

BEK TEK LLC

Forensic Audio/Video/Image Consultants

Douglas S. Lacey
doug@bekteklc.com

(540) 602-2706

Bruce E. Koenig
bruce@bekteklc.com

LABORATORY REPORT

February 3, 2016

To: Sara J. Lathrop, Esq.
Assistant City Attorney
Office of the City Attorney
350 South 5th Street, Room 210
Minneapolis, MN 55415

Re: *Walter Louis Franklin II, et al. v. Lucas Peterson, et al.*
Court File No.: 14-cv-01467

Laboratory Number: 1510230

Item received: September 3, 2015, via an attachment to the email from Attorney Sara J. Lathrop.

NE1 One Adobe PDF file named "Complaint, Franklin.pdf", which is a 24-page Complaint filed in the U.S. District Court, District of Minnesota, dated May 9, 2014.

Item received: October 15, 2015, via an attachment to the email from Attorney Sara J. Lathrop.

NE3 One Adobe PDF file named "Ed Primeau Report.pdf", which is a 27-page, unsigned letter to Mike Padden from "Edward J Primeau", dated 15 October 2015.

Specimen received: October 16, 2015, via FedEx from Attorney Sara J. Lathrop.

Q1 One Innovera 700 MB CD-R data disc marked "Jimmy Gaines Videos". In a paper/plastic CD/DVD envelope marked "Terrance Franklin".

Item received: November 10, 2015, downloaded from the following Internet site:
https://manuals.info.apple.com/en_US/ipod_touch_ios5_user_guide.pdf

NE11 One Adobe PDF file named “ipod_touch_ios5_user_guide.pdf”, which is a 141-page “iPod touch User Guide For iOS 5.1 Software”.

Item received: November 10, 2015, downloaded from the following Internet site:
https://support.apple.com/kb/SP594?locale=en_US

NE12 One Adobe PDF file named “iPod touch (4th generation) - Technical Specifications.pdf”.

Item received: November 11, 2015, via an attachment to the email from Attorney Sara J. Lathrop.

NE13 One email message of November 11, 2015 from Scott Stillman, Stillman Cyber Forensic Investigations, LLC, Rogers, MN, regarding the iPod touch specifications.

Specimens received: December 7, 2015, personally from Attorney Sara J. Lathrop.

K1 One iPod touch, model “MC540LL/A”, with serial number “C3LHRNAFDT75”.

K2 One iPod touch, model “MC540LL/A”, with serial number “C3XGTFENDT75”.

Specimen received: December 9, 2015, via UPS from Scott Stillman.

K3 One unmarked, 16 GB SanDisk Cruzer Switch flash drive.

Specimens received: December 17, 2015, downloaded from the Google Drive Internet site:

<https://drive.google.com/a/stillmanforensics.com/folderview?id=0B3lCko4o5EICek92TU5vcGxSVXc&usp=sharing>

K4 One MOV file named "IMG.0004.MOV".

K5 One MOV file named "IMG.0005.MOV".

K6 One MOV file named "IMG.0009.MOV".

K7 One MOV file named "IMG.0010.MOV".

K8 One MOV file named "IMG.0012.MOV".

K9 One MOV file named "IMG.0023.MOV".

K10 One MOV file named "IMG.0030.MOV".

K11 One MOV file named "IMG.0032.MOV".

K12 One MOV file named "IMG.0033.MOV".

K13 One MOV file named "IMG.0036.MOV".

K14 One MOV file named "IMG.0038.MOV".

K15 One MOV file named "IMG.0044.MOV".

K16 One MOV file named "IMG.0047.MOV".

Item received: January 9, 2016, via FedEx from Attorney Sara J. Lathrop.

K17 One unmarked PNY 64 GB flash drive.

I. Overall BEK TEK LLC Conclusions:

An examination of the above submitted items and specimens, as set forth in detail below, revealed the following overall conclusions:

