CRIME SCENE MANUAL

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Revision History

Revision #	Description of Changes
1	First Qualtrax revision. Changes to table of contents and section headings: Section 5 now "Crime Scene Security and Precautions", Section 6 now "Crime Scene Investigation Methodology", Section 7 now "Observations and Notes", Section 8 now "Photography", Section 9 now "Diagrams", Section 10 now "Presumptive Blood Tests", Section 11 now "Biological Evidence Collection", Section 12 now "Blood Enhancement Chemicals", Section 13 now "Recognition and Documentation of Evidence in Bloodshed and/or Shooting Scenes", Section 14 now "Latent Print Development and Preservation", Section 15 now "Impression Evidence", Section 16 now "Trace Evidence", Section 17 now "Firearms and Tool Mark Evidence", Section 18 now "Vehicle Processing", Section 19 now "Human Remains and Buried Body Excavations", Section 20 now "Entomology", Section 21 now "Fire and Arson Investigation", Section 22 now "Documentation and Evidence Collection from Victims, Subjects, and Suspects", Section 23 now "Validation", Section 24 now "Forms", Section 25 now "Equipment Calibration and Maintenance", Section 26 now "Chemicals, Supplies, and Reagent Preparation", Section 27 now "Report Writing", Section 28 now "Review", Section 29 now "Proficiency Testing", and Section 30 now "Safety." Addition of Presumptive Blood Testing (section 10), including addition of safety sections, clarifying language, and formatting changes. Addition of Organization and Management (section 3), Personnel (section 4), Crime Scene Investigation Methodology (section 6), Observations and Notes (section 7), Biological Evidence Collection (section 11), Latent Print Development and Preservation (section 14), Impression Evidence (section 15), Trace Evidence (section 16), Vehicle Processing (section 18), Validation (section 23), Forms (section 24). Change of manual name. Addition of references. Formatting and grammatical changes throughout.

1.0 Introduction

1.1 Statement of Purpose/Background

The purpose of the Idaho State Police (ISP) Crime Scene Response Unit is to provide an evaluation and examination of the crime scene for the purpose of recovering physical evidence and documenting the scene's condition for use by the criminal justice system. The ISP Quality Manual and the ISP Crime Scene Manual provide the structure for these objectives.

1.2 Objectives/Scope:

1.2.1 To develop and maintain, through annual review and revision, a system of quality procedures, analytical methods, and controls.

1.2.2 To ensure that personnel have quality, relevant, and timely training in the subjects for which they'll conduct analyses at crime scenes.

1.2.3 To remain scientifically neutral by basing evidence collection and analysis decisions, case reports, and testimony on scientific rationale.

1.2.4 To provide high quality training, technical and informational assistance, analyses, written reports, and testimony.

1.2.5 To provide services in a timely and cost effective manner.

1.3 References

1.3.1 Idaho State Police Forensic Services – Quality Manual Section 2.0 NORMATIVE REFERENCES.

1.3.2 Practical Crime Scene Processing and Investigation, Second Edition, Ross M. Gardner

1.3.3 Practical Homicide Investigation, Fourth Edition, Vernon J. Geberth

1.3.4 Principles of Bloodstain Pattern Analysis, Theory and Practice, Stuart H. James, Paul E. Kish, and T. Paulette Sutton

1.3.5 United States Department of Labor, Occupational Safety and Health Administration (OSHA) website (www.osha.gov)

1.3.6 A Short Course in Photography, Third Edition, Barbara London and Jim Stone

1.3.7 Association of Firearm and Toolmark Examiners (AFTE) Glossary, 6th Ed.

1.3.8 International Association for Property and Evidence, Inc., "Professional Standards", REV March 8, 2015, (http://home.iape.org/)

1.3.9 Advances in Fingerprint Technology, Henry Lee and R.E. Gaensslen.

1.3.10 Scott's Fingerprint Mechanics, Robert D. Olsen, 1978.

1.3.11 Fingerprint Techniques, Andre A. Moenssens, 1971.

1.3.12 Manual of Fingerprint Development Techniques Home Office Police Scientific Development Branch, 1998.

1.3.13 Friction Ridge Skin, Comparison and Identification of Fingerprints, James F. Cowger, 1993.
1.3.14 “Decoding a Sample VIN”, DMV.ORG
1.3.15 Ada County Sheriff’s Office, Crime Scene Analytical Method, Impression Evidence.

2.0 Definitions

ABRASION – An injury to the skin in which the superficial epithelial layer of the skin (the epidermis) is removed due to friction against a rough surface with resultant scraping away of the superficial portions of the epidermis; wearing away of the skin in small shreds by friction.

ABRASION COLLAR – the circular perforation and blackening effect on the edges of the skin as the bullet passes through the skin.

ACTION – the working mechanism of a firearm; the combination of the receiver or frame, the breech bolt, and the other parts of the mechanism by which a firearm is loaded, fired, and unloaded.

ADHESIVE LIFTER – any variety of adhesive-coated material or tapes, commonly used to lift fingerprints or footwear impressions; may also be employed to lift trace materials from a surface.

ADIPOCERE – waxy, soap-like substance formed during the decomposition of animal bodies buried in moist places; consists principally of insoluble salts of fatty acids; also called “grave wax”.

AIRBORNE PATHOGENS – infectious disease-causing microorganisms, which may be present in biological fluids, and are spread through the air via coughing, sneezing, talking, spitting, etc.

AIR GUN – a gun that uses compressed air or gas (carbon dioxide) to propel a projectile.

ALTERNATE LIGHT SOURCE (ALS)/FORENSIC LIGHT SOURCE – light source that produces a high-intensity light, ranging from ultraviolet to infrared, which may be used to facilitate the recovery of evidence such as latent prints, hairs, fibers, and bodily fluids.

AMBIENT LIGHT (AVAILABLE LIGHT) — the light that already exists (as opposed to being added by the photographer) where a photograph is to be made.

AMBIENT TEMPERATURE – the temperature of the air circulating around a given location.

AMMO/ AMMUNITION – one or more loaded cartridges consisting of a primed cartridge case, propellant, and with or without one or more projectiles; often abbreviated as AMMO.

ANTEMORTEM – before death.

ANTERIOR – (Ventral) the front; indicates the front or belly side of the body.

ANGLE OF IMPACT – The acute or internal angle formed between the direction of a blood drop in flight and the plane of the surface it strikes.

APERTURE – the lens opening formed by the iris diaphragm inside the lens. The size is variable and adjusted by the aperture control.

APERTURE PRIORITY MODE – an automatic exposure system in which the photographer sets the aperture (f-stop) and the camera selects a shutter speed for normal exposure.

AREA OF CONVERGENCE – the area to which stains within a bloodstain pattern can be reconstructed on a two-dimensional surface determined by tracing the long axis of well-defined bloodstains within the pattern to a common area.

AREA OF ORIGIN – The three-dimensional area to which stains within a bloodstain pattern can be reconstructed in space using the common area of convergence and the angles of impact.

ARTERIAL PATTERN – A pattern resulting from blood exiting the body under pressure from a breached artery.

AUTOMATIC EXPOSURE – a mode of camera operation in which the camera automatically adjusts either the aperture, the shutter speed, or both for normal exposure.

AUTOMATIC FLASH – an electronic flash unit that uses its light-sensitive cell or the camera's to determine the duration of the flash for normal exposure by measuring the light reflected back from the subject.

AUTOPSY – the internal and external examination of the body after death.

BACKSTRAP – the exposed metal strip at the rear of a pistol or revolver grip.

BALL – typically refers to a cylinder-shaped bullet with either a rounded or pointed nose and is typically used with muzzle-loaded firearms.

BALLISTICS – the study of projectile motion and effects.

BACK SPATTER – Blood droplets directed back toward the force or energy that caused the spatter, often associated with gunshot wounds of entrance.

BARREL – that part of a firearm through which a projectile or shot charge travels under the impetus of powder gasses, compressed air, or other like means; a barrel may be rifled or smooth.

BARREL ARRANGEMENT – the relationship to each other, in which multiple barrel systems are positioned in firearms (e.g. over and under, side-by-side, etc.).

BB – the designation of spherical shot having a diameter of .180" used in shotshell loads; also used to designate steel or lead air gun shot of .175" diameter.

BIOHAZARD BAG – a plastic bag with the biohazard logo or insignia imprinted on it; appropriate disposal method for items exposed to blood or biological fluids that may contain contamination.

BIOLOGICAL FLUIDS – Blood, semen, saliva, vaginal fluid, urine, mucous, perspiration, etc.

BIRD SHOT – refers to shotgun projectiles that have a diameter less than 0.24".

BLACK POWDER – the earliest form of firearm propellant; modern form is smokeless powder.

BLOODBORNE PATHOGENS – pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

BLOODSTAIN – A stain on a surface caused by blood.

BOLT ACTION – a firearm in which the breech closure is in line with the bore at all times, manually reciprocates to load, unload, and cock, and is locked in place by breech bolt lugs and engaging abutments, usually in the receiver.

BORE – the interior of a barrel forward of the chamber.

BOUNCE LIGHT – indirect light produced by pointing the light source at a ceiling or other surface to reflect the light back toward the subject; softer and less harsh than direct light.

BRACKETING – taking several photographs of the same scene at different exposure settings, some greater than and some less than the setting indicated by the meter, to ensure at least one well-exposed image.

BUBBLE RING – Vacuoles in bloodstains that form when blood containing air bubbles dries and retains the circular configuration of the original bubble.

BUCK SHOT – refers to shotgun projectiles that have a diameter of 0.24" or greater.

BULLET – a non-spherical projectile for use in a rifled barrel.

BULLET CORE – the inner portion of a jacketed bullet often made of lead.

BULLET JACKET – the envelope enclosing the core of a projectile that is typically of metallic construction.

BULLET WIPE – the discolored area on the immediate periphery of a bullet hole, caused by the transfer of residues from the bearing surface of the bullet.

BUTT – in handguns, it is the bottom part of the grip; in long guns, it is the rear or shoulder end of the stock.

CABLE RELEASE – an encased wire that attaches at one end to the shutter release on the camera and has a shutter release button on the other end that the photographer depresses to activate the shutter; used to avoid camera movement or to activate the shutter from a distance.

CALIBER – a term used to designate the specific cartridge for which a firearm is chambered; the approximate diameter of the circle formed by the tops of the lands of a rifled barrel, typically expressed in hundredths of an inch (38 caliber) or millimeters (9mm caliber); in ammunition, caliber is a numerical term, without the decimal point, included in a cartridge name to indicate the nominal bullet diameter.

CAMERA BODY – the light-tight box that contains the camera mechanisms and protects the sensor from light until an exposure is made.

CAMERA RAW – one of several proprietary (brand specific) file formats that preserves all the data from a digital camera picture with no after-capture interpretation.

CANNELURE – a circumferential groove generally of a knurled or plain appearance on a bullet or cartridge case.

CARTRIDGE – a single unit of ammunition consisting of the cartridge case, primer, propellant, and with or without one or more projectile(s).

CARTRIDGE CASE – the container for all the other components which comprise a cartridge.

CAST-OFF PATTERN – A pattern, usually linear in configuration, created when blood is released or flung from a blood-bearing object in motion.

CASTING – the filling of a three-dimensional footwear, tire track, or tool mark impression with material that takes on and retains the characteristics that were left in the impression by the original footwear, tire, or tool.

CAUSE OF DEATH – any injury or disease that produces a physiological derangement in the body resulting in death.

CEREBROSPINAL FLUID – the fluids around the brain and spinal cord.

CESSATION CAST-OFF PATTERN – A pattern resulting from the rapid deceleration of an object wet with blood.

CENTER WEIGHTED METER – a through-the-lens exposure meter that measures light values from the entire scene but gives greater emphasis to those in the center of the image area.

CHAIN OF CUSTODY – refers to the chronological documentation of the seizure, custody, control, transfer (temporary or permanent), and disposition of evidence.

CHAMBER – the rear part of the barrel bore that has been formed to accept a specific cartridge or shotshell; in a revolver, the holes in the cylinder represent multiple chambers.

CLIP – a container that holds a group of cartridges, which may either be transferred or inserted into a firearm.

COMPRESSION – a means of reducing the size of a digital image file in order to reduce storage requirements for transmission time across a network. "Lossy" techniques permanently eliminate some information to obtain highly compressed, very small files. Lossless techniques compress images without losing any information in the file.

CONCENTRIC FRACTURES – fractures or cracks in glass or other similar brittle or ceramic material that take a generally circular form around the bullet hole or impact site in such materials.

CONING EFFECT – the characteristic cone shape on the exit side of a projectile hole through a relative brittle medium (e.g. glass, bone, etc.) caused by the spalling around the exit.

CONTACT WOUND – an injury that occurs when a firearm is pressed against a surface of the body. Gases from the explosion expand between the skin and the bone, producing a bursting effect and a ragged wound. Gas, soot, metallic particles, vaporized metal from the bullet and cartridge case, primer residue, and powder particles can all be driven into the wound track.

