SOMEONE	00:07:39.598		
5	04 (00:07:47.080) KILL HIM	00:07:47.080		
6	05 (00:07:47.080) KILL HIM	00:07:47.754		
7	06 (00:07:49.809) GUNSHOT	00:07:49.809		
8	07 (00:08:03.067) GUNSHOT	00:08:03.067		
9	8 (00:08:09.615) GUNSHOT	00:08:09.615		
10	9 (00:08:13.581) GUNSHOT	00:08:13.581		
11	01 00:09:19.127 BELL	00:09:19.156		
12	01 00:09:19.647 GUARD	00:09:19.647		
13	03 00:09:30.154 ALL RIGHT PREPARE	00:09:30.154		
14	04 00:09:31.518 TO FIRE!	00:09:31.518		
15	05 00:09:32.296 GET DOWN!	00:09:32.296		
16	06 00:09:35.355 GUARD	00:09:35.355		
17	07 00:09:35.547 FI (Ficature)	00:09:35.547		
18	08 00:09:36.011 3-4 ROUND SMALL ARMS FIRE	00:09:36.011		
19	09 00:09:37.108 HIGH VELOCITY RIFLE FIRE (30-06 cal)	00:09:37.108		
20	07	00:09:50.054		
21	01	00:12:58.843		
22	02	00:13:14.401		

All forensic examination, procedures, techniques and protocols are in compliance with the **Standards and Practises** as set forth by:

Best Practices for Recorded Evidence- FBI Handbook for Forensic Services

AES27-1996 Audio Engineering Society recommended practice for forensic purposes- Managing recorded audio and video materials intended for examination and **AES43-2000 Audio Engineering standard for forensic purposes- Criteria for the authentication of analog audio and video tape recordings.**

CERTIFICATION

This submittal represents a final report of the forensic examination of the above captioned audiocassette. I hereby warrant and certify under the penalties of perjury that the foregoing information is true and accurate to the best of my knowledge.

Respectfully submitted,

International Media Services. Inc.
LEGAL SERVICES GROUP

Stuart Allen

Stuart Allen, ACFE, ABRE, SMPTE, IEEE,
President & Chief Examiner

State of New Jersey
Vendor Id: 222-125-765/000

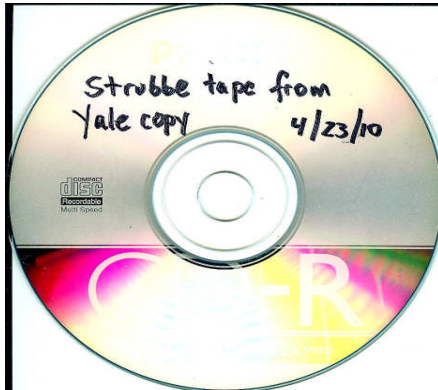
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S E A L

member:
American College of Forensic Examiners
American Board of Recorded Evidence
American Society of Criminology
Society of Motion Picture and Television Engineers
Audio Engineering Society- Forensic Working Group
Institute for Electrical and Electronic Engineers
ASIS International – New Jersey Chapter

EXHIBITS

Exhibit A



Q-1 CD ROM Strubbe Tape from Yale Copy 4-23-10

Exhibit B

fedex.com 1.800.GoFedEx 1.800.463.3339

1 From
Date: 4/28/10
Sender: John Mangie
Address: 1801 Sycamore Ave.
City: Cleveland
State: OH Zip: 44114

2 Your Internal Billing Reference

3 To
Recipient: Stuart Allison
Company: Levent Services Group
Address: 718 Sherman Ave.
City: Plainfield
State: NJ Zip: 07060-2832

4 Express Package Service
FedEx Priority Overnight
FedEx 2Day
FedEx Overnight Surety
FedEx International Priority
FedEx International Economy
FedEx International First Class
FedEx Home Delivery

5 Packaging
FedEx Signature
FedEx Signature Confirmation
FedEx Signature Required
FedEx Signature Required - Restricted

6 Special Handling
STANDARD SHIPPING
NO CD WAREHOUSE
NO CD STORAGE
NO CD RETURN TO SENDER
NO CD RETURN TO OFFICE

7 Payment Method
Sender
Recipient
Third Party
Cash on Delivery
Bill Me Later
Bill Me Later - Invoicing
Bill Me Later - Invoicing with Payment Request

8 Recipiental Delivery Signature Options
No Signature
Direct Signature
Indirect Signature
Signature Required
Signature Required - Restricted