1. Critical listening, spectrographic and high-resolution waveform analyses of the six (6) MOV (QuickTime's "Movie" file format) audio/video files, in the "Gaines Video" folder on specimen Q1, detected no gunshot-like sounds.
2. Two (2) iPod touch units (specimens K1 and K2), located on the front porch at 2720 South Bryant Avenue, Minneapolis, MN, were used to record the sounds of: 1) three weapons being fired in the basement laundry room and 2) pre-recorded male voices both yelling and talking in a loud voice in the basement at 2717 South Bryant Avenue.
3. The recordings of the gunshot events on the specimen K1 and K2 iPod touch units revealed that the only ones audible were when the laundry room, exterior side and exterior kitchen doors were all open. When either or both of the laundry room and exterior side doors were closed, the gunshot sounds were not audible on the iPod touch recordings.
4. The recordings of the pre-recorded males yelling in the basement of 2717 South Bryant Avenue revealed, at best, only very low amplitude speech that was mostly unintelligible on the two iPod touch units.
5. The recordings of the pre-recorded males talking in loud voices in the basement of 2717 South Bryant Avenue revealed no audible speech information on the two iPod Touch units. Therefore, individuals, in the basement at 2717 South Bryant Avenue, talking in loud or quieter voices would not be audible, when recorded on an iPod touch unit on the front porch at 2720 South Bryant Avenue.
6. The intelligibility and audibility would be further reduced on these iPod touch test recordings, when there are added sounds, such as wind noise, vehicular traffic, other talkers closer to the microphones, and low flying aircraft.
7. Critical listening, spectrographic and waveform analyses were conducted of the specimen Q1 test recordings and the designated speech information (according to items NE1 and NE3) recorded on the "IMG_0592.MOV" file on specimen Q1. These examinations revealed that the specified speech segments on "IMG_0592.MOV" did not originate from the basement at 2717 South Bryant Avenue, due to their higher amplitudes.

II. Examination of the Recordings Produced by Mr. Gaines on May 10, 2013:

Critical listening, digital data, spectrographic and high-resolution waveform analyses were conducted of the six (6) “Gaines” MOV audio/video files on specimen Q1, which revealed the following:

1. All six (6) files: 1) are in an Apple QuickTime 5.1, MPEG-4 (Moving Picture Experts Group) format; 2) were produced on an iPod touch unit; 3) have a frames/images per second rate of 29.970; 4) have a frame/image size of 1280 pixels wide by 720 pixels high; and 5) have a monaural audio sampling rate of 44.1 kilohertz (kHz) with lossy compression.
2. The six (6) MOV files have the following date/start time and length characteristics, with the time in Coordinated Universal Time (UTC), which is also called Greenwich Mean Time, and can be converted to Central Daylight Time (CDT) by subtracting five (5) hours:

Video File	Date	Start Time (UTC)	Length (seconds)
IMG_0591.MOV	5/10/2013	20:18:46	44.8
IMG_0592.MOV	5/10/2013	20:29:58	62.4
IMG_0593.MOV	5/10/2013	20:32:30	55.6
IMG_0594.MOV	5/10/2013	20:33:53	14.5
IMG_0595.MOV	5/10/2013	20:34:56	124.9
IMG_0596.MOV	5/10/2013	20:40:47	12.4

3. No recorded gunshot-like events were detected on the six (6) MOV files.
4. The speech segments heard in the audio portion of the “IMG_0592.MOV” (as designated in paragraphs 25, 26, 27, 28 and 30 of item NE1 and page 25 of item NE3) revealed higher overall amplitude than the audible yelling on the specimen K1 test recordings on specimen K3.
5. Exhibit B contains the Bitmap image files of the spectrograms prepared of all the audio information in the “IMG_0592.MOV” file on specimen Q1.
6. Exhibit C contains the PDF (Portable Document Format) and MATLAB FIG files of the waveforms prepared of all the audio information in the “IMG_0592.MOV” file on specimen Q1.
7. Exhibit D contains the Bitmap image files of the spectrograms prepared of the louder speech portions of the on-site tests prepared on specimen K1.
8. Exhibit E contains PDF and MATLAB FIG files of the waveforms prepared of the louder speech portions of the on-site tests prepared on specimen K1.

III. Preparation of Test Recordings of Males Yelling and Talking Loudly:

To prepare the test recordings of males yelling and talking loudly, the following procedures were followed:

1. A composite file named “1510230 Composite yelling.wav” [monaural, 24-bit PCM (Pulse Code Modulation), 48.0 kHz], containing males yelling, was produced from all or portions of the yelling male voice information in the following files, in order of appearance:
 - a. “TDK 11GÇ624 SWAT Team Wild.M.wav” [approximately 1:09.5 to 1:18.5 (minutes:seconds)];
 - b. “TDK 11GÇ678 SWAT Guy Yells.M.wav” (all);
 - c. “TDK 11GÇ677 SWAT Team Yells.M.wav” (approximately 0:10.9 to 0:14.2); and
 - d. “TDK 11GÇ638 SWAT Team Callo.M.wav” (all).