CONTRAST – the difference between the light and dark parts of a scene or photograph.

CLOT – A gelatinous mass formed as the result of a complex mechanism involving red blood cells, fibrinogen, platelets, and other clotting factors.

CROP – to trim the edges of an image, often to improve the composition. Cropping can be done by moving the camera position while viewing a scene, during image editing, or by trimming the finished print.

CYLINDER – the rotating component of a firearm that contains the chambers.

CYLINDER GAP – in a revolver, the maximum space between the cylinder and the barrel.

DAGGER – a short weapon for stabbing that is usually considered to be double edged.

DECOMPOSITION – postmortem degeneration of the body.

DEFENSE WOUNDS – cuts, abrasions, and contusions of the hands, wrists, forearms, and arms, which occur during a violent struggle as the victim attempts to ward off the attacker.

DEFLECTION – *as differentiated from ricochet*: a deviation in the projectile's normal path through the atmosphere as a consequence of an impact with some object; *as a consequence of ricochet*: is used to describe any lateral component of the ricocheted projectiles departure path relative to the plane of the impacted surface as viewed from the shooter's position and with the plane of the surface normalized to a horizontal attitude; *as a consequence of perforating or striking an object*: is used to describe deviations in any direction from the projectile's normal flight path as a consequence of perforating or string an object rather than rebounding off of surfaces.

DEPTH OF FIELD – the distance between the nearest and farthest points that appear in acceptably sharp focus in a photograph. Depth of field varies with lens aperture, focal length, and camera-to-subject distance.

DERRINGER – the generic term applied to many variations of small one-, two-, or even four-shot pistols, using both percussion caps and cartridges.

DIAPHRAGM (IRIS DIAPHRAGM) – the mechanism controlling the size of the lens opening, therefore the amount of light that reaches the sensor. It consists of overlapping metal leaves inside the lens that form a circular opening of variable sizes. The size of the opening is referred to as the f-stop or aperture.

DIFFUSED LIGHT – light that has been scattered by reflection or by passing through a translucent material; an even, often shadowless, light.

DIGITAL CAMERA – a camera that records an image directly in digital form, instead of on conventional silver film.

DIRECT LIGHT – light shining directly on the subject and producing strong highlights and deep shadows.

DIRECTIONAL/DIFFUSED LIGHT – light that is partly direct and partly scattered; softer and less harsh than direct light.

DOUBLE BARREL – two barrels in a firearm mounted to one frame; may be vertically (over-under) or horizontally (side-by-side) aligned.

DRAWBACK EFFECT – the presence of blood in the barrel of a firearm that has been drawn back into the muzzle.

DRIP PATTERN – a bloodstain pattern created by free-falling drops of blood striking already-existing blood on a surface commonly associated with satellite spatter. The parent stain on the surface is larger than what would be associated with a single free-falling drop and is usually associated with satellite spatter.

DSLR – digital single lens reflex; a type of camera with one lens that is used both for viewing and for taking the picture. A mirror inside the camera reflects the image up into the viewfinder. When the picture is taken, this mirror moves out of the way, allowing the light entering the lens to travel directly to the sensor.

EJECTION PORT – an opening in the receiver or slide to allow for ejection of a cartridge, cartridge case, or shotshell.

EJECTOR – a mechanical device of a firearm which expels a cartridge, cartridge case, or shotshell.

ELECTRONIC FLASH (STROBE) – a camera accessory that provides a brief but powerful flash of light; a battery-powered unit requires occasional recharging or battery replacement but can be used repeatedly.

ELECTROSTATIC LIFTING DEVICE – a device consisting of a high-voltage supply used with a special conductive lifting film to transfer a dry origin footwear impression electrostatically from a surface to a film.

ELIMINATION PRINTS – exemplars of friction ridge skin detail taken from a person who had access to an item of evidence.

ENTOMOLOGY – branch of science dealing with the study of insects.

EPIDERMIS – the outermost layer of the skin.

EXEMPLARS – the prints of an individual, associated with a known or claimed identity, and deliberately recorded, by ink, or by another medium (also known as known prints).

EXPIRATED BLOOD – blood that has been blown from the nose, the mouth, or a wound in the respiratory system as the result of air flow or pressure.

EXPOSURE – the act of allowing light to strike a light sensitive surface; the amount of light reaching that surface, controlled by the combination of aperture and shutter speed.

EXPOSURE METER (LIGHT METER) – an instrument that measures the amount of light and provides aperture and shutter-speed combinations for correct exposure. Exposure meters may be built into the camera or they may be separate instruments.

EXTRACTOR – a device that pulls (hooks) cartridge cases out of a chamber.

FILE – a quantity of data storage on a computer. Each photograph is saved as a single file.

FILE FORMAT – one of several standard ways a photograph can be encoded digitally. See JPEG, TIFF, and RAW.

FINGERPRINT – an impression of the friction ridges of all or any part of the finger.

FIREARM – an assembly of a barrel and action from which a projectile(s) is propelled by products of combustion.

FIRING PIN – that part of a firearm mechanism which strikes the primer or rim of a cartridge to initiate ignition in order to fire a cartridge or shotshell.

FIRING PIN IMPRESSION – the indentation of the primer of a centerfire cartridge case or in the rim of a rimfire cartridge case caused when it is struck by the firing pin.

FIXED BLADE – any knife in which the blade does not fold or retract into the handle.

FLASH – 1. A short burst of light emitted by an electronic flash unit or strobe to illuminate the scene being photographed. 2. The equipment used to produce this light.

FLOW PATTERN – a volume of blood on a surface that moves in one or more directions as a result of the influence of gravity.

FOCAL LENGTH – the distance from an internal part of the lens to the image plane when the lens is focused on infinity. The focal length is usually expressed in millimeters (mm) and determines the angle of view (how much of the scene can be included in the picture) and the size of objects in the image. A 100mm lens, for example, has a narrower angle of view and magnifies objects more than a lens of shorter focal length.

FOCUS – 1. The point at which the rays of light coming through the lens converge to form a sharp image. The picture is "in focus" or sharpest when this point coincides with the focal plane. 2. To change the lens-to-sensor distance until the image is sharp.

FORWARD SPATTER – blood droplets directed away from the force or energy that caused the spatter, often associated with gunshot wounds of exit.

FRAME – In photography, a single exposure or image; the edges of an image. In revolvers, pistols, and break-open guns, the basic unit of a firearm which houses the firing and breech mechanism and to which the barrel and grips are attached.

FRICTION RIDGE SKIN – A specialized type of skin present on the palmar portion of the hands and the plantar portion of the feet.

F-STOP – A numerical designation (f/2, f/2.8, etc.) indicating the size of the aperture (lens opening).

FULL METAL JACKET (FMJ) – a projectile in which the bullet jacket encloses the entire bullet, with the usual exception of the base.

GAUGE – a term used in the identification of a shotgun bore. The gauge is equal to the number of round lead balls of bore diameter that equal one pound.

GRAY CARD – a card that reflects a known percentage of light falling on it. Often has a gray side reflecting 18% and a white side reflecting 90% of the light. Used to take accurate exposure meter readings (meters base their exposures on a gray tone of 18% reflectance).

GRIP – in handguns, the handle; in long guns, the portion of the stock located behind the action which is normally grasped by the shooter's trigger hand; in knives, the part of the hilt that is normally held in the hand.

GRIP SAFETY – an auxiliary locking device on the grip of some handguns which prevents firing until it is depressed, typically accomplished by grasping the grip correctly.

GUIDE NUMBER – a number rating for a flash unit that can be used to calculate the correct aperture for a particular ISO speed and flash-to-subject distance.

GUNPOWDER – any of various powders used as the propellant in a cartridge or shotshell.

GUNSHOT RESIDUE (GSR) – the total residues resulting from the discharge of a firearm.

HAMMER – a component of the firing mechanism which strikes the firing pin or primer.

HANDGUN – a firearm designed to be held and fired with one hand.

HAND HOLD – to support the camera with your hands rather than with a tripod or other fixed support.

HEADSTAMP – numerals, letters, and symbols (or a combination thereof) stamped into the head of a cartridge case or shotshell to identify the manufacturer, caliber, gauge, or other additional information.

HILT – the handle of a sword or dagger.

HINGED FRAME ACTION – a design wherein the barrel(s) is pivoted on the frame. When the action is open, the barrel(s) may pivot up, down, or sideways for loading or unloading. When the action is closed, the breech of the barrel(s) swings against the standing breech.

HISTOGRAM – a graph that shows the distribution of tones or colors in a digital image.

HOLLOW POINT BULLET – a projectile with a cavity in the nose to facilitate expansion.

HOMICIDE – the killing of a human being by another human being.

HOT SHOE – a clip on the top of the camera that attaches a flash unit and provides an electrical link to synchronize the flash with the camera shutter, eliminating the need for a sync cord.

IDENTIFICATION PHOTOGRAPH – a photograph taken to distinguish an item of importance within the scene, often something to be collected as evidence.

INCISION – a wound inflicted by an instrument with a sharp cutting edge; characteristically longer than it is deep.

INCLINOMETER – a device for measuring or displaying the angle of a surface relative to the horizontal or vertical plane.

INFINITY – the farthest distance marked on the focusing ring of the lens, generally about 50 feet. When the camera is focused on infinity, all objects at that distance or farther away will be sharp.

INFRARED – wavelengths of electromagnetic radiation, like light but slightly longer than those in the visible spectrum. Photographs can be made from reflected infrared radiation with special equipment.

INTERCHANGEABLE LENS – a lens that can be removed from the camera and replaced by another lens.

INTERMEDIATE TARGET – refers to something located between the firearm and the target at the time of shooting.

ISO – a numerical rating that indicates the sensitivity (speed) of a sensor.

JPEG – a “lossy” format for saving digital photographs that compresses data to preserve space in the computer’s memory.

LACERATION – a split or tear of the skin produced by blunt force.

LAMINATED GLASS – layers of glass bonded to a plastic material; may also be referred to as safety glass.

LATENT PRINT– transferred impression of friction ridge detail not readily visible; generic term used for questioned friction ridge detail.

LCD – liquid crystal display; the kind of thin, flat visual display screen often used for on-camera monitors and data displays.

LEAD-IN MARK – a visible, thin, elongated deposition of bullet wipe transferred to a surface as a bullet first makes contact with that surface at a shallow incident angle; is useful in establishing the direction of fire and travel of the projectile.

LENS – one or more pieces of optical glass used to gather and focus light rays to form an image.

LENS HOOD – a shield that fits around the lens to prevent unwanted light from entering the lens and causing flare.

LENS TISSUE – a soft, lint-free tissue made specifically for cleaning camera lenses.

LEVER ACTION – a design wherein the breech mechanism is cycled by an external lever generally below the receiver.

LIFT – An adhesive or other medium used to transfer a friction ridge impression from a substrate.

LIGATURE – anything which binds or ties.

LIGHT EMITTING DIODE (LED) CAMERA DISPLAY– a display in the viewfinder of some cameras that gives you information about aperture and shutter-speed settings or other exposure data.

LIVIDITY (LIVOR MORTIS) – postmortem discoloration of the body due to the settling of blood in the dependent areas of the body.

LOADED – a firearm with ammunition in the firearm magazine or chamber.

LONG-FOCAL-LENGTH LENS (TELEPHOTO LENS) – a lens that provides a narrow angle of view of a scene, including less of a scene than a lens of normal focal length and therefore magnifying objects in the image.

LONG GUN – any firearm fitted with a stock and designed to be used while held with both hands and supported by a shoulder.

MACRO LENS – a lens specifically designed for close-up photography and capable of good optical performance when used very close to a subject.

MACRO PHOTOGRAPHY – production of images on the sensor that are life size or larger.

MAGAZINE – a container for cartridges which has a spring and follower to feed those cartridges into the chamber of the firearm.

MAGAZINE RELEASE – the device that retains or releases the magazine in a firearm.

MAGAZINE WELL – that opening in a firearm that receives the detachable magazine.

MAJOR CASE PRINTS/ COMPLETE FRICTION RIDGE EXEMPLARS – A systematic recording of all of the friction ridge detail appearing on the palmar sides of the hands. This includes the extreme sides of the palms, joints, tips, and sides of the fingers. Under special circumstances, complete friction ridge exemplars may also need to be taken from the plantar portion of the feet.

MANNER OF DEATH – explanation as to the cause of death; medicolegal manners of death are homicide, suicide, accidental, natural, and undetermined.

MANUAL EXPOSURE – a nonautomatic mode of camera operation in which the photographer sets the aperture, shutter speed, and ISO.

MANUAL FLASH – a nonautomatic mode of flash operation in which the photographer controls the exposure by adjusting the size of the camera's lens aperture.

MEMORY CARD – an in-camera, removable, and reusable storage device that records and saves images captured by the camera until transferred to a computer or other storage device and reformatted.

MIRROR – a polished, metallic reflector set inside a DSLR camera body at a 45 degree angle to the lens to reflect the image up onto the focusing screen. When a picture is taken, the mirror moves out of the way so that light can reach the sensor.

