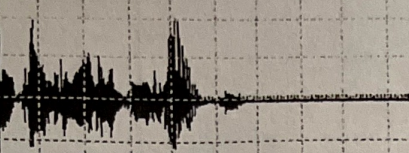


# AFTI



RCVD  
18 March 93

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September 4, 1994

Mark Lukasiewicz  
Senior Producer  
ABC News, Prime Time Live  
147 Columbus Avenue  
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AFTI File No. 94-92

Subject: Tape Tampering Exam

RE: Pam Smart Case

### LAB REPORT

#### 1. Exhibits Examined

- Q-1 Maxell C-60 cassette tape marked, "#9 starts here," and identified as the defense copy of an original tape recorded on 7/12/90.
- Q-2 Maxell C-60 cassette tape marked, "#3, This side," and identified as the defense copy of an original tape recorded on 7/13/90.
- Q-3 Maxell C-60 cassette tape marked, "#8" and identified as the defense copy of an original tape recorded on 8/1/90.
- Q-4 Maxell C-60 cassette tape marked, "Enhanced copy of 6/21/80," and identified as the defense copy of an original tape recorded on 6/21/90.

Note: Accompanying the above tape were ABC transcripts of all four tape conversations.

#### 2. Results of Examination

An aural, spectrographic and waveform analysis of the submitted Q-1 through Q-4 recordings developed a number of suspicious acoustic record events ("anomalies") which cast serious doubt on the authenticity of some of the original recordings (presuming that the submitted copies are true, accurate, and complete duplications of the original tapes).

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2. **Physical Inspection:** The forensic expert next inspects for tampering with a thorough visual inspection of the tape itself. He inspects the housing for pry marks, welding, size, label and date consistent with alleged recording date. He also measures the tape and assures the splicing of the magnetic tape to the leader is consistent with normal manufacturing process. Any other splices are noted as possible alteration.
3. **Magnetic Development:** Direct visual observation of the magnetically "developed" tape is conducted to find track widths, the type of recorder used, and the presence or absence of residual speech signals.
4. **Spectrum Analysis:** Specialized computer equipment and programs to produce a visual interpretation of a frequency-versus-amplitude and frequency-versus-amplitude-versus-time displays. This allows the expert to view the entire spectrum or to zoom in on an area of particular interest thereby helping to characterize the acoustic quality of anomalies and identify their source.
5. **Waveform Analysis:** A computer generated display representing time-versus-amplitude of recorded sounds in graphic form. With such analysis the expert can sometimes measure signal return time which reveals how long a recorder had been turned off. He can identify record-mode events including the measurement of record-to-erase-head distances, determination of the spacing between gaps in multiple-gap erase heads, and inspection of the signature shape and spacing of various record event signals.
6. **Recorder performance:** various electrical and mechanical measurements of standard and modified recorders for use in finding possible origins of buzz sounds, hum, etc.

SUMMARY

In order to submit sound recordings as evidence in court proceedings, an attorney must prove that the tape is an authentic representation of the conversation it is said to record. The traditional method of establishing authenticity involves maintaining a chain of custody which logs all persons, times, and locations concerned in the creation of the tape. Then, the tape must be officially sealed and stored to complete a proper chain. However, even if this procedure is strictly observed, there may still be a challenge to the tape's authenticity.

The recording may contain inconsistencies suggestive of tampering. In such cases, an attorney may consult a qualified forensic examiner to inspect the tape. The examiner would initially listen critically for signs such as gaps, transients, fades, equipment sounds or extraneous voices which indicate tampering. Then he would utilize other methods like physical inspection, magnetic development, spectrum analysis, and waveform analysis to discover anomalies. It is relatively easy to change the content of a recording by deleting words or sections; by obscuring meaning with overrecorded sounds; or by transforming context through rearrangement of selected phrases or by adding additional words through synthesis. Nevertheless, falsifications normally leave detectable magnetic and waveform acoustic signatures which can lead to forensic individualization of the evidential recorders and tapes.

## TECHNICAL DEFINITIONS

### Falsification of tapes

A qualified forensic expert determines authentication by performing a number of scientific tests which detect evidence of tampering or falsification. Four basic types of tampering include:

1. Deletion - the elimination of words or sounds by stopping the tape and overrecording unwanted areas.
2. Obscuration - the mixing in of sound of amplitude sufficient to mask wave form patterns which originally would show stops and starts in inappropriate places.
3. Transformation - the rearranging of words to change content or context.
4. Synthesis - the adding of words or sounds by artificial means or impersonation.