The four segments were each normalized to -1.0 decibel (dB).

2. “1510230 Composite yelling.wav” was copied and pasted two additional times, for a total of three occurrences, and was saved as a separate file named “1510230 Composite yelling (3x loop).wav”.
3. An approximate one-minute portion [01:05:59.693→01:07:00.227 (hour:minutes:seconds)] of an audio podcast file named “23 RFR_ SWOxygen023.mp3”, featuring two males in conversation, was copied and saved to a separate file named “1510230 Male speech.wav” (stereo, 16-bit, 44.1 kHz). The file was normalized to -4.9 dB, which resulted in an approximate average RMS (root mean square) loudness level of 12 dB below that of “1510230 Composite yelling.wav” and “1510230 Composite yelling (3x loop).wav” files.
4. “1510230 Composite yelling (3x loop).wav” and “1510230 Male speech.wav” were copied to a TASCAM DR-05 digital audio recorder.
5. Exhibit F contains the two wavefiles “1510230 Composite yelling (3x loop).wav” and “1510230 Male speech.wav”.
6. Using the calibrated sound level meter in TerraSonde’s The Audio Toolbox, it was found that the playback of the “1510230 Composite yelling (3x loop).wav” and “1510230 Male speech.wav” files, using the TASCAM DR-05, with an Anchor AN-100 loudspeaker at the 9:00 o’clock volume position and the bass and treble controls set to the 12 o’clock positions, produced dBASPLs (decibels, A-weighted, sound pressure levels) of approximately 89 and 76, respectively. Exhibit A, which is the paper entitled “Average Speech Levels and Spectra in Various Speaking/Listening Conditions: A Summary of the Pearson, Bennett, & Fidell (1977) Report”, was used as a reference to set the yelling and loud talking levels.

IV. On-Site Testing in Minneapolis on December 7, 2015:

The following procedures were followed at the sites on South Bryant Avenue, Minneapolis, MN, on December 7, 2015:

1. The internal clocks of the specimen K1 and K2 iPod touch units were manually set based on the approximate time (hours and minutes) displayed on an iPhone 6 Plus unit.
2. The address for the on-site recording location was the residence located at 2720 South Bryant Avenue, Minneapolis, MN. A plastic shelving unit with its top shelf having a height of approximately 52.25 inches was placed onto the raised front porch. The porch was approximately 25 inches above ground level. The shelving unit was placed near the front left (from the perspective of the residence) corner of the porch.
3. Specimen K1 was placed on the top shelf of the shelving unit in a landscape orientation, with its front-facing camera (on the opposite side from the large display) pointed toward 2717 South Bryant Avenue (across the street in a northeastern direction) and angled such that the corner pole of the porch was visible in the left-hand edge of the camera view. Based on this orientation, the specimen K1 microphone was facing toward the southeast, and was approximately 0.5 inch off the surface of the top shelf. A binder clip was used to hold specimen K1 in its vertical orientation on the shelf, and specimen K1 was placed close to the edge of the shelf facing the street.
4. Initially, specimen K2 was also placed onto the top shelf of the shelving unit in a similar orientation as specimen K1, except rotated 180 degrees, such that its microphone was facing toward the northwest. However, it was noted that when the binder clip was attached to specimen K2, in order to hold it in place, a video recording was unable to be started. The video camera image was frozen and the app was unresponsive. Also, a "low battery" condition kept appearing, possibly indicating that the clip was shorting out the circuitry or otherwise causing issues with the functionality of specimen K2. As such, specimen K2 was not used by BEK TEK LLC for this testing set-up, but was used by Mr. Scott Stillman to make some test recordings from the screened-in area at the southern-most end of the porch at 2720 South Bryant Avenue.
5. Two (2) Shure SM81 microphones were attached to separate microphone stands on the shelving unit, one on the top shelf and the second on the second shelf from the top, both oriented approximately parallel with the shelves and facing toward 2717 South Bryant Avenue. The diaphragm of the upper microphone was approximately 62 inches above the porch floor, and the diaphragm of the lower microphone was approximately 46 inches above the porch floor. Both microphones were set to a flat response curve with no attenuation. The supplied windscreens were placed onto the microphones.