MISFEED – any malfunction during the feeding cycle of a repeating firearm resulting in the failure of a cartridge or shotshell to enter the chamber completely.

MISFIRE – a failure of the priming mixture to be initiated after the primer has been struck an adequate blow by a firing pin or the failure of the initiated primer to ignite the powder.

MISTING – blood that has been atomized to a fine spray by the application of force, usually associated with a gunshot or explosion event.

MULTIPLE FLASH – a technique used in low-light situations in which the photographer sets the shutter release to open and adds light to the scene by repeatedly cycling a flash unit or by setting up multiple flash units within a scene.

MUSHROOMED BULLET – a projectile that has expanded upon impact to a mushroom-like shape.

MUZZLE – the end of a firearm barrel from which the projectile emerges.

MUZZLE IMPRINT – a general term describing the marks produced by the muzzle, front sight, magazine tube, spring housing, etc., and caused by the contact discharge of a firearm.

NEGATIVE CONTROL – A test performed to demonstrate that no false positives result from the performance of a procedure.

NOISE – pixels of random colors and brightness, most often appearing in the dark areas of a digital image.

NON-POROUS – Non-absorbent.

NORMAL FOCAL LENGTH (STANDARD LENS) – a lens that provides about the same angle of view of a scene as the human eye.

OBLIQUE LIGHTING – light positioned at a low angle of incidence relative to the surface being examined or photographed; also referred to as side lighting.

OPEN UP – to increase the size of the lens aperture; the opposite of stop down.

ORIENTATION PHOTOGRAPH – a photograph taken to document the general condition and layout of the scene; also referred to as an overall photograph.

OVEREXPOSE – to make an exposure with too much light.

OVERALL PHOTOGRAPH – a photograph taken to document the general condition and layout of the scene; also referred to as orientation photographs.

OVER AND UNDER – a firearm with two barrels, one placed over the other.

PAINT BY LIGHT – a technique used in low-light situations in which the photographer sets the shutter release to open and adds light to the darker areas of an object or scene.

PALM PRINT – an impression of the friction ridge of all or any part of the palmar surface of the hand.

PARENT STAIN OR DROP – a bloodstain from which satellite spatter or wave cast-off stains originate.

PASSIVE BLOODSTAINS – stains and patterns whose physical features indicate that they were created without any significant outside force other than gravity and friction.

PATENT PRINT – a friction ridge impression of unknown origin, visible without development.

PATTERN – the distribution of shot fired from a shotgun.

PELLETS – the common name for the spherical projectiles loaded into shotshells; a nonspherical projectile used in some air rifles and air pistols.

PENETRATING INJURY – caused by an object entering but not exiting the body.

PERFORATING INJURY – caused by an object passing through the body.

PERIMORTEM – near or around the time of death.

PETECHIAE – round purplish-red spots of blood, pinpoint to pinhead in size, that appear on the skin as a result of bleeding into layers of the skin.

PINCH POINT – in painted metal surfaces, a small area of surviving paint that was pinched between the initial contact point of a low incident angle bullet and the painted metal surface. The pinch point establishes the entry side of an impact or ricochet mark and thereby the bullet's direction of travel.

PISTOL – a handgun in which the chamber is integral with the barrel.

PIXEL – short for picture element; the smallest unit, usually square, of a digital image that can be displayed or changed.

PLASTIC PRINT – a friction ridge impression of unknown origin that is impressed in a soft substrate to create a three-dimensional impression, visible without development.

POLARIZING FILTER – a filter placed in front of the camera lens to reduce reflections from nonmetallic surfaces like glass or water, or to darken the sky.

POROUS – Absorbent.

POSITIVE CONTROL – A test performed prior to or in parallel with evidentiary samples that is designed to demonstrate that a procedure works correctly.

PPI – pixels per inch, a measure of the resolution of an image that has a physical size.

POSTERIOR (DORSAL) – indicates the back side of the body.

POSTMORTEM – after death.

POWDER STIPPLING – small hemorrhagic marks on the skin produced by the impact of gunpowder particles.

POWDER TATOOING – the embedding of unburned and partially burned gunpowder particles in the skin or other tissue with accompanying hemorrhagic marks associated with living tissue.

PRIMER – the ignition component of a cartridge.

PROGRAMMED AUTOMATIC – a mode of automatic exposure in which the camera sets both the shutter speed and the aperture for a normal exposure.

PROJECTED BLOODSTAIN PATTERN – spatter created as the result of a force other than impact.

PUGILISTIC ATTITUDE – position that a body often assumes in fire deaths in which the muscle fibers contract due to the heat of the fire, causing the limbs to be drawn in.

PUMP ACTION – see slide action.

PURGE FLUID – decomposition fluid that drains from an orifice of the body; may be mistaken for blood.

PUTREFACTION – postmortem decomposition of soft tissues by bacteria, fermentation, and enzymes.

RADIAL FRACTURES – the fractures or cracks that radiate out from an impact side in non-crystalline material such as glass, ceramics, bone, and certain plastics.

RAW – a digital camera file that contains picture information exactly as it is acquired. Most RAW file formats used in cameras are proprietary, or specific to the camera manufacturer, and must be interpreted before editing.

RECEIVER – the basic unit of a firearm which houses the firing and breech mechanism and to which the barrel and stock are assembled; in revolver, pistols, and break-open firearms, it is called the frame.

REFLECTOR – any surface- a ceiling, a card, an umbrella- used to bounce light onto a subject.

RELATIONSHIP PHOTOGRAPH – a photograph taken in order to frame an item of evidence in conjunction with some obvious landmark present within the scene.

RELOAD – a cartridge which has been reassembled with a new primer, powder, projectile(s), and/or other components.

RESOLUTION – the total number of pixels in a camera sensor; the number of pixels per unit length, generally a measure of maximum image quality.

REVOLVER – a firearm, usually a handgun, with a cylinder having several chambers so arranged as to rotate around an axis.

RICOCHET – the continued flight of a rebounded projectile and/or major projectile fragments after a low angle impact with a surface or object.

RIFLE – a firearm with a rifled bore designed to be fired from the shoulder.

RIGOR MORTIS – rigidity or stiffening of the muscle tissue of the body after death.

SABOT – a lightweight carrier in which a subcaliber projectile is centered to permit firing in a larger bore firearm.

SAFETY MECHANISM – a device on a firearm intended to help provide protection against accidental discharge under normal usage when properly engaged; such a mechanism is considered “on” when the position of the safety device is set in a manner to provide against accidental discharge under normal usage; such a mechanism is considered “off” when it is set to allow the firearm to be discharged by a normal pull of the trigger.

SCALLOPING – a serrated edge characteristic of bloodstains.

SD CARD – Secure Digital card; a memory card format utilized with digital cameras.

SEMI-POROUS – a substrate that demonstrates both absorbent and non-absorbent properties.

SERUM STAIN – a yellowish stain resulting from the separation of serum from the retraction of a blood clot.

SHARP – describes an image or part of an image that shows crisp, precise texture and detail; the opposite of blurred or soft.

SHOE – a clip on a camera for attaching a flash unit.

SHORT-FOCAL-LENGTH LENS (WIDE ANGLE LENS) – a lens that provides a wide angle-of-view of a scene, including more of the subject area than a lens of normal focal length.

SHOT – generally, spherical pellets used in loading shotshells or cartridges.

SHOTGUN – a long gun designed to shoot from the shoulder, typically having a smooth bore and designed to fire shotshells.

SHOTSHELL – a complete round of ammunition having a plastic body, a base wad that may or may not be a single unit, and a metallic head.

SHUTTER – a device in the camera that opens and closes to expose the sensor to light for a measured length of time.

SHUTTER PRIORTY MODE – an automatic exposure system in which the photographer sets the shutter speed and the camera selects the aperture (f-stop) for normal exposure.

SHUTTER RELEASE – the mechanism, usually a button on the top of the camera, which activates the shutter to expose the sensor.

SHUTTER SPEED CONTROL – the camera control that selects the length of time the sensor is exposed to light.

SIDE-BY-SIDE – a firearm with two barrels arranged adjacently in the horizontal plane.

SILENCER – a colloquial term used to describe a device attached to the barrel of a firearm designed to reduce the noise of discharge; such a device is more accurately identified as a sound suppressor.

SIMULTANEOUS IMPRESSION – Two or more friction ridge impressions from the same hand or foot deposited concurrently.

SKELETONIZED BLOODSTAIN – a bloodstain that consists of a darkened outer peripheral rim with the central portion of the stain having been removed by wiping through the partially dry stain. A skeletonized bloodstain is also produced by the flaking of the central portion of a completely dried stain.

SLIDE ACTION – an action which features a movable forearm that is manually actuated in a motion parallel to the barrel by the shooter; also known as pump action.

SLUG – a single projectile for shotshells; a slang term for a fired bullet.

SPATTER – bloodstains that exhibit directionality and variation in size and are associated with a source of blood being subjected to external force(s).

SPATTER PATTERN – a distribution of individual spatters on a surface that can be traced to a common area of origin.

SPINES – an edge characteristic of bloodstains consisting of narrow, elongated projections from the central area of the stain.

SPLASH – a bloodstain created by a free-falling volume of blood in excess of 1.0 ml onto a surface from a distance of at least four inches, OR an altered bloodstain pattern characterized by a preexisting volume on a surface that has been subjected to additional force creating elongated narrow spines, such as stepping into blood.

STAB WOUND – injury caused by sharp instrument; wounds are deeper than they are wide.

STAGED SCENE – a crime scene in which the perpetrator purposely alters the crime scene to mislead or redirect the investigation.

STELLATE – star-shaped wound; characteristic of contact wounds in regions of the body where only a thin layer of skin and tissue overlies the bone (e.g. head).

STOCK – the wood or plastic component(s) to which the metal parts of a firearm are attached to enable the shooter to hold the firearm.

STOP – an aperture setting that indicates the size of the lens opening; a change in exposure by a factor of 2. Changing the aperture from one full setting to the next full setting doubles or halves the amount of light reaching the sensor.

STOP DOWN – to decrease the size of the lens aperture; the opposite of open up.

STOVE-PIPE – a failure to eject in which the cartridge case is caught in the ejection port by the forward motion of the bolt or slide.

STIPPLING –pinpoint hemorrhages due to the discharge of burning gunpowder against the skin; also referred to as tattooing.

SWIPE – the transfer of blood associated with motion onto a non-bloody surface.

SYNCHRONIZATION (SYNC) CORD – a wire that links a flash unit to a camera's shutter-release mechanism.

SYNCHRONIZE – to cause a flash unit to fire while the camera shutter is open.

TANG – the metal portion which projects into the handle of fixed blade knives.

TARGET – a surface on which blood has been deposited.

TELEPHOTO LENS – see LONG-FOCAL-LENGTH LENS

TERMINAL VELOCITY – the maximum velocity that a free-falling drop of blood can accelerate in air, determined to be approximately 25.1 feet per second.

THROUGH-THE-LENS (TTL) METER – an exposure meter built into the camera that takes light readings through the lens.

TIFF – a lossless, open-source (non-proprietary) format for saving digital photographs that is readable by most graphic software.

TOTAL METAL JACKET (TMJ) – a projectile made by copper plating a lead core to create a jacket that encloses the entire bullet.

TRACE EVIDENCE – evidence such as hairs, fibers, glass fragments, wood splinters, and other microscopic evidence.

TRAJECTORY – the curved, aerial path traveled by a projectile.

TRANSFER – the deposition of blood onto a surface as the result of contact.

TRIGGER – that part of a firearm mechanism that is moved manually to cause the firearm to discharge.

TRIGGER GUARD – a rigid loop which partially surrounds the trigger to prevent damage or an accidental discharge.

TRIPOD – a three-legged support for the camera.

UNDEREXPOSE – to make an exposure with too little light, making a picture that is too dark.

UNIVERSAL PRECAUTIONS – approach to infection control to treat all human body fluids as if they were known to be infectious.

VOID – the absence of blood in an otherwise continuous bloodstain pattern that suggests the presence of an intermediate target that may have been removed.

WAD – a felt, paper, cardboard, or plastic component used in a shotshell for various purposes.

WAVE CAST-OFF – a small stain that has originated from a parent stain as the results of the wavelike action of the original drop striking a surface at an angle of less than 90 degrees.

WHITE BALANCE – the color balance of a white light source; a setting or adjustment on a camera that adjusts the overall image colors for the light source in which it was captured.

WIDE ANGLE LENS – see SHORT-FOCAL-LENGTH LENS

WIDE-ANGLE DISTORTION – an unusual perspective caused by using a wide-angle lens very close to a subject; objects appear stretched out or farther apart than they really are.

WIPE – an alteration of a preexisting wet or partially dry bloodstain caused by movement through the existing stain.

3.0 Organization and Management

3.1 An organizational chart for the Idaho State Police appears in the ISP Policy Manual.

3.2 An organizational chart for ISP Forensic Services (ISPFS) appears in the ISP Forensic Services Quality/Procedure Manual.

