



DEPARTMENT OF THE TREASURY

Laboratory Report

To: Special Agent Jeff Kerr
Bureau of Alcohol, Tobacco and Firearms
10 Causeway Street, Room 701
Boston, MA 02222-1081

Forensic Science Laboratory
BUREAU OF ALCOHOL, TOBACCO AND FIREARMS
1401 Research Boulevard
Rockville, Maryland 20850
(202) 294-0420

Date of Report: June 9, 1992
Lab Number: 91N0991
Submissions: 1-13
Reference: 63212922008C
Type of Exam: Explosives

Thirteen submissions of evidence, as listed below, have been received.

EXHIBITS

SUBMISSION 1

- Delivered to the ATF laboratory by Special Agent Sandra LaCourse on October 29, 1991.
- 1A,B - Glass jar with two vials containing white material scraped from side of house
 - 19A,B - Two 1 gallon cans of sifted dirt from the seat of the blast
 - 21 - Two gun belts and equipment from Officers Hurley and Foley
 - 22 - Clothing from Officer Hurley
 - 23 - Clothing from Officer Foley
 - 24 - Debris recovered from the Officers' clothing at hospital

SUBMISSION 2

- Received by Federal Express 3167418785 on October 30, 1991.
- 2-1 - Manila envelope containing swabbings and samples from hands of T. Shay, Sr., as follows:
 - 2-1.1 - Swabbings with dry gauze
 - 2-1.2 - Swabbings with gauze and water
 - 2-1.3 - Swabbings with gauze and ethanol
 - 2-1.4 - Swabbings with dry cotton ball
 - 2-1.5 - Swabbings with cotton ball and water
 - 2-1.6 - Scrapings from the finger of T. Shay, Sr.
 - 2-1.7 - Gauze control
 - 2-1.8 - Cotton ball control

SUBMISSION 3

- Received by Registered Mail R055-054-923, R055-054-924, and R055-054-925, on November 4, 1991.
- 34 - Two jars labelled "control samples of epoxy" from T. Shay, Sr.
 - 35 - T. Shay, Sr.'s clothing

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Accredited by The American Society of Crime Laboratory Directors

(91N0991 continued)

- 38 - Three X-rays, a glass jar, and three bags with fragments from Officers Foley and Hurley
- 39 - Seven X-rays, a glass jar and envelope with fragments
- 40A,B,C,D - Four paper bags containing blue hospital blankets
- 41 - Two white sheets from hospital
- 42 - Two folded papers with magnet fragments from Officers Foley's and Hurley's firearms
- 43 - Photos of Officers Foley's and Hurley's firearms
- 44 - Four slides containing debris and tissue removed from Officers Hurley's gurney at hospital

SUBMISSION 4

Delivered to the ATF Laboratory by Cynthia L. Wallace on November 2, 1991

- 1 - Remains of one electric detonator
- 2 - Wood and plastic debris
- 3 - Plastic debris
- 4 - Device fragments and other debris
- 5 - Pieces of wire, fabric and tape
- 6 - Pieces of metal and screws
- 7 - Pieces of magnet, plastic, fabric and glass
- 8 - Remains of AA battery
- 9 - Pieces of wood
- 10 - Pieces of metal, nail and foam
- 11 - Pieces of fabric, tape and plastic
- 12 - Pieces of metal, paper and plastic
- 13 - Pieces of paper and wire
- 14 - Pieces of wood, wire and fabric
- 15 - Debris from the seat of the blast
- 16 - Piece of wood
- 20 - Debris from sifting of seat of the blast
- 25 - Pieces of wood, metal, plastic, etc. from sifting
- 26 - Magnet fragment
- 27 - Piece of black plastic
- 28 - Wood, wire, plastic, fabric, and glass pieces
- 29 - Pieces of magnet and wood
- 30 - Piece of black tape, and white ceramic electrical component
- 31 - Black and grey tape
- 32 - Residue from undercarriage of black Buick Century
- 33 - Battery, wood, and residue
- 36 - Piece of wood, metal and paper
- 37 - Piece of paper, plastic and metal
- S4-A - Newspaper clipping with piece of black electrical tape from T. Shay, Jr.
- S4-B - Exemplar inclinometer with button magnet

SUBMISSION 5

Received by Federal Express FE2217808473 on November 7, 1991.

