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Follow-up REPORT of:

Meeting with members of Assassination Records Review Board (ARRB),  
Wednesday 11 September 1996.

*Background:*

In the meeting at the Assassination Records Review Board Offices, arranged by Douglas P. Horne and James R. Milch we reviewed a detailed outline of topics for discussion between ARRB and Kodak. The discussion identified the need for an assessment of questions regarding the photographic evidence of the JFK assassination, including motion picture films, stills and X-Rays.

We agreed that Kodak's activity subsequent to the meeting, unless requested otherwise by the ARRB, would fundamentally be limited to a review of period film types, edge numbering and corner marking.

The results of this very basic preliminary investigation is supplemented with a limited literature search to assess investigations by others of the material we were shown.

The verbal contributions made by us to the group during the meetings are repeated here in part for continuity.

We recall that Mr. Gunn alerted us to understand that any data, interpretation, correspondence etc., i.e. all input presented to the ARRB, will become part of the public record.

Further communication with ARRB will be required if additional input is desired to address all of the issues identified in Mr. Gunn's outline and to fully comprehend the contribution that may be expected of us and to effectively design studies we could/should undertake.

## *Zapruder Film*

If we are given the opportunity to scan the film and analyze the digital image data, we should be able to provide input to most of the issues identified in Mr. Gunn's outline.

### *Artifacts in the Perforated Edge*

The tutorial provided during the meeting at the ARRB identified typical camera/film interface, 8mm image area positioning and options for camera claw pull-down location.

*Flare:* The concern about "image and flare" at the film edge between the perforations was determined to be a consequence of camera aperture/film claw pull-down design. The probability of claw flare is common if the film pull-down is the "zero to plus one" position necessitating the camera aperture to be cut-out adjacent to the minimum camera image to permit claw movement. It was not common to provide an internal lens image limiting aperture, thereby allowing the camera lens to extend the primary image into the area between the perforations (commonly with some claw flare).

*Density Variable:* As an answer the question regarding image density variation of scene information outside the normal "minimum camera aperture image area" yet "seen" by the lens and recorded between the perforations, we reported that the image density difference in the area between the perforations was most likely due to the perforations contributing to development turbidity, increasing development activity and resulting in lower reversal density. The pull-down claw flare mentioned above may also be a contributing factor.

### *Within scene density fluctuation:*

*Broad Area Density Changes:* Subsequent to our meeting, we confirmed that a ~~van~~<sup>Van</sup> type of exposure control and a broad area photo-electric sensing mechanisms was typical for 1960s vintage 8mm camera. Our general response to questions of causes of variation of exposure (resulting in detectable multiple frame film density variations), would be that the photoelectric sensor during a pan could adjust exposure with some lag. We reserved judgment on specific frame-to-frame or group of frames density differences and caution that any conclusions regarding this topic would require additional film and hardware review and study.

*First-frame Over Exposure:* The beginning of two scenes in the roll had a single over exposed-light blue hue frame. The suspect cause of camera claw position/film inertia start-up problems was reviewed with Mr. M. Brown, former Engineering Department Head of Amateur Movie Equipment, KAD Elmgrove. It is a design objective to have the claw at rest at the bottom of the pull-down cycle to maximize the inertia of start-of-scene to avoid the problem. However the exposure defect is not uncommon.

### Edge Print

Edge print on the film showed the word **Kodachrome II** within a clear field, "37" as 16mm slit strip location, a vertical bar followed by two small solid triangles ( **▲▲** ) and the word "S\*AFETY".

The edge print is added to the film as it is finished (slit, spooled and packaged). The markings show the film was finished in Rochester in 1961. Since no letter "A" followed the name "Kodachrome II", the film was balanced for "Daylight" exposure conditions.

If the edge print identification needs to be reinforced, the only form of "destructive" testing recommended would be to take about a frame from a non critical portion of the film (e.g. the family pictures which were located on the opposite side of the unslit roll) and make microscopic cross section analysis to confirm Kodachrome II coating technology and support thickness.

### Prints of the Zapruder Camera Original


*FBI or Secret Service Print:* A print, 1 of 3 prints, made of the Zapruder 8mm camera film prior to slitting was reported to have been printed by the Jamieson Film Company. The print was unslit and our very casual examination shows a significant loss of color image quality, compared to the original, for undetermined causes. (Printer timing or storage??) The group also identified some damage due to handling such as perforation damage and an area of "burn through or melting" possibly due to high intensity light.

After reviewing the poor photographic characteristics of the unslit Secret Service print, I wished, if possible, to gain an understanding about the quality of the print printed by Jamieson Laboratories 22 Nov. 1963. Neither the affidavit by Frank R. Sloan, Manager of Jamieson, or the

affidavit of Tom Nulty of Kodak Dallas Processing Laboratories provide any information of film emulsion numbers or resulting film quality.

I called, and spoke at length, to Mr. Bruce Jamieson, Plant Manager at that time, who was personally present during the printing of Mr. A. Zapruder's 8mm motion picture film. Mr. Jamieson related that Mr. Zapruder (et al.) brought the processed and unslit Kodachrome II film to the lab together with three 25ft<sup>1</sup> rolls of Kodachrome II (type A) customer packaged camera raw stock provided by Kodak.