3.3 The organizational chart that includes the Crime Scene Coordinator position appears in the Latent Prints Quality Manual.

4.0 Personnel

4.1 CRIME SCENE COORDINATOR

4.1.1 The Crime Scene Coordinator is responsible for coordinating ISPFS responses to crime scenes state-wide.

4.1.2 The Crime Scene coordinator participates in routine quality control measures, equipment maintenance, and troubleshooting; supplies crime scene gear, PPE, supplies, and equipment state-wide; develops and maintains crime scene methods and manuals; provides assistance at complex crime scenes.

4.1.3 The Crime Scene Coordinator shall ensure that analysts' training records are on file with the Quality Manager.

4.2 CRIME SCENE RESPONDERS

4.2.1 Crime Scene responders are responsible for adhering to established methods, safety practices, and policies/procedures.

4.2.2 Crime Scene responders come from different disciplines within the lab system. If a responder has specialized training as a part of his/her primary discipline (e.g. bullet strike testing, acid phosphatase testing, development of bloody impressions with blood-reactive chemicals), then he/she can perform those tests/analyses at crime scenes.

4.2.3 Crime Scene responder duties may include, but are not limited to:

- 4.2.3.1 Documentation of crime scenes through photography, notes, and sketches/diagrams;
- 4.2.3.2 Conducting presumptive blood tests;
- 4.2.3.3 Collection and preservation of evidence;
- 4.2.3.4 Recognition and documentation of evidence in bloodshed and/or shooting scenes;
- 4.2.3.5 Latent print processing;
- 4.2.3.6 Processing vehicles;
- 4.2.3.7 Buried body excavations;
- 4.2.3.8 Documentation and evidence collection from persons;
- 4.2.3.9 Issuing reports of crime scene activities;
- 4.2.3.10 Performing technical and administrative casework reviews;
- 4.2.3.11 Satisfactorily completing annual proficiency tests;
- 4.2.3.12 Presenting expert testimony in court.

4.2.4 As the pool of crime scene responders grows, responders may be tasked with learning aspects of disciplines outside of their primary discipline in order to elicit a more efficient and timely response for our customers.

4.2.5 If a responder is going to learn to do tests/analyses that are not part of a discipline for which s/he has completed training, then s/he must go

through a training process, be competency tested on the tests/analyses, and be regularly proficiency tested.

4.2.6 When testifying about tests/analyses performed at a crime scene, the responder can only rely on his/her training and not the accreditation of the lab as a basis for their expertise. If questioned about the lab's accreditation, the responder must specify that the discipline of crime scene has not yet sought accreditation.

5.0 Scene Security and Precautions

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6.0 Crime Scene Investigation Methodology

6.1 There is no one right way to process a crime scene. The methods and the order in which those methods are employed is determined by the particulars of the scene and the experience of the responders. The purpose of processing the crime scene is to collect as much information and evidence as possible, in as pristine a condition as possible. Evidence collection is more than the physical collection of items from the scene; cataloging the interrelationships of where items are in the scene, noting the physical layout of the scene, and documenting observations of things that cannot be physically collected are all integral parts of collecting evidence. Content and context of the scene are both important aspects.

6.2 At any crime scene, the responder will proceed through six actions.

6.2.1 Assessing

6.2.1.1 Before any action is taken on the scene, the responder must assess the circumstances in order to decide on a proper course of action. This assessment includes resource determination, risks, and task/procedure determination. Assessment is an ongoing process as well. The responder must continuously assess the situation and adjust the processing plan as necessary. Remaining flexible is a critical aspect of responding to and dealing with the crime scene.

6.2.2 Observing

6.2.2.1 Looking at and mentally registering the condition of the scene and artifacts found in the scene is the most basic aspect of crime scene processing. During observations, the responder must move around in the scene, which may alter the scene. In most cases, observation is not intrusive. However, when combined with search efforts, it may become an intrusive act. After proper documentation has been completed, more intrusive observations may be undertaken.

6.2.3 Documenting

6.2.3.1 Documentation includes written recordings of observations, photography of the scene, and the creation of sketches and/or diagrams. Documentation must be undertaken from the least intrusive to the most intrusive. In this way, documentation of observations should precede photography; photography should precede sketching and measuring; detailed photography and reconstruction

documentation should be the last types of documentation completed. Documentation is the critical component; it is through documentation that we can properly preserve the original condition and context of the scene, before any significant alteration. Documentation must be ongoing as searching, collecting, and processing of the scene take place.

6.2.4 Searching

6.2.4.1 The nature of any search and associated activity is intrusive, so it should not be undertaken until documentation is complete. During searches, items may be moved to be more thoroughly examined, which alters the scene. Multiple searches, at varying levels of depth, may be conducted throughout the scene, as appropriate.

6.2.4.2 Crime scene searches should be methodical (i.e. ordered and systematic). The type of search to be conducted should be determined based on the nature of the terrain/area being searched, lighting conditions, environmental conditions, and the size of the item(s) being searched for (if applicable).

6.2.4.3 Circle/Spiral searches are common when searching interior scenes. Generally, the responder starts at the perimeter of the room and works inward in a spiral pattern.

6.2.4.4 Strip/Line searches are often used when searching exterior scenes (e.g. parking lot, yard). The area is divided into parallel strips based on an area that can be examined by a single searcher. When a searcher has finished searching a strip of land, s/he would move one strip over, and repeat the process, until each strip had been searched. If multiple searchers are utilized, they may go through their strips side-by-side, until all strips are searched.

6.2.4.5 Grid searches are a variation of the strip/line search. Instead of only searching in one direction like in a strip/line search, the area is divided into two sets of strips that are perpendicular to one another. Once the searcher has moved through the strips in one direction, s/he begins a second search, using the strips that run perpendicular to the first strips.

6.2.4.5.1 When conducting grid searches, it may be helpful to assign letters and numbers to the rows and

columns created, so that the location and/or orientation of evidence can be more quickly ascertained.

6.2.4.6 Zone searches are conducted by breaking an area into smaller sections. A zone search may be utilized in a small areas (e.g. inside a vehicle) where the other types of searches could not be conducted. A vehicle may be broken down into driver's area, front passenger area, rear driver side area, rear passenger side area, cargo area, trunk, and engine compartment, or other similar areas, based on the vehicle design. A zone search may also be utilized to break a very large area into smaller sections that can be searched by another method, such as when searching a residential street. The street may be broken down by lanes, and the residences on the street may be broken down by front yard, driveway, side yard, etc.

6.2.5 Collecting

6.2.5.1 Physical collection of items in the scene is always an intrusive process. Once an item has been moved, the context of the scene is changed forever. If an item is moved prior to the completion of documentation, significant notes should be made as to the items original location/orientation and the reason for moving it. An item should not be returned to its original location/orientation to attempt to photograph it.

6.2.6 Processing

6.2.6.1 The act of chemically or physically processing the scene is significantly intrusive, so it should almost always be one of the last actions undertaken.

6.3 The process of documentation and searching is cyclical. As additional items of evidence are discovered during searches, additional documentation is necessary. This process continues throughout the scene until the scene has been searched in its entirety.

6.4 Before releasing a scene, the response team should review their actions taken in the crime scene. Notes, sketches, photography, and evidence should be checked against one another to ensure that all information has been documented and all evidence has been collected.

7.0 Observations and Notes

7.1 Documentation of observations in the scene requires significant effort. Overall observations are best documented via handwritten notes.

7.2 Investigative notes are a staple of any crime scene investigation. Notes should begin with notification of the crime, identify involved personnel, note conditions and actions upon arrival, and provide a clear and detailed record of all observations and actions taken while in the scene. Descriptions of techniques employed, areas where the techniques were employed, who employed them, and the results of such techniques should all be included in the notes.

7.2.1 It is important to note areas that are undisturbed or in which nothing significant was observed. The absence of activity or disturbance may be relevant.

7.2.2 Some information present in a scene is transient. Observations of transient evidence (e.g. smells, rain washing away apparent blood, wet footprints that are drying, etc.) should be documented when observed to be certain that they are recorded before they are lost.

7.2.3 When describing items, be careful to remain objective. For example, describe a chair as resting on its right side, not as being overturned, which would imply a particular action.

7.3 Description of vehicles, buildings, and other scenes

7.3.1 Vehicle descriptions will include the year, color, make, model, license plate number, and Vehicle Identification Number (VIN). The vehicle's location and the condition of any seals will be noted, including the time the seals were broken. The general condition of the vehicle and its contents will be noted. Note if the license plate and/or VIN plate/sticker is missing.

7.3.2 Building descriptions will include the type of building, the number of stories, the direction it faces, the type of location, and the number and types of rooms contained therein. The general condition of the building and rooms of importance will be noted. Specifically note any damage or absence of damage that may be pertinent to point of entry or exit or to the crime itself.

7.3.3 Other types of scenes will be described using cardinal directions referenced from a landmark or location or described generally, including GPS coordinates.

7.4 Description of rooms of importance

7.4.1 Starting with the doorway to the room, moving around the room (either clockwise or counterclockwise), describe the furniture and items in the room, including structures. Note condition of lights (on, off), window shades (up, down, open, closed), appliances, etc.

7.4.2 The description of the furniture and structure of the room may be more easily accomplished by making a sketch. If a sketch is used, it should be supplemented by handwritten notes for observations not easily referenced in a sketch.

7.5 Description of deceased person(s)

7.5.1 Until the Coroner arrives, the body cannot be moved or altered in any way, as the Coroner has jurisdiction over the body.

7.5.2 Describe the body's position in the scene, including the general direction of the head and feet. The way the head is turned, the position of an arm or leg, whether straight or bent, etc. should be noted.

7.5.3 Describe all clothing, visible jewelry, and accessories. Note their position and condition, if unusual and/or relevant.

7.5.4 Note the location of any visible injuries and note the presence of apparent blood or other fluids, if present.

7.5.5 Once the Coroner is on scene, you may ask their assistance in additional examinations and/or documentation that would require moving the clothing and/or body.

7.5.5.1 If photographing using an ABFO scale, take care to keep it from touching the body.

7.5.5.2 If there is evidence on the clothing that could be destroyed during transport (e.g. bloodstain pattern, GSR, etc.), we can ask to remove the clothing. If removing any clothing, care should be taken to avoid cutting through any patterns and/or defects related to the cause of death.

7.5.5.3 If there is evidence on the body that could be lost during transport (e.g. hairs, fibers, broken fingernail), we can ask to collect that prior to moving the body.

7.5.5.4 Any evidence or items being removed from the body at the scene will be carefully documented so that the doctor performing autopsy has photographs to review, since they won't be able to examine the body in situ.

7.5.5.5 If any decisions are made regarding evidence collection from the body, or removal of items from the body, note who specifically gave authorization for those actions.

7.5.5.6 Best practice is to place clean paper bags over the hands of all deceased persons to preserve evidence on the hands. Paper bags can be secured at the wrists by wrapping tape around the bag; it should be tight enough that the bag won't slide off the hands, but not so tight as to impart artifacts into the skin. If continued blood loss could saturate the

paper bags, plastic bags may be loosely placed over the paper bags to keep them from becoming saturated.

7.5.6 Note the name and County of the Coroner who took custody of the body. Indicate the time of removal, and by which mortuary/funeral home (if applicable). If the body bag is sealed, note the seal number; the seal may be photographed for additional documentation.

7.6 Description of items of evidence in the scene

7.6.1 When describing an item of interest, the following aspects of the item should be noted: quantity, size, color, material, item, identifying features, condition, and location (e.g. two small black plastic fragments, stained with apparent blood, on the floor east of the dresser; one black metal bar, bent in half, with apparent blood, tissue, and hair adhering to one end, on the floor southwest of the victim's head).

7.6.2 Describe the item of evidence sufficiently enough that it can be distinguished from other similar items of evidence. Use serial numbers or identifying numbers, brands, or labels, as applicable. Include evidence markers with descriptions. If the investigating agency assigns their own item number to an item of evidence, that number may be included so that the items can be easily correlated with that agency's reports.

7.6.3 Size may be important when documenting an item. While some items are only manufactured in one size, other items are made in a variety of sizes. Approximate sizes should be noted for items in which size may be significant (e.g. knives, tools, items used in blunt force injuries).

7.7 Results from testing and/or processing

7.7.1 Results from all tests conducted will be noted, whether positive, negative, or inconclusive. The "Presumptive Blood Testing Notes" page may be utilized, if desired, when performing presumptive blood tests.

7.7.2 Results from all types of processing conducted will be noted.

7.7.3 Evidence may be collected after testing and/or processing an area or item. The method of collection (e.g. swabs, comparison photograph, gel lift, etc.) will be noted.

7.8 Collection of evidence from the scene

7.8.1 All items that are collected by ISPFS personnel will be noted. The "Evidence Collection Notes" page may be utilized, if desired.