Tracking Number: 8694 2514 9117

Weight: 0.20 lbs

Dimensions: 11.00 x 11.00 x 11.00

Package Type: Other

Special Services: Fragile

Insurance: \$500.00

Estimated Delivery Date: 05/04/10

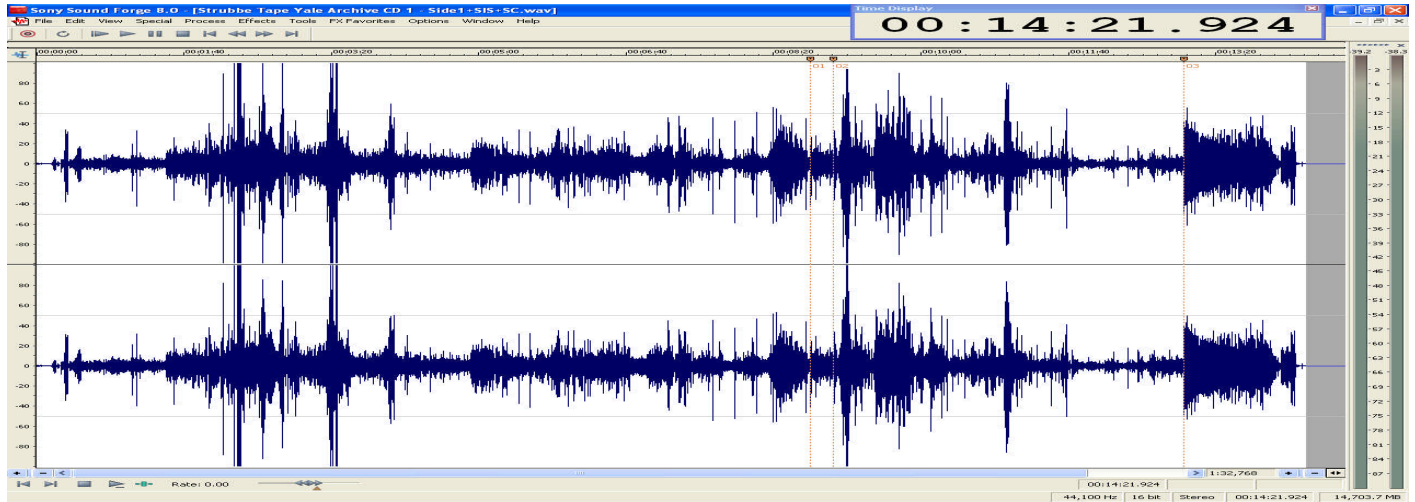
Shipping Method: Express

Rate: \$6.94

Tracking URL: fedex.com/track

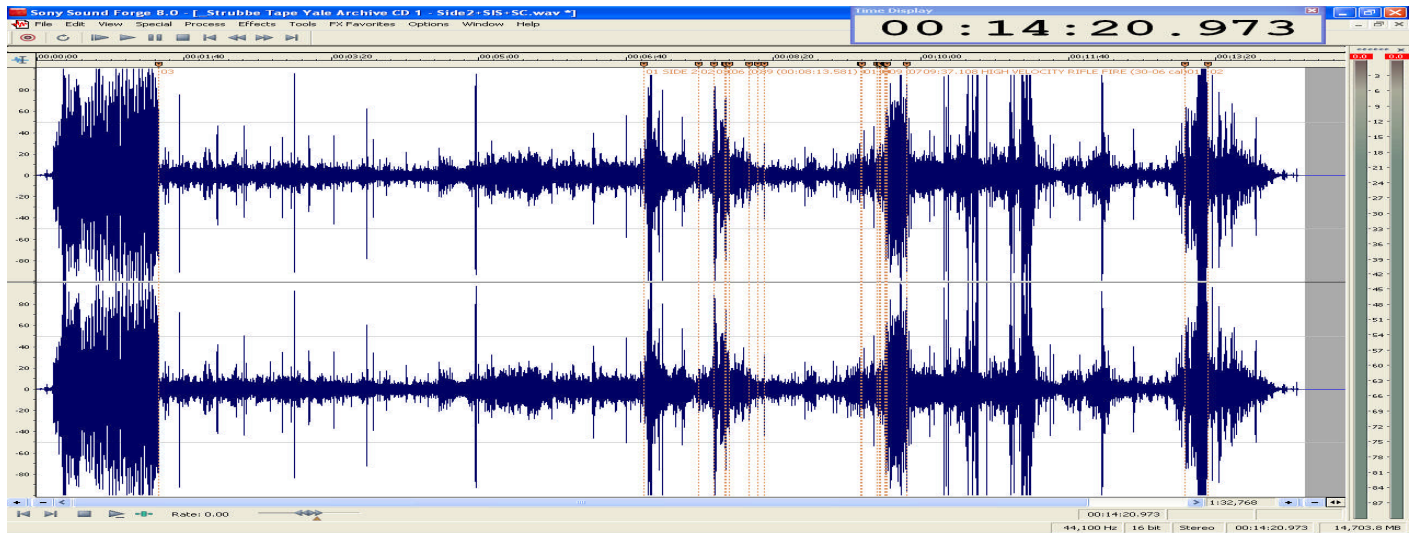
Federal Express 869425149117

Exhibit C



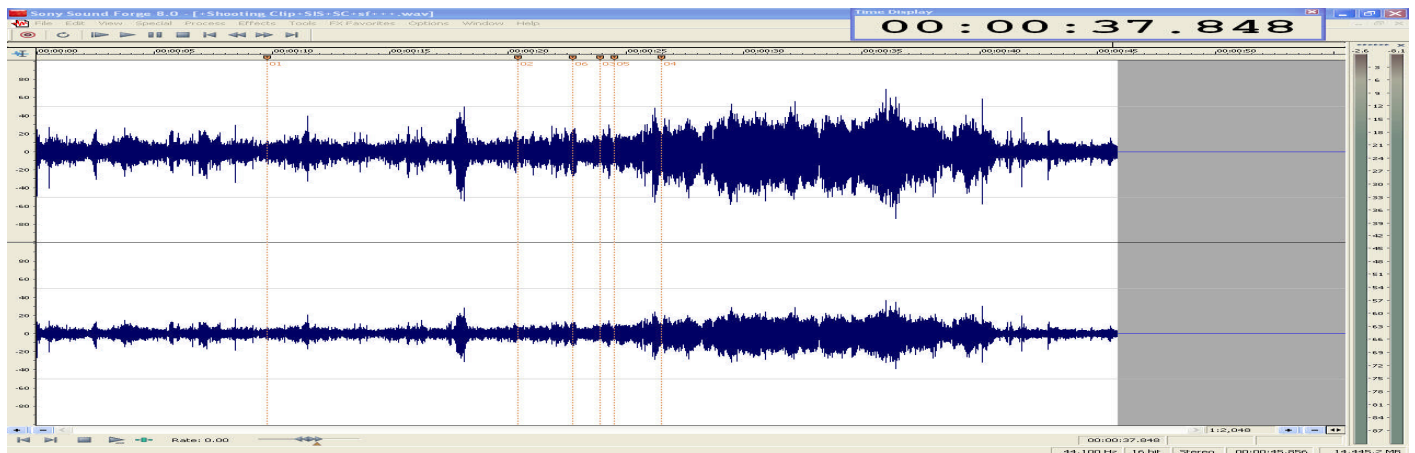
Q-1: "Strubbe Tape Side 1 May 4, 1970" 00:14:21.924

Exhibit D