- 5-1 - Box of photographs
- 5-2 - Three audio tapes

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(91N0991 continued)

SUBMISSION 6

Received by Federal Express FE3167419765 on November 14, 1991.

- 6-46 - Glue and wire
- 6-47 - Seven tools
- 6-48 - Two empty Radio Shack bubble packs
- 6-49 - Four rolls of tape
- 6-50 - Roll of silver duct tape
- 6-51 - Red wire cutter with black handle
- 6-52 - Wire
- 6-53 - Green handled cutter
- 6-54 - Wire
- 6-55 - Grey carpet
- 6-56 - Wood shim
- 6-57 - Jack
- 6-58 - Two AA batteries
- 6-59 - Electrical device

SUBMISSION 7

Received by Registered Mail R673-478-645 on November 25, 1991.

- 60A - Roll of black electrical tape
- 60B - Tape dispenser with the end of a roll of black electrical tape
- 61 - Black & Decker hot melt glue gun

SUBMISSION 8

Received by Certified Mail P009-198-342 on November 27, 1991.

- 8-1 - Ring magnet

SUBMISSION 9

Received by Federal Express FE3167419592 on December 10, 1991.
65 - Plywood from Thomas Shay, Sr.

SUBMISSION 10

Received by Federal Express FE3167419404 on December 6, 1991.

- 63 - Wood fragments
- 64 - Wood and tape fragments

SUBMISSION 11

Received by Registered Mail R673-478-352 and R673-478-353 on March 2, 1992.

- 11-1 - Radio Shack Cat. No. 270-391 AA battery holder
- 11-2 - Radio Shack Cat. No. 275-602 SPST toggle switch
- 11-3 - Radio Shack Cat. No. 272-1133 package of two #50 lamps
- 11-4 - Radio Shack Cat. No. 272-356 Miniature Lamp Base
- 11-5 - Radio Shack Cat. No. 270-220 Deluxe Project Case 4X2X1
- 11-6 - Radio Shack Cat. No. 270 223 Deluxe Project Case 5-11/16 X 3-1/16 X 1-11/16

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SUBMISSION 12

Received by Federal Express FB0605064950 on December 18, 1991.
12-1 - Piece of wood

SUBMISSION 13

Evidence from three search warrants delivered to the ATF laboratory by Cynthia L. Wallace on February 3, 1992.

From 82 Broad St., Weymouth (business)

- 69 - Wires
- 70 - Roll of silver duct tape
- 72 - Vacuum bag from Dirt Devil Vacuum Cleaner
- 77 - White cable containing four wires
- 78 - J&L Industrial Supply Catalog

From 7 Whitelawn Ave. (garage)

- 79B - Samples taken from wooden box
- 80 - Spray can of Black Leaf Pruning and Tree Wound Dressing
- 81 - White plastic spool with red single strand copper wire
- 82A,B,C,D - Four adhesives
- 83A,B,C,D - Four wires
- 84 - Quart can of Rust-oleum Gloss Black
- 85 - Gallon can of black Gloss Trim
- 88 - Bottom of wine bottle
- 89 - Can containing match heads
- 90 - Roll of black electrical tape
- 91 - Battery, wire, etc.
- 93 - Tube of Liquid Nails All-Purpose Adhesive
- 94 - Roll of black electrical tape

From 133 Atlantic Street (apartment)

- 95 - Miniature speaker
- 96 - Bottle of LePages Rubber Cement
- 97 - Stick of Crazy Glue
- 98 - Eleven pens
- 99 - Batteries
- 101 - Vacuum bag from Hoover vacuum

RESULTS OF EXAMINATION

THE DEVICE

Fragments of the device were present in Submission 1 (all exhibits), Submission 3 (exhibits 38 - 44), and Submission 4 (all exhibits except exhibit 30, 31, 32, S4-A and S4-B). The device consisted of a wooden box, magnets, radio control components, a switch, two detonators, dynamite, tape and paint.

The device container was a wooden box with another smaller box constructed on one side. The larger box was originally approximately 1-3/4 inches thick with one side at least 6-1/2 inches in length. The original outside dimensions of the smaller box were 2-5/8 X 2-5/8 X 1-1/4 inches.