7.8.2 Note whether or not the evidence was sealed by ISPFS personnel; evidence packaging may or may not be sealed prior to turning the evidence over to the investigating agency, based on that agency's policy.

7.8.3 The date and time that items of evidence are turned over to the investigating agency will be noted.

7.8.4 Document any damage that was done by ISPFS personnel in the collection of evidence (e.g. cut out section of drywall to remove bullet fragment).

8.0 Photography

8.1 Crime scene photography will be in accordance to the ISPFS Quality Manual.

8.2 The intent of crime scene photography is to document the condition, orientation, and spatial relationships in the scene and to show details of specific items found in the scene in order to provide analysts, investigators, and ultimately, the jury, with a visual representation of the elements and nature of the scene.

8.2.1 Crime scene photographs should lead the viewer of the photographs through the scene, from an overall perspective up to the details of specific items of evidence.

8.3 Photographs taken for general crime scene documentation are considered part of the note taking process.

8.3.1 All photographs taken at a crime scene will be uploaded to Foray or equivalent digital imaging system in a folder named the same as the lab number associated with the response (e.g. M2018-9876).

8.3.2 All photographs taken at a crime scene will be provided to the initiating agency at their request. Images may be saved to digital media (e.g. compact disc, removable drive, SD card), downloaded from the camera's memory card to the agency's digital imaging system, or other equivalent transfer.

8.4 Photographs taken for comparison purposes, such as those taken of latent prints, footwear impressions, and tire impressions will be treated as evidence as per the ISPFS Quality Manual.

8.4.1 All photographs taken at a crime scene will be uploaded to Foray or equivalent digital imaging system in a folder named the same as the lab number associated with the response (e.g. M2018-9876).

8.4.2 If ISPFS has a discipline which will be conducting the comparisons (e.g. latent prints), then an assignment will be created in the ILIMS case utilizing "digital media" as the item type.

8.5 ISPFS utilizes digital single lens reflex (DSLR) cameras to capture digital images (i.e. photographs) at a crime scene or other related field services response.

8.6 Digital images are numbered sequentially as they are captured. In the camera's Shooting/display menu, "File number sequence" will be set to "ON"; this allows the image file numbers to continue sequentially from 0001 to 9999 before recycling image numbers.

8.6.1 The file numbers of images captured for each scene will be documented in the case notes and in ILIMS.

8.7 Digital images will not be deleted. If an image is not as the photographer intended (e.g. flash didn't fire, image not focused, etc.), s/he will retain the unintended image and will take additional images as necessary to capture the subject.

8.8 Digital images can be stored in different file formats, which affect the quality of the images. File formats include JPEG, TIFF, and RAW. Image quality changes can be selected from the shooting menu of the camera.

8.8.1 JPEG images are of sufficient quality for general crime scene documentation. An image quality of "JPEG fine" is preferred.

8.8.2 RAW images are of ideal quality for comparison quality photographs.

8.8.3 In order to concurrently capture both a documentation photograph and a comparison quality photograph of a subject, the "NEF (RAW) + JPEG fine" (Nikon camera) or similar option can be selected from the image quality menu.

8.9 Memory cards will be utilized to store all images taken when using the camera, rather than saving images to the camera's internal storage.

8.9.1 Memory cards will be formatted prior to use. Simply deleting images from memory cards is not sufficient to completely erase all digital artifacts.

8.10 Prior to starting photography of a scene, the analyst will check the camera's settings and adjust them as necessary, based on the scene lighting and the types of photograph(s) to be taken.

8.10.1 A quick reference guide for camera settings is included in each camera case.

8.10.2 The date automatically updates and should be current. The time does not adjust for daylight savings time. These settings may be checked prior to beginning photography to confirm correctness.

8.11 The camera should be turned off prior to adding or removing any auxiliary equipment.

8.12 Camera lenses can be adjusted to either manual focus or auto focus. The analyst must be cognizant of which area in the composed photograph is in focus; this can be monitored by the indicator(s) that illuminate(s) when looking through the viewfinder.

8.13 White balance should be set to "auto" unless the analyst has received specialized training in the proper use of alternate settings.

8.14 Depth of field is adjusted by changing the f-stop setting. The analyst should adjust the f-stop setting based on what elements of the scene should be in focus.

8.15 Taking photographs with the camera in Manual mode is the preferred setting so that all elements of the photograph capture can be adjusted.

8.15.1 Analysts may choose to select aperture-priority mode, shutter priority mode, and/or programmed auto mode as is appropriate for the scene.

8.15.2 Analysts may choose to select Auto mode as is appropriate for the scene or for their experience level.

8.16 The exposure necessary to accurately photograph the crime scene is dependent upon the lighting conditions present at the scene. The exposure can be controlled using the ISO, f-stop, and shutter speed settings within the camera and external lighting, utilizing either an electronic flash and/or other lighting methods.

8.16.1 The exposure should be adjusted so that the resulting photograph is neither over nor under exposed.

8.16.2 Intentionally over or under exposing an image may be necessary to capture details of the scene, but will not be the regular photographic practice.

8.16.3 Electronic flash and/or other lighting methods should be placed in a way that eliminate bright, over exposed areas in the photograph.

8.17 ISO is a numerical rating that indicates the sensitivity of a sensor. Increasing the ISO setting increases the amount of light captured by the sensor.

8.17.1 At a very high ISO setting, there is the possibility of digital noise in the image.

8.18 F-stop is a numerical designation that indicates the size of the aperture (i.e. lens opening). Because the f-stop is a fraction, f/2 is a larger lens opening than f/22.

8.18.1 While the f-stop affects the amount of light hitting the sensor based on the size of the aperture, it also affects depth of field.

8.18.2 A setting of f/2 would allow for the greatest amount of light through a wide-open aperture, but would have the shortest depth of field. A setting of f/22 would allow for a small amount of light through a small opening in the aperture, but would have a much greater depth of field.

8.19 Shutter speed is the amount of time that the lens is open, exposing the sensor to light. Shutter speed is measured in fractions of seconds (e.g. 1/250) or in whole seconds (e.g. 2”).

8.19.1 If the shutter must be open longer than a certain amount of time (e.g. 30 seconds), the shutter speed setting will read “bulb”, which indicates that the shutter will be open for as long as the shutter release button is pressed.

8.19.2 At a very long shutter speed setting, there is the possibility of digital noise in the image.

8.19.3 When taking a very long exposure, the best practice is to use a shutter-release cable to eliminate potential movement of the camera that would occur by pressing the shutter release button on the camera body.

8.20 Electronic flashes may be utilized to provide a brief flash of light.

8.20.1 Electronic flash settings can be set to manual, automatic, or by through-the-lens (TTL) metering; flashes will be set to TTL metering unless the analyst has received specialized training in other settings.

8.20.2 Electronic flashes can be operated manually or by synchronizing them with the camera.

8.20.2.1 A flash may be operated by manually pressing the test fire button on the flash body. This should be utilized when the shutter is open for an extended period of time (multiple flash technique).

8.20.2.2 A flash may be synchronized with the camera unit by connecting the flash unit into the hot shoe clip on the

camera for a fixed location flash. It may also be synchronized by utilizing an off-shoe cord, which attaches to the hot shoe clip on the camera and the corresponding clip on the flash unit, allowing the flash to be hand-held and moved around.

8.20.3 Electronic flashes can be positioned so that the light emitted hits against a wall or ceiling, creating a bounce light effect.

8.20.4 Electronic flashes have a diffuser that can be pulled over the flash unit so that the light is scattered, reducing the potential for hot spots. When not in use, the diffuser can be retracted into the flash body.

8.21 Additional sources of light, such as flashlights, may be utilized to illuminate an area in order to get a properly exposed photograph.

8.21.1 With the shutter release open, the analyst can use a flashlight to direct light over an area or object that has less light than the other areas of the scene (i.e. paint by light technique).

8.22 When hand-holding the camera, the shutter speed should not be set to slower than 1/60 of a second.

8.22.1 If the shutter speed must be set to slower than 1/60 of a second, the camera will be mounted on a tripod.

8.22.2 A shutter-release cable should be utilized to eliminate potential movement of the camera that would occur by pressing the shutter release button on the camera body.

8.23 A header card should be filled out with case information and should be photographed as the first photograph in the series from a crime scene.

8.24 Photographs will be taken in a systematic method. The photographs will include three types of photographs: Orientation, Relationship, and Identification.

8.24.1 The photographer should take photographs systematically, such as moving clockwise or counter-clockwise around a room, so that there is a logical flow in the photographic sequence.

8.24.2 The purpose of overall photographs is to depict the general condition and layout of the scene. These photographs capture how the scene is oriented, where major landmarks (e.g. doors, furniture, etc.) are located, and the condition of the scene prior to any significant alteration.

8.24.2.1 Overall photographs are generally taken with a wide-angle lens to capture a wider field of view in a single photo.

8.24.2.2 The camera should be positioned to take photographs in a landscape orientation for the majority of overall photographs; the camera may be turned to a portrait orientation as is necessary, based on the scene.

8.24.2.3 Overall photographs are taken so that they overlap one another, creating a panoramic view of the area.

8.24.2.4 The most common way to take overall photographs is the corner method. The photographer goes to one corner of the room and takes several photographs as s/he rotates. S/he then proceeds to each corner and repeats the process until the room has been completely photographed.

8.24.2.5 The side method is when the photographer positions him/herself at the approximate middle of the wall and shoots a similar series of photographs as described in the corner method.

8.24.2.6 The smaller the room, the more significant the difference will be in choosing between methods; the corner method actually shows more square feet per photograph than the side method.

8.24.2.7 Overall photographs must be taken at least twice. The first occurs prior to the introduction of any scales, evidence markers, etc. The next occurs after evidence markers and/or scales have been placed, and may be repeated as additional evidence markers are placed. By doing two different sets of photographs, the photographer shows the scene as it was found, unaltered, and also shows that the addition of evidence markers isn't obscuring anything.

8.24.2.8 If, during processing of the scene, areas are significantly altered (e.g. application of blood reactive chemicals) or damaged (e.g. cutting out a section of drywall), photographs of the altered/damaged areas should be taken prior to leaving the scene.

8.24.3 The purpose of relationship photographs is to frame the evidence item in conjunction with some obvious landmark evident in the overall photographs.

8.24.3.1 When dealing with a number of similar items (e.g. cartridge cases), the addition of an evidence marker allows the viewer to discern one item of evidence from another. By photographing each of those items in relation to a landmark within the scene, the viewer can then determine the location of each of those items of evidence within the scene.

8.24.4 The purpose of identification photographs is to distinguish an item of importance within the scene, often something to be collected as evidence.

8.24.4.1 The analyst should fill the frame with the item of interest.

8.24.4.2 If the evidence marker doesn't have an incorporated scale, or evidence markers aren't used, there are numerous times

in which the addition of a scale in the photograph would be prudent.

8.24.5 The photographer should be cognizant of potential contamination of scene photographs. Other personnel, analyst tools and/or materials, response vehicles, and other items that are not material to the scene should not be contained in the photographs. If a person or item is inadvertently photographed, the image should be captured again with the person or item out of the frame.

8.24.5.1 Mirrors and other reflective surfaces (e.g. framed art, windows) can present problems when photographing a scene. If the photographer cannot position him/herself in such a way as to prevent his/her reflection from being captured, a tripod should be utilized to capture the image.

8.25 Comparison quality photographs are most often taken as a way to capture evidence that may not be collected, or whose collection may not fully document the details of the evidence; they are often taken of impression evidence, such as latent prints, footwear impressions, tire impressions, and tool mark impressions.

8.25.1 Comparison quality photographs should be taken in a lossless format; TIFF is the minimum quality, RAW is preferred.

8.25.2 When capturing a comparison quality photograph, the camera should be mounted on a tripod, with the lens at a 90 degree angle to the plane of the evidence, using a remote shutter release, utilizing a scale at the same depth as the impression, and at the greatest depth of field possible.

8.25.3 When photographing footwear and tire impressions, the tripod should be positioned higher than necessary and the lens adjusted in order to fill the frame with the impression. If the tripod is low, the lens adjustment is wider than necessary, which creates distortion in the image.

8.26 Indoor scenes may contain numerous rooms or areas. An analyst should photograph the entire scene for overall location and condition, but may not need to take relationship and identification photographs if there are no relevant items in a room/area.

8.27 The location of a scene will be documented by a street address, a business sign, or other equally identifiable marking.

8.27.1 House numbers are often located on the front face of the house, on the mailbox, or on the curb.

8.27.2 Business numbers are often located on the front face of the building, on the mailbox, or on the curb. Businesses often have a sign identifying the location as a business. Business signs are often located on the front door, front window, or on a stand-alone sign in an area adjacent to the business.

8.28 The location of outdoor scenes may be difficult to document photographically, as they don't necessarily have identifying markings readily visible.

8.28.1 When available, use landmarks such as street signs, power line towers, or other items as a point of reference to document the location, as well as to be an anchor point for photography.