6. The upper Shure SM81 microphone was connected to the left input of a Marantz PMD660 digital audio recorder, and the lower SM81 was connected to the right input. The phantom power of the Marantz PMD660 was turned on, and the record/file settings were stereo, 48 kHz, 16-bit PCM WAV. The input levels were set to the approximate 9 o'clock position, and it was noted that at times, wind gusts would max out the input levels. These recordings were briefly reviewed, but were not used to draw any conclusions by BEK TEK LLC.
7. The following four (4) sets, of three gunshots each, from each of five (5) weapon/ammunition combinations [9mm MP5/+P (duty), 9mm MP5/147 Grain, 9mm Sig Sauer/+P (duty), 9mm Sig Sauer/147 Grain, and 45mm/duty] were fired by law enforcement personnel, in the basement laundry room of the house at 2717 South Bryant Avenue, Minneapolis, MN (all with the door connecting the kitchen to the exterior porch open):

Number	Laundry Room Door	Exterior North Side Doors	Comments
1	Open	Open	
2	Closed	Closed	Repeated 9mm Sig Sauer/+P (duty)
3	Open	Closed	Double shot for 9mm MP5/+P (duty); repeated 9mm MP5/+P (duty) & 45mm/duty
4	Closed	Open	

8. Test recordings of gunshots fired in the basement of 2717 South Bryant Avenue were made using the inherent "Camera" function of specimen K1 to record both video and audio, and the Marantz PMD660 to record audio.
9. The following sets, each with the playback on a TASCAM DR-05 of the files containing males yelling and males talking loudly, through an Anchor AN-100 loudspeaker (amplitude set at 9 o'clock, flat response) at four (4) different locations: 1) bottom of stairs facing the exterior north side doors; 2) bottom of stairs facing away from the exterior north side doors; 3) in the laundry room facing the south wall; and 4) in the laundry room facing the north wall, all in the basement of the house at 2717 South Bryant Avenue, Minneapolis, MN (all with the door connecting the kitchen to the exterior porch open):

Number	Laundry Room Door	Exterior North Side Doors	Comments
1	Open	Open	
2	Closed	Closed	Repeated all positions except the bottom of stairs facing the exterior north side doors
3	Open	Closed	
4	Closed	Open	

10. Spoken narrations were given during the test recordings explaining the weapon/ammunition combinations and the states (open or closed) of the laundry and side doors. Certain weapon/shot combinations were repeated during the tests due to noise factors in the vicinity of the recording environment.
11. Using a Nikon D7100 DSLR camera, NEF raw images were taken with a Sigma 17-70 mm lens of the front of the residences at 2717 and 2720 South Bryant Avenue; the corner street sign; the interior and exterior of the basement laundry room at 2717 South Bryant Avenue; the hot water heater area in the basement at 2717 South Bryant Avenue; the exterior side doors at 2717 South Bryant Avenue; the door between the kitchen and exterior porch at 2717 South Bryant Avenue; and images of the loudspeaker locations in the basement at 2717 South Bryant Avenue.

V. Results of the On-site Testing Performed in Minneapolis on December 7, 2015:

Using the iPod touch test recordings on specimens K3 through K16, the following results were obtained for the recorded gunshot, yelling and talking loudly events:

1. Aural and on-screen waveform examinations of the following files, produced during the test weapons firings and recorded using the specimen K1 iPod touch unit, revealed (only the four middle numbers in the file names are listed; all times are approximate and are in minutes:seconds format referenced to the beginning of the file; and many portions have wind noise):

File	Test	Weapon	Ammo	Laundry Room Door	Exterior Side Doors	Identifications of Lower Amplitude Transient-Like Signals
0004	1	MP5	+P	Open	Open	0:51.16, 0:58.79, & 1:05.39
0004	2	MP5	147	Open	Open	1:47.95, 1:53.02 & 1:57.78
0004	3	9 Sig	+P	Open	Open	3:17.71, 3:23.00 & 3:27.98
0004	4	9 Sig	147	Open	Open	4:03.06, 4:08.50 & 4:13.34
0004	5	45	Duty	Open	Open	4:48.77, 5:03.33 & 5:13.48
0005	1	MP5	+P	Closed	Closed	None heard.
0005	2	MP5	147	Closed	Closed	None heard.
0005	3	9 Sig	+P	Closed	Closed	None heard.
0005	3 Repeat	9 Sig	+P	Closed	Closed	None heard.
0005	4	9 Sig	147	Closed	Closed	None heard.
0005	5	45	Duty	Closed	Closed	None heard.
0006	1	MP5	+P	Open	Closed	None heard.
0006	1 Repeat	MP5	+P	Open	Closed	None heard.
0006	2	MP5	147	Open	Closed	None heard.
0006	3	9 Sig	+P	Open	Closed	None heard.
0006	4	9 Sig	147	Open	Closed	None heard.
0006	5	45	Duty	Open	Closed	None heard.
0006	5 Repeat	45	Duty	Open	Closed	None heard.
0007	1	MP5	+P	Closed	Open	None heard.
0007	2	MP5	147	Closed	Open	None heard.
0007	3	9 Sig	+P	Closed	Open	None heard.
0007	4	9 Sig	147	Closed	Open	None heard.
0007	5	45	Duty	Closed	Open	None heard.