### Electromechanical Indications of Such Falsification (Anomalies) Would include:

1. Gaps - segments in a recording which represents unexplained changes in content or context. A gap can contain buzzing, humming, or silence.
2. Transients - short, abrupt sounds exemplified by clicks, pops, etc. Transients may indicate tape splicing.
3. Fades - gradual loss of volume. Fades can cause inaudibility and are considered gaps when the recording becomes fully inaudible.
4. Equipment Sounds - are inconsistencies of context caused by the recording equipment itself. Common equipment sounds include hums, static, whistles, and varying pitches.
5. Extraneous Voices - are background voices which at times appear to be as near as the primary voices. These can, at times, even block the primary voices.

## EXPERT TASKS

### Methods AFTI Uses to Detect Falsifications and Authenticate Tape Recordings

A forensic expert is trained to correlate his observations of such anomalies with machine functions to interpret events in the following ways:

1. Critical listening: Use human analytical capabilities to locate anomalies. The forensic scientist listens with proper headphones to the original tape using high-quality analytical equipment. He first performs a preliminary overview of the original tape and notes events including starts, stops, speed fluctuations, and other variations requiring further investigation. He then examines record events and categorizes them as environmental or non-environmental. After examining recorded events, the expert analyzes background sounds. He listens for abnormal changes, absences, or presences in environmental sound. The final phase of critical listening is an extensive audit of the foreground information. He concentrates on voices, conversation and other audible sounds. Here anomalies include sudden changes in a person's voice, abrupt unexplained topic change, or strong foreground interruptions indicative of obscuration. So the initial forensic process of critical listening provides foundation and direction for later intensive instrumental tests.

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### TASK DESCRIPTION TAPE TAMPERING EXAMINATION

When an audio tape becomes suspected of tampering, it may be forwarded to a qualified forensic audio specialist for authentication. Examples of such problems are: Credibility questions relating to the tape recorder operator, chain-of-custody contradictions, and differences between the content of the tape and testimonies of what was said. Most often, though, a forensic expert is contracted when the tape is believed to have been altered or tampered with. Due to the nature of the allegations surrounding tampering issues, the examiner required specific items from the patron. The Federal Bureau of Investigation, for example, has a list of required information including:

1. The original tape.
2. The tape recorders and related components used to produce the recording.
3. Written records of any damage or maintenance done to the recorders, accessories, and other submitted equipment.
4. A detailed statement from the person or persons who made the recording, describing exactly how it was produced and the conditions that existed at the time, such as:
  - a. Power source, such as portable generator or dry-cell batteries.
  - b. Input, such as telephone, radio frequency transmitter/receiver, miniature microphone, etc.
  - c. Environment, such as telephone transmission line, restaurant, apartment, etc.
  - d. Background noises, such as television, radio, unrelated conversations, computer games, etc.
  - e. Foreground information, such as number of individuals involved in the conversation, general topics of discussion, closeness to microphone, etc.
  - f. Magnetic tape, such as brand, format, when purchased, whether previously used.
  - g. Recorder operation, such as number of times turned on and off in the record mode, type of keyboard or remote operations for all known events, use of voice-activated features, etc.
5. A typed transcript of the entire recording or, if that is not available, transcriptions of the portions in question.

The items listed above are examples of what is required by a forensic expert as he begins an examination of questioned audio recordings.

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to provide at least some improvement of the speech signal. Copies of these enhanced tapes will be forwarded to Mr. Longhini within the next week.

As noted in the stop mark distances reflected during the spectrographic/waveform analysis of the tape, it is apparent at least three different recorders may have been used by the law enforcement agents during the intercept process. Review of the transcripts of trial testimony elicited during the Smart trial should assist in determining the relevant facts surrounding the recording of the original tape. This testimony could be crucial in establishing if tampering occurred in this case.

Mr. Longhini further advised he would release copies of the prosecution transcript to AFTI for review and comment. The ABC transcripts have been annotated showing the anomalous locations and will be available, if requested.

Sincerely,

Steve Cain  
President

cc: Doug Longhini

Encl: S/Recordings  
Digital Editing of tapes  
Task Description--Enhancement & Tampering

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Advanced Work  
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330-775-2148

The items listed above are examples of what is required by a forensic expert at the beginning of an examination of questioned tape recordings.