8.28.2 If identifying markings are a distance from the area of interest, the photographer should consider taking a series of photographs that show the path from the identifying marker to the area of interest (e.g. series from mile marker on the roadway to the body under a tree, which isn't visible from the roadway).

8.29 When photographing a living person, identification and condition photographs should be taken.

8.29.1 To document the identification of a person, a minimum of five photographs should be taken: front of person (head-to-toe), left side of person (head-to-toe), back of person (head-to-toe), right side of person (head-to-toe), and a close up of the person's face.

8.29.2 When the condition of a person's clothing or body is important to document, relationship and identification photographs should be taken.

8.29.3 If there is a defect in the clothing or an injury to the person, the area should be photographed both without and with a scale for reference.

8.29.4 Depending on the nature of the injury, it may be necessary to photograph it as found and then photograph again after it has been cleaned; each set of photographs should be taken both without and with a scale for reference.

8.30 When photographing a vehicle, identification and condition photographs should be taken.

8.30.1 To document the exterior of a vehicle, a minimum of four photographs should be taken of the body of the vehicle: front, left side, back, and right side; ideally, four additional photographs, taken from each corner of the vehicle, each showing one end and one side, should also be taken.

8.30.2 The vehicle identification number (VIN), located on metal plate on the driver's side dashboard and on a sticker on the driver's door edge, will be photographed if present.

8.30.3 The front and rear license plates will be photographed if present.

8.30.4 The overall condition of the interior of the vehicle will be photographed as general documentation.

8.30.5 The condition of the exterior of the vehicle will be captured in the overall documentation photography; if areas of damage exist that are relevant to the investigation, the investigating officer should direct the photographer as to the photography necessary.

8.30.6 Relationship and identification photographs should be taken of any evidence collected by ISPFS analysts, utilizing a scale where relevant.

8.31 Filters may be used to allow the photographer to capture information that would not be captured otherwise.

8.31.1 An ultraviolet (UV) filter should be kept on the primary camera lens (e.g. 18-200mm, 18-105mm) at all times unless its use conflicts with the use of another filter or a photographic process.

8.31.2 When photographing a pool of water, a reflection of light on the surface is captured; a polarizing filter may be utilized in order to visualize below the surface, into the pool of water.

8.31.3 When utilizing an alternate light source (ALS), a colored filter that corresponds to the color of viewing goggle(s) utilized with the ALS will be installed on the lens in order to visualize the area reacting to the ALS.

8.32 In crime scene investigations, witness vantage points may be important.

8.32.1 Overall photographs should be taken of the area from which a witness is reported to have seen something.

8.32.2 The camera lens should be set to approximately 34mm in order to photograph the approximate equivalent to what a human eye sees.

8.32.3 Photographs should be taken from the witness location, documenting his/her point of view.

9.0 Diagrams

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10.0 Presumptive Blood Tests

10.1 Background/References

10.1.1 Most screening tests for blood depend on the catalytic action of the heme group. To minimize false positives, the test is frequently performed as a multi-step test. A good overview is found in the first reference.

10.1.2 References

10.1.2.1 Gaensslen, R. Sourcebook in Forensics Serology, Immunology, and Biochemistry. (1983) U.S. Dept. of Justice, Washington, D.C., p. 101-105.

10.1.2.2 Burdett, PE (October 1976) "Presumptive Tests for Blood – A Comparative Survey", CRE Report, No. 201.

10.1.2.3 Culliford, BJ and Nicholl, LC (1964) "The Benzidine Test: A Critical Review", Journal of Forensic Sciences, 9:175-191.

10.1.2.4 Higaki, R.S. and Philip, W.M.S. A Study of the Sensitivity, Stability and Specificity of Phenolphthalein as an Indicator Test for Blood, (1976) Canadian Journal of Forensic Science, Vol 9, No. 3, p. 97-102.

10.2 Scope

10.2.1 To provide a method for the localization and presumptive identification of bloodstains.

10.3 Equipment/Reagents

Cotton swabs or filter paper
Balance (must be calibrated annually by an outside vendor)
Phenolphthalein Working Solution/Pre-prepared Phenolphthalein Test Kit
3% Hydrogen Peroxide
Sterile/Nanopure, de-ionized, or distilled H_2O
0.3% Ortho-Tolidine Stock

10.4 Phenolphthalein test for blood

10.4.1 Preparation of reagents
(the following may be made in different amounts using appropriate ratios)

Phenolphthalein	2.0g
KOH	20.0g
Zinc (granular)	20.0g

Phenolphthalein, KOH, and 100mℓ of dH_2O are refluxed, in a fume hood, with Zinc until solution is colorless (producing phenolphthalein in ~4 hours). Store stock solution refrigerated in dark bottle to which ~5g mossy zinc has

been added to keep the solution in its reduced form. Remove for working solution as needed.

Working solution: Mix 2mℓ stock solution with 8mℓ Ethanol

10.4.2 Phenolphthalein Safety

10.4.2.1 Zinc is flammable. The unreacted portions and used filter paper are to be disposed of properly.

10.4.2.2 Chemicals/Reagents will be labeled using NFPA labels in accordance with the Health and Safety Manual.

10.4.3 Phenolphthalein Procedure

10.4.3.1 Positive (known bloodstain) and negative control samples are processed, prior to testing any forensic samples (on the day of testing), to ensure the working solution and/or kit reagents are functioning properly. If a swab is moistened with H_2O to collect the positive control sample, then H_2O shall be added to the swab for the negative control sample.

10.4.3.2 Cotton swabs or a folded piece of filter paper are used to collect the suspected blood onto the tip. A swab may be moistened with H_2O if necessary.

10.4.3.3 If using a Pre-prepared Phenolphthalein Test Kit, follow the procedure provided by the manufacturer. If using lab-prepared Phenolphthalein, follow steps 10.4.3.4 and 10.4.3.5.

10.4.3.4 To the swab or filter paper with the suspected blood, add 1-2 drops of phenolphthalein working solution. Wait 10-15 seconds to detect potential false positives.

10.4.3.5 Add 1-2 drops of 3% H_2O_2 and note appearance or absence of bright pink color. Color reaction should occur rapidly (≤ 1 minute).

10.4.3.6 Document result in case notes. Record positive (+), as indicated by the development of the above color change, or negative (-) as indicated by the absence of the color change. Analyst may use other descriptive word(s) as well (e.g. strong, weak, slow, etc.).

10.4.4 Phenolphthalein comments

10.4.4.1 Only those responders who have been trained and competency/proficiency tested to use Phenolphthalein may use it.

10.4.4.2 Direct testing of a small cutting/sample may also be performed.

10.4.4.3 Color changes occurring prior to the addition of 3% H_2O_2 are generally considered inconclusive.

10.4.4.4 Color changes occurring after 1 min. are generally considered negative.

10.4.4.5 The Presumptive Blood Testing Notes page may be used to assist in note-taking related to tests performed.

10.5 Ortho-Tolidine (O-Tolidine) test for blood

10.5.1 Preparation of O-Tolidine reagents
(the following may be made in different amounts using appropriate ratios)

O-Tolidine	0.6g
Glacial Acetic Acid	100mℓ
Ethanol	100mℓ

Dissolve O-Tolidine in Acetic Acid/Ethanol mixture consistent with ratios above. O-Tolidine is light sensitive and should be stored in dark reagent bottle and kept refrigerated when not in use.

10.5.2 O-Tolidine safety

10.5.2.1 O-tolidine is designated as a potential carcinogen and should be used with caution.

10.5.2.2 Chemicals/Reagents will be labeled using NFPA labels in accordance with the Health and Safety Manual.

10.5.3 O-Tolidine Procedure

10.5.3.1 Positive (known bloodstain) and negative control samples are processed, prior to testing any forensic samples (on the day of testing), to ensure the working stock reagents are functioning properly. If a swab is moistened with H_2O to collect the positive control sample, then H_2O shall be added to the swab for the negative control sample.

10.5.3.2 Cotton swabs or a folded piece of filter paper are used to collect the suspected blood onto the tip. A swab may be moistened with H_2O if necessary.

10.5.3.3 To the swab or filter paper with the suspected blood, add 1-2 drops of o-tolidine working solution. Wait 10-15 seconds to detect potential false positives.

10.5.3.4 Add 1-2 drops of 3% H_2O_2 and note appearance or absence of blue-green color. Color reaction should occur rapidly (≤ 1 minute).

10.5.3.5 Document result in case notes. Record positive (+) as indicated by the development of the above color change, or negative (-) as indicated by the absence of the color change.

Analyst may use other descriptive word(s) as well (e.g. strong, weak, slow, etc.).

10.5.4 O-Tolidine comments

10.5.4.1 Only those responders who have been trained and competency/proficiency tested to use O-Tolidine may use it.

10.5.4.2 Direct testing of a small cutting/sample may also be performed.

10.5.4.3 Color changes occurring prior to the addition of 3% H_2O_2 are generally considered inconclusive.

10.5.4.4 Color changes occurring after 1 min. are generally considered negative.

10.5.4.5 The Presumptive Blood Testing Notes page may be used to assist in note-taking related to tests performed.

10.6 Results/Conclusion statements

10.6.1 There are numerous ways to report the results of presumptive blood testing. Reporting format may vary based on the number of items/surfaces tested or the number of results. The following are suggested wording examples and can be modified as necessary, depending on circumstances. (Blanks and items in parentheses indicate a choice or description should be entered).

General Statements:

Results from presumptive chemical tests for the presence of blood were negative.

Results from presumptive chemical tests for the presence of blood were positive, indicating the presence of blood.

Results from presumptive chemical tests for the presence of blood were inconclusive.

Statements that group by location:

I performed a presumptive test(s) for the presence of blood on (number) items from (locations). Positive results, indicating the presence of blood, were obtained on (number) stains from (locations). Negative results were obtained on the other items tested. Swabs were collected from (locations).

Results from presumptive chemicals tests for the presence of blood were (negative/inconclusive) for (locations).

Statements that group by evidence marker numbers:

I performed a presumptive test(s) for the presence of blood on items from marker numbers (numbers). Positive results, indicating the presence of blood, were obtained from items at marker numbers

(numbers). Blood was not detected on the other items tested. Swabs were collected from marker numbers (numbers).

Results from presumptive chemicals tests for the presence of blood were (negative/inconclusive) for items at marker numbers (numbers).

11.0 Biological Evidence Collection

11.1 The type of biological evidence most commonly encountered in crime scenes is in the form of liquid or dried blood, semen, and saliva. Other biological evidence that may be encountered includes hair, urine, feces, bone, teeth, and other tissues. Biological evidence may lead to the identification of a victim or a suspect, so proper collection and preservation is imperative. Biological evidence must be protected from possible contamination from scene responders and possible cross-contamination from other evidence in the crime scene.

11.2 All biological evidence should be treated as infectious. Appropriate personal protective equipment (PPE) should be utilized.

11.2.1 Gloves should be changed frequently to avoid cross-contamination from items in the crime scene.

11.3 Biological evidence should be properly documented using photography, notes, and sketches/diagrams (as appropriate) prior to collection.

11.3.1 Documentation of blood stain patterns for reconstruction should be conducted as outlined in Section 13 of this manual.

11.3.2 Small or light colored stains may not be easily visualized in photos. Evidence markers (e.g. stickers, placards) may be utilized to help visualize stains in scene photography.

11.3.3 Relevant biological evidence will be described in notes and may be included in sketches (if used); descriptions may include color, size, orientation, state (e.g. liquid, dried, flaky), and distribution. If evidence markers were used, the numbers/letters will be included in the description. The results of any presumptive blood tests will be included in notes and may be included in sketches (if used).

11.3.4 Crime scene diagrams may include references to large areas of biological evidence, such as a blood pattern distribution on a wall, or a pool of blood on a floor.

11.3.5 Crime scene sketches may be used to augment notes by detailing areas containing biological evidence within a scene.

11.3.5.1 A detailed sketch of one area may be made without sketching other adjacent areas that do not contain relevant biological evidence.

11.3.6 Colored pens/pencils may be used in sketches/diagrams to more accurately represent the details of biological evidence.

11.4 It may be difficult to locate very small stains, dilute stains, or stains in a scene that has been altered/cleaned.

11.4.1 A high intensity white light should be one of the first tools utilized to search for biological evidence.

11.4.2 An alternate light source (ALS) may be utilized when searching for biological fluids such as semen and saliva.

11.4.2.1 The most appropriate wavelength to search for bodily fluids is 430-515 nm, utilizing orange goggles/barriers.

11.4.2.2 An ALS may only be utilized by those responders who have training in the appropriate and safe use of an ALS.

11.4.3 A volume of blood may flow into floorboard cracks or be absorbed into carpet padding and may not be visible at the surface.

11.4.4 Blood enhancement chemicals may be used as outlined in section 12 of this manual.

11.5 Collection of biological evidence is often determined based on the size of the item containing the evidence.

11.5.1 If an item is small enough to be collected, the entire item should be collected.

11.5.2 If an item is large, a piece of the item may be taken (e.g. seat cushion of a chair) or an area may be removed from the item (e.g. cutting fabric from a mattress, cutting out a piece of drywall from a residence, etc.). Authorization from the primary detective or investigating agency must be obtained prior to removal.