Printer light level tests could not be made on the Kodachrome II film, therefore he and his chief printer estimated the best printer light and filter pack. (Note: Kodachrome II-A was balanced for 3400°K whereas typical print stock is balanced for 3200°K.) To the best of his recollection the film was printed on a custom multi-head printer of Jamieson's own design. The picture aperture plus edge print aperture format was similar to that of Bell & Howell Model C printers of that period.

Bruce mentioned that Mr. Zapruder was so concerned about his film that he "followed his film" into the dark room during the printing operation. Mr. Zapruder took the exposed film back to Kodak for processing. Kodak had perforated identification numbers 0183 on the camera original and subsequently perforated ~~0184~~, 0185 and 0186<sup>0187</sup> on the Jamieson prints. All were given to Mr. A. Zapruder. The original was slit to 8mm, and the processed prints were returned unslit (16mm width). Mr. Jamieson did not see the results of their printing. 

We may assume that since Kodak proceeded with slitting the camera original to 8mm, that the prints were of reasonable quality. Also, the FBI and the Secret Service both accepted the quality as sufficient for use as evidence in their investigations of the assassination. Both original and prints were of the same film type and processed the same day with the same processing machine and chemistry, so their resulting dye stability should be nearly identical. Why then the poor quality of the unslit (FBI or Secret Service) print we viewed?

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<sup>1</sup>Note: Twenty-five foot camera original double 8mm film actually contained thirty three feet of film to allow for thread-up and processing leader.

*Edge Print:* An examination of the edges of the film edge shows a print-through of the camera film edge print as "Kodachrome II" as well as the film stock edge print, "Kodachrome II A". The word "S\*AFETY" was edge printed as well as the code bar-dot-dot (I..).

As noted above the edge print indicates that the film was finished in Rochester, but the double dot indicates the year was 1959 or 1979! Since Kodachrome II was not introduced until 1961, the identification indicates that the print we saw was made in 1979 or later on 1979 raw stock.

*Note:* Because our viewing of the film material was rather brief, and required taking notes, the edge print code should be rechecked. The National Archives could make a photocopy of the edge print from the film in a non-sensitive or non-image area for confirmation. The outline indicates that two Secret Service prints (of the three made), were available. We saw only one and the other should have the edge print cross-checked for verification. As speculation, and as a question to the ARRB, because of the extensive evaluation of the photographic evidence contained in the studies by the 1979 House Select Committee on Assassinations, could, what we saw, be a subsequent generation print, (rather than the Jamieson Lab first generation) made for those studies?

### *Autopsy-Related Images*

*Bethesda  
Dallas  
Hosp* At our meeting, Mr. Gunn noted that there was considerable interest in confirming authenticity or the possibility of alteration of ~~Dallas~~ Hospital operating room scenes. Volume VI, Appendix to Hearings before the Select Committee on Assassinations, has a section addressing an extensive photographic authentication of the autopsy photographs and X-Rays. Although significant and in-depth, there may be a basis for additional supportive studies.

In this section, it is reported that a total of 27 color transparencies and 25 black and white negatives were taken during the autopsy.

According to the literature<sup>2</sup>, autopsy photographer John Stringer placed his Linhoff 4x5 camera on a tripod, and identical color and black-and-white photographs were taken by changing film holders. A single strobe light was the reported light source, but in the 1992 interview, referenced above, Stringer recollected two light sources, one on either side of the camera.

*Photographs of the Head:* We were shown "Right Posterior Occipitoparietal" photographs identified as 15 and 16 (black-and-white), and 42 and 43 (color).

*Corner Notches and Edge Print:* The color film is marked 256 KODAK -- S°AFETY FILM with a shallow triangular notch followed by a broad rectangular notch from the upper right corner of the film. These markings identify the film as EKTACHROME Daylight Type Sheet Film, Film Code 6115, emulsion batch 256, manufactured in Rochester 8/25/63.

The black and white negative material is marked KODAK -- S°AFETY FILM without number but with four small corner "VVVV" notches. These markings identify the film as PORTRAIT PAN Sheet Film, Film Code 6614, manufactured in Rochester. No batch number was noted on the negatives we saw to establish a date of manufacture.

*Photographs of Brain:* The photographs of the President's brain - removed and on a plain background, consisted of seven black and white and seven color transparencies - all 4 x 5.

*Corner Notches and Edge Print:* The color transparency film is marked 251 KODAK -- S°AFETY FILM with a shallow triangular notch followed by a broad rectangular notch from the upper right corner of the film. These markings identify the film as EKTACHROME Daylight Type Sheet Film, Film Code 6115, emulsion batch 251, manufactured in Rochester 7/20/63.

The black and white images are edge marked ANSCO SUPER HYPAN, and are of the character (format and thickness) that we believe

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<sup>2</sup> Livingstone, Harrison Edward, "High Treason 2". Appendix by Steve Mills, pp582-588

consistent with film pack material. The "white dots" at the top and bottom (different patterns) we concluded were pricks or indentations from two different types of film hanger clips used to keep the thin film from curling during processing.