7. CC:162 Interruption of recording process (i.e. discontinuity)
8. CC:236 Unused transient activity
9. CC:290 Normal stop/re-start of recorder prior to police announcement is missing
10. CC:292 End of audio (stop marks of recorder observed)

**Q-3 (SIDE A)**

1. CC:07 Start of audio without start mark apparent
2. CC:116 Unusual transient during on-going speech
3. CC:300 Shut-off (stop) of recorder. (Stop marks observable)

**Q-4 (SIDE A)**

1. CC:06 Start of audio during ring-up of telephone. No starting of recorder apparent
2. CC:38-42 Loss of 60 cycle hum during on-going conversation
3. CC:120 Unused shut-off of recorder at end of first telephone call
4. CC:130 Start of audio during ring-up of second phone call
5. CC:148 End of second call during ring-up of phone call. (No stop marks observable)

**Q-4 (SIDE B)**

1. CC:10 Start of audio during ring-up of call. (No start of recorder apparent)
2. CC:35 Drop-out during on-going conversation
3. CC:148 End of audio during dialing of phone. (No conventional stop mark apparent)
4. CC:351 Shut-off of recorder. (Stop marks observable)

**3. Remarks**

ABC Transcripts submitted with the Q-1 through Q-4 tapes disclosed areas marked UI (unintelligible), especially those involving Pam Smart. As discussed on 9/2/94 with Senior Producer, Doug Longhini, some of these areas are capable of improvement through the use of proper filtering techniques. I did state, however, that the best enhancement would necessarily be done with an examination of the original tapes and recorders. At Mr. Longhini's request, the Q-1 through Q-4 copies are being enhanced

A more detailed explanation of the characteristics of edited/tampered tapes was provided ABC executives Ms. Diane Doherty and Producer Doug Longhini with additional copies appended to this report. As reflected in these published articles, it is essential for the original tapes and recording equipment to be released for inspection and analysis before my definitive judgements can be reached concerning authenticity issues. Some of the more troublesome anomalies found on the tape copies included the below described phenomena:

#### Q-1 (TAPE 9) SIDE A

	<u>Counter #</u>	<u>Description of Anomalie</u>
1.	CC:15	Stop/re-start of audio recorder
2.	CC:18	Apparent pause/re-start of recorder
3.	CC:20	Lack of stop/re-start between police preamble announcement and start of SMART/PIERCE conversation
4.	CC:24	Apparent loss of signal
5.	CC:348	Change in background signature
6.	CC:414	Audio ends on leader on Side A with PIERCE in middle of conversation

#### Q-1 (TAPE 9) SIDE B

7.	CC:02	Start of audio within on-going conversation (SMART). (Portion of audio apparently removed from end of Side A to beginning of Side B)
8.	CC:49	No stop/re-start of recorder between end of target conversation and police announcement
9.	CC:51	End of Audio - Side B (Stop marks of recorder observable)

#### Q-2 (SIDE A)

1.	CC:05	Lack of normal start mark of original recorder
2.	CC:23	Stop/re-start of recorder during police announcement
3.	CC:24	Lack of stop/re-start of recorder between announcement and start of target conversation
4.	CC:26	Interruption (pause?) of on-going conversation
5.	CC:74	Suspicious breaks during on-going conversation
6.	CC:81	Interruption of recording process (i.e. discontinuity)

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**Specialized Forensic Audio Training at the following institutions:**

Michigan State Police Crime Laboratory, Lansing, Michigan 1981 - 1989

OJT Training Program - U.S. Treasury Department and Michigan State Police Crime Laboratory (1981 - 1985) (1987 - 1989)

Attended various orientation courses involving forensic tape analysis and voice identification techniques at FBI Crime Laboratory, Washington D.C.; National Transportation Safety Board; Los Angeles Sheriff's Department; New York City Police Department, etc. (1984 - 1985)

Attended numerous specialized seminars and forensic training and educational programs hosted by the International Association of Identification; Voice Identification, Inc.; Michigan State Police; Michigan State University; Audio Engineering Society (1981 - present)

- 1. CC:08 Lack of normal start mark of original recorder
- 2. CC:23 Stop/re-start of recorder during police announcements
- 3. CC:24 Lack of stop/re-start of recorder between announcer's and start of target conversation
- 4. CC:28 Interruption (pause) of an going conversation
- 5. CC:74 Suspicious noise during an-going conversation
- 6. CC:81 Interruption of recording process (i.e. disconnection)



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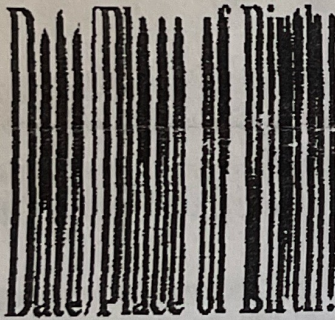
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