11.5.2.1 If an item or area is damaged in the collection of evidence (e.g. cutting a piece of drywall from a residence), it should be documented in notes and with photos.

11.5.3 If collection is not possible or appropriate, the item may be swabbed in order to collect the biological evidence.

11.6 COLLECTION OF SWABS

11.6.1 When swabbing an item/area, appropriate water sources and swabs will be used.

11.6.2 If a swab must be moistened to collect a sample, water from a sterile water ampule will be utilized.

11.6.3 Cap-Shure swabs are sterile swabs whose ends are enclosed with a breathable plastic capsule. Cap-Shure swabs may be utilized to collect a variety of types of biological evidence.

11.6.3.1 After collection, Cap-Shure swabs may be placed in an evidence envelope without allowing the swab to dry due to the capsule design.

11.6.4 Standard wood/plastic shaft sterile swabs may be utilized to collect a variety of types of biological evidence.

11.6.4.1 After collection, standard swabs should be placed in a vented swab box or a small, coin-type envelope; time should be allowed for the swab to dry. It is effective to tent

the envelope to keep it somewhat open in order to facilitate swab drying.

11.7 COLLECTION OF LIQUID OR SEMI-LIQUID STAINS

11.7.1 When collecting a stain that is liquid or semi-liquid, the following guidelines should be followed.

11.7.2 When possible, two swabs should be collected simultaneously.

11.7.3 The cotton end of an appropriate swab should be placed into the liquid in order to absorb the liquid into the swab.

11.7.4 The swab should be dried appropriately based on swab type.

11.8 COLLECTION OF DRIED STAINS

11.8.1 When collecting a stain that is dried, the following guidelines should be followed.

11.8.2 When possible, two swabs should be collected simultaneously.

11.8.3 The cotton end of an appropriate swab should be slightly moistened.

11.8.3.1 Do not saturate the swab. If a swab is inadvertently over-saturated, it should be discarded.

11.8.3.2 Do not touch the tip of the water ampule to the swab.

11.8.4 The swab should be held at approximately 90 degrees to the stain in order to concentrate the material onto the end/tip of the swab.

11.8.5 The swab should be rubbed against the stain until a sufficient amount of material has been collected.

11.8.6 The swab should be dried appropriately based on swab type.

11.9 COLLECTION OF POSSIBLE DNA MATERIAL

11.9.1 When collecting possible DNA material from a person (e.g. finger swabs, penile swabs), the following guidelines should be followed.

11.9.2 When possible, two swabs should be collected simultaneously.

11.9.3 The cotton end of an appropriate swab should be slightly moistened.

11.9.3.1 Do not saturate the swab. If a swab is inadvertently over-saturated, it should be discarded.

11.9.3.2 Do not touch the tip of the water ampule to the swab.

11.9.4 The swab should be held at approximately 90 degrees to the surface in order to concentrate the material onto the end/tip of the swab.

11.9.5 The swab should be rubbed against the surface until a sufficient amount of material has been collected.

11.9.5.1 When swabbing fingers, two swabs should be used for one entire hand (e.g. one set of swabs for the left hand, one set of swabs for the right hand). Do not separate the hand into sections for collection (e.g. swabs from right index finger, swabs from right middle finger, etc.) Extra attention should be paid when swabbing areas where potential DNA

material may collect, such as under the edge of the fingernails and around the nail bed.

11.9.5.2 When collecting penile swabs, two swabs should be used for the entire genital area. Do not separate the genitals into sections for collection (e.g. base, shaft, scrotum, etc.).

11.9.6 The swab should be dried appropriately based on swab type.

11.10 COLLECTION OF POTENTIAL DNA MATERIAL

11.10.1 When collecting potential DNA material from a surface (e.g. door handle, gear shift knob, etc.), the following guidelines should be followed.

11.10.2 When possible, two swabs should be collected simultaneously.

11.10.3 The cotton end of an appropriate swab should be slightly moistened.

11.10.3.1 Do not saturate the swab. If a swab is inadvertently over-saturated, it should be discarded.

11.10.3.2 Do not touch the tip of the water ampule to the swab.

11.10.4 The swab should be held at approximately 90 degrees to the surface in order to concentrate the material onto the end/tip of the swab.

11.10.5 The swab should be rubbed against the surface until a sufficient amount of material has been collected or until a sufficient area of the surface has been swabbed.

11.10.6 The swab should be dried appropriately based on swab type.

11.11 COLLECTION OF SANITARY PADS AND TAMPONS

11.11.1 Sanitary pads and tampons may contain DNA from both the victim and the suspect. When collecting pads or tampons, the following guidelines should be followed.

11.11.2 If the adhesive surface of the sanitary pad is exposed, it should be affixed to a paper envelope to keep the adhesive portion from adhering to other areas of the pad.

11.11.3 The pad should be placed in a paper envelope (inner packaging). This paper envelope should then be placed in an evidence envelope or sack (outer packaging).

11.11.4 A tampon should be placed in a paper envelope (inner packaging). This paper envelope should then be placed in an evidence envelope or sack (outer packaging).

11.12 COLLECTION OF CONDOMS

11.12.1 Condoms may contain DNA from both the victim and the suspect. When collecting condoms, the following guidelines should be followed.

11.12.2 The condom should be handled as minimally as possible to prevent transfer of DNA between the interior and exterior surfaces.

11.12.3 Condoms often have lubricant on their surfaces. While the biological materials may dry on the interior and exterior surfaces, the lubricant may not fully dry and can be absorbed into paper packaging.

11.12.4 The best practice is to store condoms frozen. If a condom cannot be frozen, it should be refrigerated. Condoms should be put into cold storage as soon as possible.

11.12.5 If cold storage is available in a reasonable time frame, the condom may be packaged in plastic.

11.12.5.1 If the condom is pliable, it can be placed into a screw top plastic vial. The plastic vial should then be placed in an evidence sack.

11.12.5.2 A notation should be made on the exterior evidence packaging indicating the need to freeze/refrigerate the evidence.

11.12.5.3 If the condom is not pliable, it should be packaged as outlined in 11.12.6.1.

11.12.6 If a condom cannot be stored in a cold environment, it should be packaged in order to facilitate drying.

11.12.6.1 The condom should be placed in a paper envelope (inner packaging). This paper envelope should then be placed in an evidence envelope or sack (outer packaging).

11.12.7 If there is concern that the liquid contents of the condom may leak out, one piece of sterile gauze should be placed inside the condom to absorb any liquid.

11.13 OTHER BODILY FLUIDS (e.g. VOMIT, URINE, AND FECES)

11.13.1 Some types of bodily fluids have a very limited forensic value; vomit, urine, and feces may be collected if determined to be probative.

11.13.2 Vomit may be collected if poisoning, ingested drug use, or an oral sexual assault is suspected.

11.13.2.1 Dried vomit may be collected on the source (e.g. clothing, bedding, etc.) or a large sample may be swabbed or collected and placed into a plastic screw top container.

11.13.2.2 Wet vomit should be collected in a plastic screw top container.

11.13.2.3 ISPFS can test vomit for ingested drug use. ISPFS does not have protocols for testing wet vomit for poison, alcohol, or semen.

11.13.3 Wet or dry urine samples on clothing, bedding, etc. have limited forensic value.

11.13.3.1 ISPFS can test urine for drugs. Liquid urine samples may be submitted following the established toxicology protocols.

11.13.4 Fecal material generally has a limited forensic biology value.

11.13.4.1 If DNA analysis is needed on fecal matter (e.g. missing child case), then the exterior of the feces, near the “pinch” point,

may be swabbed. The feces as a whole should not be collected. Swabs should be dried appropriately based on swab type.

11.13.4.2 If a fecal sample appears to contain potentially probative blood or semen, the suspected blood or semen should be collected by swabbing. Care should be taken to minimize fecal contamination of the swabs. Swabs should be dried appropriately based on swab type.

11.13.4.3 If potentially probative blood or semen is observed in a diaper and fecal matter is present, a sample may be collected. If there is an isolated stain that may be cut or swabbed from the diaper, it may be removed to avoid contamination and air dried. If the sample is mixed, the diaper should be collected and stored frozen until submission for analysis.

11.13.4.3.1 The diaper should not be rolled or folded tightly in a way that would trap moisture inside. The open diaper should be placed into a paper evidence sack; the interior sides of the front and back panels of the diaper may be in loose contact with one another without any likely moisture issues.

11.14 Biological evidence should be packaged in paper, both for internal and external packaging, unless specifically noted (e.g. condoms).

11.14.1 Internal packaging may include various sizes of paper envelopes.

11.14.2 Plastic jars may be used as internal packaging as outlined in 11.12.5.1.

11.14.3 External packaging may include various sizes of paper envelopes, paper sacks, and cardboard boxes.

11.15 For all evidence containing known biological materials (e.g. blood, semen), the external packaging should have a “biohazard” sticker affixed to it, or should have the word “biohazard” written in bold print.

11.16 For all evidence that requires special storage considerations, the external packaging should have the storage medium written (e.g. “freeze”, “refrigerate”) in bold print.

12.0 Blood Enhancement Chemicals

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13.0 Recognition and Documentation of Evidence in Bloodshed and/or Shooting Scenes

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14.0 Latent Print Development and Preservation

14.1 Latent prints are one of the most common types of physical evidence found at crime scenes and are valuable in terms of identifying subjects and associating people with locations and/or objects related to a crime.

14.1.1 The term "latent" refers to prints that are not visible prior to utilizing a development method; however, all prints recovered from a crime scene or items of evidence are often referred to as latent prints.

14.1.2 Latent prints found at crime scenes are made when the friction ridge skin of the fingers, palms, or soles of the feet come in contact with a surface and leave an impression on that surface.

14.1.3 Latent prints may be made from a variety of residues, including sweat, oil, blood, and any other substance that may cover any portion of the fingers/palms/soles prior to coming in contact with a surface.

14.1.4 Patent prints are those impressions that are visible prior to any development (e.g. print in blood).

14.1.5 Plastic prints (i.e. three-dimensional impressions) may be present if friction ridge skin comes in contact with a soft substance in the scene.

14.2 Items that are thought to contain potential latent print evidence, which are small enough to be collected, should be collected for processing at the lab. Surfaces in the scene that are not easily removed (e.g. doors, windows, floors, walls, furniture, etc.) should be processed at the scene unless it is a critical piece of evidence that would benefit from lab processing techniques. The determination to collect large items or elements of a building/vehicle (e.g. windows) for submission will be left to the analyst's discretion.

14.3 Latent print evidence should be properly documented using photography, notes, and sketches/diagrams (as appropriate) prior to collection.

14.3.1 Due to the small size of some latent prints, they may not be easily visualized in photos. Evidence markers (e.g. stickers, placards) may be utilized to help visualize latent prints in scene photography.

14.3.2 It is best practice to photograph all latent prints that are thought to have value prior to collection.

14.3.2.1 All latent prints that will be collected should be photographed for documentation prior to attempting any lifts.

14.3.2.1.1 Dry erase markers may be utilized, depending on the surface, to mark the location of latent prints.

14.3.2.1.2 An arc may be used to note the top of a finger impression and a bracket may be used to note an

area of palm, sole, unknown friction ridge skin, or unknown orientation.

14.3.2.1.3 The marking, when lifted, will help to authenticate the location of the print in the scene.

14.3.2.2 The analyst will determine which latent prints should be photographed (comparison quality) prior to collection based on his/her training and experience. Comparison quality photographs will be taken as outlined in section 8.25 of this manual.

14.3.2.3 If the nature of the surface bearing the latent print is such that a lift is not likely to be an effective means of collecting the latent print, comparison quality photographs shall be taken before a lift is attempted.

14.3.2.4 If the latent print is visualized using an alternate light source (ALS), the latent print must be photographed using the appropriate color of barrier filter.

14.3.3 Notes will reflect the types of latent print processing that was conducted, the areas/items processed, and the results of each type of processing.

14.3.4 A simple sketch will be made on the latent lift card noting the orientation of the print and the location on the item from which the lift was collected.

14.3.4.1 If a large area/item is being processed, a larger diagram(s) may be utilized to show the locations of multiple latent prints.

14.4 The development of latent prints in a crime scene is dependent upon a number of factors, including the nature of the surface and the composition of the latent print residue.

14.4.1 Analysts may use light based methods, chemical methods, or physical methods to locate and develop latent prints within a scene.

14.4.2 Latent print processing generally starts with methods that would cause the least potential damage to items and proceeds as appropriate.

14.4.3 Prior to processing an item that may have sentimental or inherent value, the analyst will get authorization from the primary investigator; documentation will be added to notes.

14.5 VISUALIZING LATENT PRINTS

14.5.1 Latent prints may be visualized through the use of various angles and wavelengths of light. Visualization of latent prints through the use of forensic lighting methods is non-destructive and should be attempted prior to other processing methods.