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The outside of the container had been painted black with an acrylic based paint. The container was constructed with a 3-ply plywood approximately 1/4 inch thick. All three layers of the plywood were hardwood, and the two veneers were consistent with oak. Blue ink lines on some of the edges appear to be from a template drawn before the wood was cut. The container had been constructed with two-penny nails and a cyanoacrylate ("super-glue" type) adhesive.

Two types of magnets were originally attached to the wooden box with cyanoacrylate adhesive: button magnets and ring magnets. Fragments of at least twelve button magnets were found, ten of which were originally red and two were blue. The exposed surfaces of all of the magnets had been painted black. Two of the red button magnets were glued directly to the plywood surface, two red magnets and one blue were glued to the box after it had been painted, and it could not be determined if the other seven magnets had been glued to the box before or after it was painted. Fragments of at least one strontium-territe type ceramic ring magnet were recovered. The original outer diameter for the magnet was approximately 3.65 inches, the ring width was approximately 0.79 inch, and the magnet height was 0.60 inch. The wooden box had been painted before the magnet was attached. This type of magnet is used in antennas, speakers, or small motors.

Fragments of two Austin Rock*Star millisecond delay electric detonators were recovered. The base of the shell for one detonator indicated it was delay period six. A recovered wire connection had two yellow insulated 23 gage single strand copper wires wrapped with white plastic tape. This is consistent with a connection of leg wires from two Austin Rock*Star detonators. The white plastic tape was originally at least 0.65 inch wide.

Submission 1 exhibit 1A and B contained white material scraped from the outside of the house from which the detonator in submission 4 exhibit 1 was recovered. More of this material was recovered from the tape-backed magazine fragments in submission 4. The recovered material was identified as ammonia dynamite. Dynamite residues were also identified in exhibit 19B, dirt from the seat of the blast.

Fragments of at least five Duracell 9 volt batteries were recovered. On four of the batteries the freshness code (labelled "best if installed by") was "JUL 94"; on the fifth only "JUL" was clear. The snaps from the tops of the 9 volt batteries had the remains of 9 volt battery snap connectors attached. Adhesive on the sides of the battery casings is consistent with the 9 volt batteries being glued together. Fragments of four Duracell AA batteries, three bearing a freshness code "JUL 94", were recovered.

The following Futaba brand radio control components were identified: receiver, servo, battery holder, and slide switch. The recovered receiver components were from a Futaba Model No. FP-R102JE. The receiver was originally attached to the inside of the box with adhesive. A partial FCC ID code from a sticker on the back of the receiver had been transferred to the adhesive on two small wood fragments. The characters are consistent with an original code ending as follows: "-R102JE72". This is an obsolete code which indicates the receiver operated on band 72, a frequency reserved for radio control aircraft only.

The servo label was recovered and read as follows:

Futaba
FP-S148

INDIRECT DRIVE

Fragments of a Futaba model FSH-6E servo horn were recovered.

The battery holder fragments were consistent with a Futaba battery holder labelled "UM-3X4...6V" designed to hold four AA batteries.

Fragments of an obsolete model of a Futaba Mini slide switch were recovered.

Two switch contacts were recovered and identified as Radio Shack Catalog number 275-602 single-pole single-throw toggle switch.

The relative arrangement of some of the components within the device were determined by reconstruction of the wooden box and impressions in the adhesive. The Radio Shack switch and the servo were secured in an opening from the large box into the smaller box. The servo horn and the toggle for the Radio Shack switch projected into the smaller box and appeared to be configured so that the action of the servo horn would move the toggle. At least two of the 9 volt batteries were glued to the inside of the larger box next to the base of the servo.

A number of wire fragments were recovered including single-strand red and yellow wire consistent with the leg wires from the Austin detonators. Multistrand copper and tinned copper wire fragments with red and black insulation were consistent with the size and type of wire on the recovered types of components (Futaba components and 9 volt battery snap connectors). Fragments of triple conductor multistrand copper wire with black, red and white insulation were consistent with wire used on Futaba components. Fragments of multistrand copper wire with white insulation had been glued to the wood from the device and then painted black. This type of wire is used as antennas on Futaba receivers. Fragments of insulation from a larger size multistrand wire with red insulation were also recovered.

Fragments of a magazine page were recovered. The source of this was identified as page 25/26 from the July, 1991 issue of Muscle Mag International. This magazine page had originally been wrapped with several layers of silver duct tape and 3/4 inch nominal width black electrical tape. On some fragments the black electrical tape was six layers thick. The silver duct tape was stuck to the paper with the black electrical tape layered on top. The original width of the duct tape was at least 1-9/16 inches. The black electrical tape was consistent in physical characteristics and chemical composition with Scotch brand tapes.