2. Aural and on-screen waveform examinations of the following files, produced during the test weapons firings and recorded using the specimen K2 iPod touch unit, revealed (only the four middle numbers in the file names are listed; all times are approximate and are in minutes:seconds format referenced to the beginning of the file; and many portions have wind noise):

File	Test	Weapon	Ammo	Laundry Room Door	Exterior Side Doors	Identifications of Lower Amplitude Transient-Like Signals
0006	1	MP5	+P	Open	Open	0:06.44 & 0:13.04 (first gunshot sound occurs before the start of this recording.
0007	2	MP5	147	Open	Open	0:24.35, 0:29.40 & 0:34.16
0008	3	9 Sig	+P	Open	Open	1:08.33, 1:13.61 & 1:18.57
0011	5	45	Duty	Open	Open	0:15.82, 0:30.46 & 0:40.61
0013	6	MP5	+P	Closed	Closed	None heard.
0014	2	MP5	147	Closed	Closed	None heard.
0015	3	9 Sig	+P	Closed	Closed	None heard.
0016	3 Repeat	9 Sig	+P	Closed	Closed	None heard.
0017	1	MP5	+P	Open	Closed	None heard.
0018	2	MP5	147	Open	Closed	None heard.
0019	3	9 Sig	+P	Open	Closed	None heard.
0020	4	9 Sig	147	Open	Closed	None heard.
0021	5	45	Duty	Open	Closed	None heard.
0022	5 Repeat	45	Duty	Open	Closed	None heard.
0025	1	MP5	+P	Closed	Open	None heard.
0026	2	MP5	147	Closed	Open	None heard.
0027	3	9 Sig	+P	Closed	Open	None heard.
0028	4	9 Sig	147	Closed	Open	None heard.
0029	5	45	Duty	Closed	Open	None heard.

3. Aural and on-screen waveform examinations of the following files, produced during the playback of the pre-recorded males yelling and talking loudly tests and recorded using the specimen K1 iPod touch unit, revealed (only the four middle numbers in the file names are listed; all times are approximate and are in minutes:seconds format referenced to the beginning of the file; and many portions have wind noise):

File	Test	Loudspeaker Location	Laundry Room Door	Exterior Side Doors	Identifications of Lower Amplitude Speech
0009	1	Bottom of Stairs-Facing Side Doors	Open	Open	Only yelling heard at a very low level-mostly unintelligible.
0010	2	Bottom of Stairs-Facing Side Doors	Closed	Closed	None heard, but higher ambient noise overall.
0011	3	Bottom of Stairs-Facing Side Doors	Open	Closed	Only yelling heard at a very low level-mostly unintelligible.
0012	4	Bottom of Stairs-Facing Side Doors	Closed	Open	Only yelling heard at a very low level-mostly unintelligible.
0013	5	Bottom of Stairs-Facing Away from Side Doors	Open	Open	Only yelling heard at a very low level-mostly unintelligible.
0014	6	Bottom of Stairs-Facing Away from Side Doors	Closed	Closed	Only yelling heard at a very low level-mostly unintelligible.
0015	6 Repeat	Bottom of Stairs-Facing Away from Side Doors	Closed	Closed	Only yelling heard at a very low level-mostly unintelligible.
0016	7	Bottom of Stairs-Facing Away from Side Doors	Open	Closed	Only yelling heard at a very low level-mostly unintelligible.
0017	8	Bottom of Stairs-Facing Away from Side Doors	Closed	Open	Only yelling heard at a very low level-mostly unintelligible.
0018	9	Laundry Room Facing South	Open	Open	Only yelling heard at an extremely low level-mostly unintelligible.
0019	10	Laundry Room Facing South	Closed	Closed	Only yelling heard at an extremely low level-mostly unintelligible.
0020	10 Repeat	Laundry Room Facing South	Closed	Closed	None heard, but higher ambient noise overall.
0021	11	Laundry Room Facing South	Open	Closed	None heard.
0022	12	Laundry Room Facing South	Closed	Open	None heard.
0023	13	Laundry Room Facing North	Open	Open	None heard, but higher ambient noise overall.
0024	14	Laundry Room Facing North	Closed	Closed	None heard, but higher ambient noise overall.
0025	14 Repeat	Laundry Room Facing North	Closed	Closed	None heard, but higher ambient noise overall.
0026	15	Laundry Room Facing North	Open	Closed	None heard, but higher ambient noise overall.
0027	16	Laundry Room Facing North	Closed	Open	None heard.