*Note:* The color balance of the brain photographs differ significantly compared to those of the autopsy. This can be attributable to the speed and color temperature of the strobe light, if different, the color correction filtering to daylight balance of a tungsten light source, subject or room surround color (e.g. green walls) or the development process.

*Roll of 120 EKTACHROME Transparency Film:* We were shown an uncut roll of 120 film -yellow/orange in color- (identified as Ektachrome transparency film) purportedly flashed intentionally by an officer at the time of taking. The film was subsequently developed and the question was, "what happened causing the color and were there any images"? By blocking out all light except for transmission through the film area we were able to ascertain 2 or 3 positive square format images.

*Edge print:* Edge print marking showed S<sup>o</sup>AFETY FILM and several frame numbers 4-7 etc. and the number -- 03095. These markings identify the film as EKTACHROME E3 Daylight Type, Film Code 6003, emulsion batch 095, manufactured in Rochester / / .

As reported<sup>3</sup>, the exposures were made by an enlisted man Floyd Riebe. After taking about five photos at the request of autopsy photographer John Stringer, a Secret Service man seized the camera and exposed the film to room light. The film was subsequently processed.

My initial impression was that the film was processed wrong proved incorrect. Following discussions with Ektachrome experts, we have determined that the yellow/orange color is not untypical of a film that was flashed through the base "holding back" blue light exposure of the blue sensitive top layer which develops with yellow dye coupler. The residual image frames are probably in the blue sensitive/yellow dye layer only.

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<sup>3</sup>. Ibid

A cross section of a small portion of the film would confirm the exposure/development characteristics and scanning/enhancement could provide some interpretation of the image content.

*X-rays:* We were shown two, approximately 10 x 12 inch, X-rays of the President's head. The X-rays were made using an enhancement screen with "RADELIN ALUMINIZED 605048" appearing in the upper area of the image. Scan lines, vertical, of about the same pitch as TV scan lines appear in the image through the object of concern.

*Comments:* We were not able to add any significant information to what we saw. Radiologists consulted confided that the portable equipment used and the exposure level chosen for autopsy X-rays fulfill an objective to detect metal. This practice generally results in overall poorer quality images for other analysis. The viewing and notes we took at the meeting did not permit any product identification or verification.

### *Robert Groden 35mm Material*

Prior to our afternoon visit to the National Archives, the group showed us a commercial VHS video tape<sup>4</sup> of the Zapruder 8mm film. The tape was prepared by Robert J. Groden, photo consultant to the House Select Committee on Assassination and Technical Advisor to Oliver Stone's movie "JFK".

We were informed that the video tape was scanned from a 35mm "wet gate" blow up. A color print from the 35mm blow-up interneg of the Nix and Muchmore films has been provided to the ARRB/National Archives. There were many questions in the outline that we could only consider resolving by direct tape/film comparison

*Edge Print:* The edge print information copied to our notes is not of much value. Confirmation or photocopies would be required for a more complete study to establish reliable conclusions. We anticipate, from the outline that the ARRB is more interested in the quality of the image than the product code information of the 35mm film.

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<sup>4</sup>. VHS 1164, "The Assassination--". New Frontier Productions, PO Box 2164, Boothwyn, PA 19061, copyright 1995.



The 35mm print of the Muchmore film was edge printed "Eastman 19 • | † T and footage marked 84705 (plus & minus). In smaller font SAFETY FILM EASTMAN and elsewhere a bar, plus sign and solid triangle I+▲ SAFETY FILM. Some of this may have been a print through from the internegative.

The I+▲ indicates a 1973 year of manufacture possibly of an 8 or 16mm product. The • | † T code does not appear to be of Kodak origin.

The second 35mm print of the NIX film contained several edge print markings including: EASTMAN 5372-255 1401 101EA, a bar code and "man readable" numbering of KS 0110635907° and marking of unknown source of a dollar sign, a right facing bracket, a pound sign and an open triangle \$ [ # Δ. Lettering height was about 2mm as well as 1.2mm.

The film type 5372 may have been read or copied incorrectly. If 5272, it represents Eastman Low Contrast Internegative film and a logical choice to reproduce a reversal film. The KS 011 also reinforces the Low Contrast Internegative product which could also be SO211 when provided to a customer as Special Order. The other code may be laboratory rather than manufacturing generated.

*Key Kode:* The Bar Code, which is Eastman "Kodak Key Kode" was established for trade use beginning in 1989.

### *1978 Digital Data Tapes*

No additional information has been developed to determine if we can use or transcode the 5 reels of computer tape from the Los Alamos National Laboratory based on the information in the "Tape Description" and "Output Description" of the Magnetic Tape format - a Scansalot program.

### *8mm Cameras for Current Testing*

Inquires have revealed that the Bell & Howell camera collection is currently housed at the George Eastman House Museum (Todd Gustavson). Cameras compatible to the Zapruder camera could be made available for testing if desired. Regular 8mm camera film is no longer available; however, Kodachrome II film is still being manufactured and we have located an 8mm 2R perforator at Kodak Colorado.

Respectfully submitted,



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As Consultant for Kodak

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