OTHER EVIDENCE IN SUBMISSIONS 2 - 5

SUBMISSION 2

Analysis of the swabs in exhibit 2-1.1 to 2-1.5 disclosed no explosives residues. Exhibit 2-1.6 (scrapings from T. Shay, Sr.'s hands) was identified as a grey colored putty.

SUBMISSION 3

Exhibit 34 (control samples of a two component "epoxy" from T. Shay, Sr.) were compared to the hand scrapings in submission 2. The material in exhibit 34 was different from the putty in exhibit 2-1.6.

Exhibit 35 contained a shirt, a pair of pants and a pair of shoes recovered from Thomas Shay, Sr. Smears of acrylic based black paint present on the clothes were different from the black paint on the device.

SUBMISSION 4

Exhibit 30 contained 1 inch nominal width black electrical tape and an electrical component. Exhibit 31 contained two types of black electrical tape and two types of silver duct tape. All of these items were different from the tape and components in the device.

Exhibit 32 contained material removed from scratches on the undercarriage of the black Buick Century. Numerous chips consistent in composition and appearance with fragments of the strontium-ferrite type ceramic ring magnet in the device were recovered. Chips of a composition consistent with the button magnets on the device were recovered including one fragment measuring approximately 5/64 X 5/32 inch. This fragment had red paint covered with black paint on one side and another side was a manufactured flat surface with black paint. The black and red paints were consistent in composition with the black and red paint on the device button magnets, and their relative positions on the fragment are consistent with originating from the top corner of one of the red button magnets glued to the top of the device.

Exhibit S4-A was a newspaper clipping and attached black electrical tape recovered from Thomas Shay Jr. by Boston Police Detective Peter O'Malley. The tape was different from the black electrical tape in the device.

Exhibit S4-B was an exemplar inclinometer with a red button magnet. This magnet was consistent in size, color and composition with the red button magnets recovered from the device.

SUBMISSION 5

Exhibits 5-1 and 5-2 were autopsy photographs of Officer Hurley and three audio tapes respectively.

SUBMISSION 6

Submission 6 contained fourteen exhibits submitted for comparison to device components.

Exhibit 6-46 contained two hot melt glue sticks, a six-inch length of wire cable with tan sheath, and a three-inch section of intertwined yellow, red, green and black wire. Hot melt glue was not recovered from the device. The red wire and both types of yellow wire were different from the single strand copper wire recovered from the detonator in the device.

Exhibits 6-52 and 6-54 contained three lengths of wire that were different from any wire recovered from the device.

Tools were submitted in exhibits 6-47, 6-51 and 6-53. Exhibit 6-47 contained seven tools: 6-47A black handled needle nose plier, 6-47B red handled needle nose plier, 6-47C red handled wire stripper, 6-47D yellow handled wire stripper, 6-47F red handled wire cutter with jagged grip, 6-47G black handled wire cutter, and 6-47H red handled wire cutter. Exhibit 6-51 was a red wire cutter with black handle, and 6-53 a green handled cutter. Microscopic examination of the cutting surfaces for residue was negative.

Exhibit 6-48 contained two Radio Shack bubble packs. 6-48A was packaging from Radio Shack Cat. No. 40-1383 "8-Ohm 20-Watt Power Resistor" and 6-48B was packaging from Radio Shack Cat. No. 271-120 "2" Piezo Tweeter" packaging. These components were not recovered from the device.

Exhibit 6-49 contained two rolls of black electrical tape, one roll of white foam tape, and one roll of silver duct tape. Both rolls of black tape were different from the black electrical tape in the device. The white foam tape was different from the white tape used in the device. The silver duct tape was different from the silver duct tape used in the device.

Exhibit 6-50, a three inch wide roll of Tuck silver duct tape, was consistent in construction and composition to the duct tape recovered from the device. An approximate 1-7/8 inch wide strip had been torn lengthwise and removed from the roll for a length of approximately 15 feet 3 inches. The widest fragment of duct tape recovered from the device was approximately 1-9/16 inch wide.

Exhibit 6-55, a sample of grey carpeting, did not contain any explosives residues.