4. Aural and on-screen waveform examinations of the following files, produced during the playback of the pre-recorded males yelling and talking loudly tests and recorded using the specimen K2 iPod touch unit, revealed (only the four middle numbers in the file names are listed; all times are approximate and are in minutes:seconds format referenced to the beginning of the file; and many portions have wind noise):

File	Test	Loudspeaker Location	Laundry Room Door	Exterior Side Doors	Identifications of Lower Amplitude Speech
0031	1	Bottom of Stairs-Facing Side Doors	Open	Open	Only yelling heard at a very low level-mostly unintelligible. Loud speech area not recorded.
0034	2	Bottom of Stairs-Facing Side Doors	Closed	Closed	None heard.
0035	3	Bottom of Stairs-Facing Side Doors	Open	Closed	None heard.
0037	5	Bottom of Stairs-Facing Away from Side Doors	Open	Open	None heard.
0039	6	Bottom of Stairs-Facing Away from Side Doors	Closed	Closed	None heard.
0040	6 Repeat	Bottom of Stairs-Facing Away from Side Doors	Closed	Closed	None heard.
0041	7	Bottom of Stairs-Facing Away from Side Doors	Open	Closed	None heard.
0042	8	Bottom of Stairs-Facing Away from Side Doors	Closed	Open	Only yelling heard at a very low level-mostly unintelligible.
0043	9	Laundry Room Facing South	Open	Open	None heard.
0045	10 Repeat	Laundry Room Facing South	Closed	Closed	None heard.
0046	11	Laundry Room Facing South	Open	Closed	None heard.
0048	12	Laundry Room Facing South	Closed	Open	None heard.
0049	13	Laundry Room Facing North	Open	Open	None heard.
0050	14	Laundry Room Facing North	Closed	Closed	None heard, and only yelling portion recorded.
0051	unknown	Laundry Room Facing North	Closed	Closed	None heard.
0052	14 Repeat	Laundry Room Facing North	Closed	Closed	None heard.
0053	15	Laundry Room Facing North	Open	Closed	None heard.
0054	16	Laundry Room Facing North	Closed	Open	None heard.

VI. Administrative:

The signal analysis examination was conducted by Bruce E. Koenig and Douglas S. Lacey of BEK TEK LLC, whose curricula vitae are attached as Exhibits G and H, respectively.

BEK TEK LLC has been reimbursed for services at \$210.00 per hour, and additionally, for actual expenses.

Specimens K1 and K2 were hand delivered to Scott Stillman on December 7, 2015 in Minneapolis, MN.

Exhibits:

- Exhibit A: Paper entitled “Average Speech Levels and Spectra in Various Speaking/Listening Conditions: A Summary of the Pearson, Bennett, & Fidell (1977) Report”.
- Exhibit B: Bitmap image files of the spectrograms prepared of all the audio information in the “IMG_0592.MOV” file on specimen Q1.
- Exhibit C: PDF (Portable Document Format) and MATLAB FIG files of the waveforms prepared of all the audio information in the “IMG_0592.MOV” file on specimen Q1.
- Exhibit D: Bitmap image files of the spectrograms prepared of the louder speech portions of the on-site tests prepared on specimen K1.
- Exhibit E: PDF and MATLAB FIG files of the waveforms prepared of the louder speech portions of the on-site tests prepared on specimen K1.
- Exhibit F: The two wavefiles “1510230 Composite yelling (3x loop).wav” and “1510230 Male speech.wav”.
- Exhibit G: Curriculum vitae for Bruce E. Koenig.
- Exhibit H: Curriculum vitae for Douglas S. Lacey.