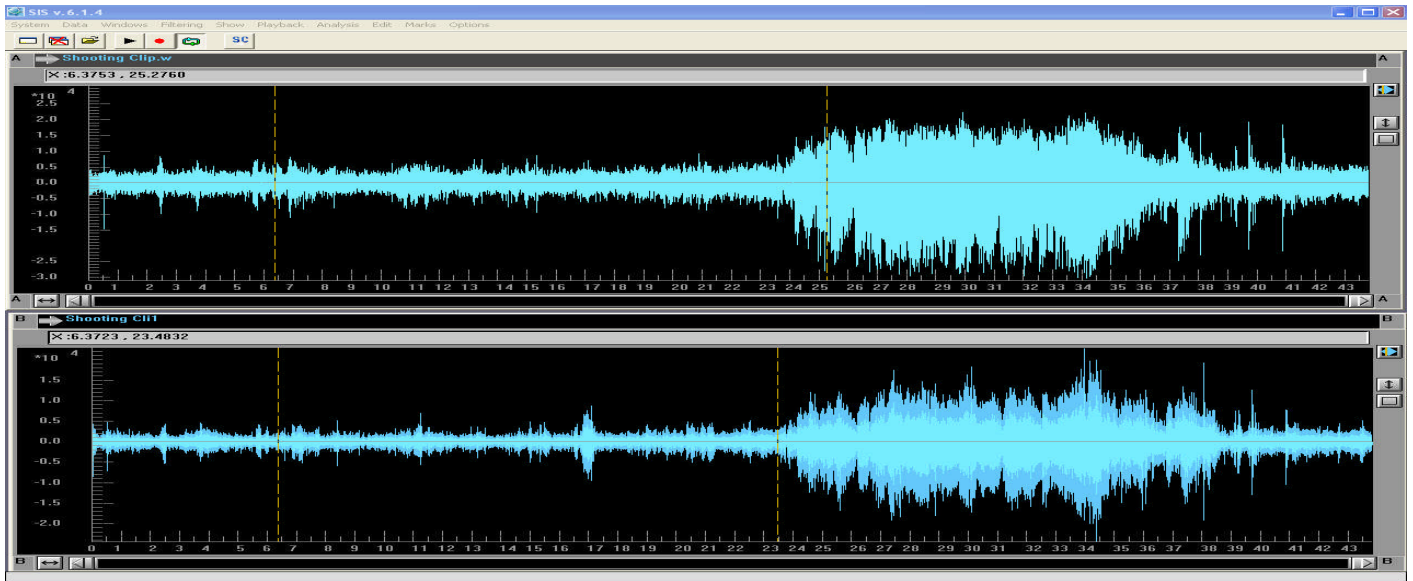
Q-1: "Strubbe Tape Side 2 May 4, 1970" 00:14:20.973

Exhibit E



Q-1: ONG opening fire on the KSU students, located at 00:09:37.108 into the recording on side 2

Exhibit F



Speech Technology Center's EdiTracker forensic software, which was designed to detect interruptions in the stationary harmonics present in all sound, was also unremarkable.

Exhibit G



Sound Forge, and STC Corporation's SIS Sound Cleaner forensic enhancement module.