Exhibit 6-56, a wood shim, was different from the three layer plywood used in the device.

Exhibit 6-57, a banana plug jack with attached wires, and exhibit 6-59, an electrical device similar in appearance to a Radio Shack Piezo Transducer Piezo Speaker, were different from any components recovered from the device.

Exhibit 6-58, two Duracell AA batteries, had freshness dates of "JAN 96". This is different from the freshness dates on the Duracell AA batteries used in the device.

SUBMISSION 7

Exhibit 60 contained two rolls of black electrical tape. Exhibit 60A was a roll of unknown brand which was different from the tape used in the device. Exhibit 60B was a roll of 3M black electrical tape on a tape dispenser, and had a nominal width of 3/4 inch. The tape dispenser had an angled cutting edge which was different from the surviving intact edges on some of the tape fragments from the device. The backing and adhesive of this tape was analyzed and found to have the same composition as the black electrical tape from the device. Both tapes appear to be the same manufacturer's product type, but could not be more closely associated.

Exhibit 61 was a Black & Decker glue gun containing a stick of hot-melt glue. This type of adhesive was not recovered from the device.

SUBMISSION 8

Exhibit 8-1 was a barium-ferrite type ceramic ring magnet with an outer diameter of approximately 3.17 inches, a ring width of approximately 0.79 inch, and a height of approximately 0.47 inch. This magnet is of a different size and composition than the magnet in the device.

SUBMISSION 9

Exhibit 65 contained two pieces of plywood from a board recovered from Thomas Shay, Sr. This is a three layer plywood (two veneers over a core) of approximately the same thickness as the plywood from the device; however, the wood is of a different construction with a different type of adhesive used for the laminate. The board had residue of grey and black spray paint. The black paint was different from the black paint on the device.

SUBMISSION 10

Exhibit 63 contained samples of crating wood and roof wood that were not similar to the wood in the device. Exhibit 64 contained four pieces of black electrical tape and three pieces of wood. The three wood fragments were solid wood, different from the plywood in the device. Two of the four black tape pieces were 3M brand with backing and adhesive of the same composition as the black electrical tape from the device, but the tapes could not be more closely associated.

SUBMISSION 11

Exhibit 11-2 (Radio Shack 275-602 SPST Toggle Switch) was the same type as the switch from the device. The materials in exhibits 11-1, 11-3, 11-4, 11-5, and 11-6 were different from any of the device components.

SUBMISSION 12

Exhibit 12-1 was the remainder of the plywood board from which pieces were cut and received in submission 9.

SUBMISSION 13

The wire in exhibits 69, 77, 81, 83, and 91 were different from any wire used in the device.

Exhibit 70 (roll of silver duct tape) was different than the duct tape in the device. Exhibit 90 was a roll of black electrical tape different in construction and composition from the black tape from the device.

The contents of the vacuum bags in exhibits 72, 94, and 101 were examined and did not contain any of the same type of materials used in the device.

Exhibit 78 was a J & L Industrial Supply catalog, which carries the same type of button magnets used in the device.

Exhibit 79B (samples from a wooden box) contained a different type of plywood and was constructed with a different type of adhesive than that used in the device.

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Exhibit 80 (can of Black Leaf Pruning and Tree Wound dressing) was different from the black paint on the device box. The black paint in exhibits 84 and 85 were different from the paint on the device.

Exhibits 82 (A, B, C, and D), 93, 96, and 97 contained adhesives. Exhibits 82D and 97 contained cyanoacrylate based adhesives, and are the same type as that used to construct the device.

Exhibit 88 was the bottom half of a wine bottle and exhibit 89 was a can containing match heads.

Exhibit 95 was a miniature speaker containing a different size magnet and different wires from those in device. The Duracell AA batteries and packaging in exhibit 99 had different freshness dates (JAN 96 and JAN 93) than those from the device.

DISPOSITION OF EVIDENCE

The evidence in submission 4 will be forwarded to Explosives Technology Branch upon completion of additional examinations. Submissions 1, 3, 4, and 6 will be forwarded to the toolmarks section for examination. The remainder of the evidence will be returned by Certified Mail.

Cynthia L. Wallace
 CYNTHIA L. WALLACE
 Forensic Chemist

REVIEWED BY: *Richard A. Strobel*
 RICHARD A. STROBEL, Chief
 Explosives Section