14.5.2 A strong white light may be utilized at an oblique angle in order to visualize latent prints.

14.5.2.1 A flashlight or the white light setting on an alternate light source (ALS) are the most common sources for a strong white light.

14.5.3 An ALS may be utilized in order to visualize natural substances or contaminants in the latent print residue. An ALS may also create a reaction with the surface, thereby creating contrast, visualizing a latent print.

14.5.3.1 An ALS may only be utilized by analysts who have received training in the appropriate use of an ALS.

14.5.3.2 When using an ALS to observe an item/surface, the appropriate goggles will be used, depending on wavelength.

WAVELENGTH	CORRESPONDING FILTER
<400nm	yellow or clear UV safe
400-450nm	yellow
450-540nm	orange
>540-700nm	red

14.5.3.3 Permanent eye damage can occur from reflected, refracted, or direct illumination by the ALS to the eye. Extreme care should be taken around highly reflective surfaces. An analyst should never look directly into the light or allow beams to bounce off the surface into his/her own eyes or another person's eyes.

14.6 CYANOACRYLATE ESTER

14.6.1 Cyanoacrylate ester (CAE), commonly known as "superglue", is a chemical used to visualize latent prints on non-porous and some semi-porous objects. CAE processing also prepares the surface for the acceptance of powders that may enable further visualization of the latent prints.

14.6.2 On scene, a vehicle, a room, or even a body may be processed using CAE. While most small items will be collected for processing in the lab, there may be instances in which CAE processing is warranted for evidence on scene.

14.6.2.1 Before a body can be CAE processed on scene, the Coroner for that county must be contacted and his/her express consent must be granted. Consent will be documented in notes.

14.6.3 In order to facilitate CAE processing, a proper environment must be able to be established.

14.6.3.1 If using liquid or gel CAE, the area to be fumed must be able to be made relatively airtight, and must be able to be

ventilated after processing. The analyst must be able to add humidity to the environment, and may need to add heat to the CAE in order to expedite the process.

14.6.3.2 If using a fuming wand, it must be in a well-ventilated area.

14.6.4 CAE may be utilized in either liquid or gel form or by using a fuming wand. The amount of CAE used will depend on the size of the area being fumed, the fuming rate, and the analyst's preference, based on training and experience.

14.6.4.1 When utilizing the liquid CAE, it can be added to a disposable aluminum dish and placed on a hot plate in order to facilitate the vaporization of the liquid.

14.6.4.2 When utilizing a foil CAE gel packet, the gel will vaporize at a controlled rate when exposed to air. Numerous gel packets may have to be used to obtain the desired results.

14.6.4.3 When utilizing a fuming wand, the cartridge size is selected based upon the size of the area/item to be processed. Fumes from the wand will rise, so it is best to direct the fumes below the item/surface.

14.6.5 Containers of hot water can be added to the environment in order to increase the humidity.

14.6.6 Control tests will be processed with the evidence and should be monitored frequently to prevent over or under fuming. Proper development is achieved when ridge characteristics on the control turn slightly white in color and begin to show good contrast.

14.6.7 CAE fuming should only be conducted in a well-ventilated area. Precautions should be taken to avoid inhaling or allowing the vapors to contact the eyes, as the vapors can be irritating to the eyes, nose, and throat. Persons wearing contact lenses should not open areas containing CAE fumes, including using a fuming wand, unless wearing non-vented goggles.

14.6.8 Gloves should be worn to prevent the CAE from contacting the skin, as adhesion may result.

14.7 LATENT PRINT POWDERS

14.7.1 Latent print powders may be utilized to develop prints at crime scenes. Powder particles physically adhere to latent print residue, allowing the latent print to be visualized. There are a variety of colors/types of powders, as well as different types of brushes/applicators that may be used, depending upon the surface and potential contaminants (e.g. blood).

14.7.2 Powder is selected based on the type and color of the surface to be processed. Traditional powders are most often effective on non-textured, non-ferrous surfaces, magnetic powders are most often effective on plastics

and textured surfaces, and fluorescent powders may be useful on multicolored surfaces.

14.7.3 The type of applicator to be used depends upon the size of area to be processed and the type of powder to be used. Magnetic wands are used with magnetic powder and fiberglass brushes are used for traditional powders and may be used for fluorescent powders. Powder should be applied in a circular motion until detail becomes visualized, and should then be applied consistent with ridge flow.

14.7.4 When the crime scene is contaminated with blood or other biological contaminants, single use brushes and powder should be utilized.

14.7.5 When using fluorescent powder, an ALS should be utilized during processing to avoid over-powdering the surface.

14.7.6 Latent prints that are developed and are deemed suitable for collection will be marked, photographed, and/or lifted. The collection type will be determined based on the analyst's training and experience.

14.7.7 If fabric, glove, or other similar impressions are developed while processing a crime scene, they should be documented in notes and possibly with photography, depending on the nature of the impressions and the circumstances at the scene.

14.8 SMALL PARTICLE REAGENT

14.8.1 Small particle reagent (SPR) works like a liquid fingerprint powder and can develop prints on a variety of surfaces, including items that are or have been wet.

14.8.2 SPR can be sprayed onto an item. The bottle of SPR should be shaken often to keep the SPR in suspension. If an area is thought to contain latent prints, SPR should be sprayed above the print so the SPR can flow over the print. Excess SPR can be removed by rinsing the surface with water.

14.8.3 Latent prints that are developed and are deemed suitable for collection will be marked, photographed, and/or lifted. The collection type will be determined based on the analyst's training and experience.

14.9 LIFTING METHODS

14.9.1 Lifting methods are effective for the preservation of latent print impressions and are one of the most common and effective methods of preserving latent prints. There are a variety of sizes, types, and finishes of lifting tape that can be utilized depending on the surface and/or characteristics of the latent print.

14.9.2 All latent lift cards that contain tape lifts will be retained and turned over to the investigating agency for submission for latent print examination; no latent lift cards containing tape lifts will be discarded.

14.9.3 Latent lift cards should be filled out as completely as possible and shall include the date and initials of the person collecting the lift, a case number, and a description and diagram of the surface from which the print was lifted. The lift card should also contain significant information about the orientation and/or position of the latent print on the surface.

14.9.4 If latent prints appear to be simultaneous impressions or are in close proximity to one another, they should be lifted together whenever possible.

14.9.5 Lifts from non-adjacent areas should be placed on different cards.

14.9.6 If multiple lifts are taken of the same latent print, they may be placed on the same latent lift card. A notation indicating the order in which they were lifted should be made on the card.

14.10 Casting compounds (e.g. Mikrosil) may be utilized to lift a latent print on a textured or uneven surface.

14.10.1 Casting compounds may be mixed by hand or by using an extruder gun.

14.10.2 Casting compounds should be applied in a way to prevent air pockets and should be left in place until solidified.

14.10.3 After lifting, casting material can be attached to a latent lift card and the information about the cast can be filled out as detailed in 13.9.2.

14.11 Blood contaminated latent prints may be present in scenes. In order to develop/visualize those latent prints, blood-reactive chemicals may be utilized.

14.11.1 Prior to the application of any blood enhancement chemicals, consideration should be taken for the collection of any evidence for biological analysis.

14.11.2 Blood enhancement chemicals should be used as detailed in section 12 of this manual.

14.12 KNOWN EXEMPLARS

14.12.1 Known exemplars is a term used to describe the intentional recording of an individual's friction ridge impressions that are made for documentation purposes. Impressions may be made using a number of techniques, including, but not limited to, traditional ink/cards and powder/adhesive lift methods. The intent in collecting known exemplars is to produce impressions that are suitable for comparison.

14.12.2 If a subject's hands are overly sweaty/dirty, they should be dried/cleaned prior to attempting to record their prints. If a subject's hands are dry, a small amount of lotion may be rubbed into their hands prior to attempting to record their prints.

14.12.3 It is often helpful to take multiple recordings of each type of exemplar (e.g. finger tips, palm prints, etc.) in case of unintentional smears or defects.

14.12.4 Pre-printed cards for fingers and palms may be utilized for recording inked exemplars. In the absence of pre-printed cards, plain white paper may be utilized. A cylindrical object, such as a piece of pipe or cardboard tube (approximately 3" or bigger in diameter), should be utilized to obtain complete palm print exemplars.

14.12.5 Adhesive lifts may be cut to size based on the area of skin being recorded.

14.12.6 All exemplars should be marked with the date, analyst's name, analyst's signature/initials, case number (if known), subject's name (if known), and subject's signature. It should be noted if the subject refuses to sign the exemplar.

14.12.7 When recording inked fingerprints, the fingerprint card should be placed on a flat surface or in a cardholder.

14.12.8 Beginning with the right thumb, roll the thumb from nail-bed to nail-bed on an inking plate or pad. Roll the thumb in the same manner on the fingerprint card in the space marked "1. R. Thumb." Roll the thumb with even pressure to avoid smearing. The procedure is continued for each finger, ensuring the prints are placed in the corresponding boxes on the fingerprint card.

14.12.9 Ink the right and left thumbs and place a plain impression in the corresponding box at the bottom of the fingerprint card. Repeat the procedure with the right and left four fingers simultaneously placing the plain impression in the corresponding boxes at the bottom of the fingerprint card. Ideally, when taking plain impressions, fingers will be rolled up to include tip information.

14.12.10 If an amputation, deformity, or injury makes it impossible to print a finger, a notation shall be made to that effect in the individual finger block. If a portion of the finger is not covered with the bandage, rolling the finger should be attempted.

14.13 POST-MORTEM EXEMPLARS

14.13.1 Post-mortem exemplars may be recovered from the deceased at autopsy in the same manner as described in 14.12. However, due to injury, decomposition, or other circumstances, traditional methods may not yield satisfactory results.

14.13.2 For individuals who are recently deceased, the methods described in 13.12 may be utilized after the body has been warmed to room temperature (ideally), the hands cleaned/dried, and rigor mortis has been broken.

14.13.3 For individuals who have advanced decomposition or in which the body was submerged in water, there may be separation of tissue on the hands.

14.13.3.1 After cleaning/drying the hands, photography, ink, and/or powder methods may be utilized as outlined in section 14.2 of this manual. A postmortem print spoon, printing strips, and ink may be utilized as well.

14.13.3.2 If the skin has separated from the hand, it may be cleaned and placed under a piece of glass for photography. If a large portion of the skin has separated, it may be placed over the analyst's gloved hand to attempt photography, ink, and/or powder methods.

14.13.4 For individuals whose skin has dried and hardened, traditional fingerprinting may not be possible.

14.13.4.1 Photography and/or powder/casting methods may be the most successful.

15.0 Impression Evidence

15.1 Impression evidence is present in crime scenes in the form of shoe and tire marks, bite marks, tool marks, and possibly by marks made from other patterned items.

15.1.1 When impression evidence is located outdoors, care should be taken to avoid loss or destruction due to weather conditions.

15.1.2 If an impression is fragile or could be altered/destroyed by movement through the crime scene, care should be taken to protect the impression.

15.2 Impression evidence should be marked using a letter marker. By using a letter, rather than a number marker, impression evidence can be easily distinguished from other items of evidence marked in the scene.

15.2.1 Letter placards should be utilized for impression evidence on horizontal surfaces. Letter stickers should be utilized for impression evidence on vertical surfaces.

15.2.2 Letter designations shall be included in any comparison photography, on any lifts, and on any casts taken of the impression.

15.3 Impression evidence should be properly documented using photography, notes, and sketches/diagrams (as appropriate) prior to collection.

15.3.1 The locations and numbers of lifts and casts shall be documented in notes.

15.4 Generally, the first step in the proper documentation and recovery of impression evidence is accomplished with photography.

15.4.1 Comparison quality photographs should be taken as outlined in Section 8.25 of this manual.

15.4.2 Comparison quality photographs shall be taken prior to attempting preservation by other means (e.g. lifting, casting).

15.5 Some types of impression evidence (e.g. shoe impressions in blood) may be enhanced for photography and collection using chemical and/or powder methods.

15.5.1 Blood enhancement chemicals should be utilized as outlined in Section 12 of this manual.

15.5.2 Powder processing techniques should be utilized as outlined in Section 14.7 of this manual.

15.5.3 Any enhanced/processed impressions that are going to be collected shall be documented with comparison quality photographs prior to attempting preservation by other means (e.g. lifting, casting).

15.6 Impression evidence may be physically recovered, depending on the circumstances. The recovery technique will depend on the nature of the impression and the substrate.

15.6.1 If the item containing the impression can be safely collected, without loss of the impression, then the entire item should be collected.

15.6.2 If the impression is a two-dimensional impression on a surface, lifting methods should be considered for collection.

15.6.3 If the impression is a three-dimensional impression, casting should be considered for collection.

15.7 ADHESIVE AND GELATIN LIFTERS

15.7.1 Lifting involves transferring a two-dimensional impression from its original surface to a surface that will provide better contrast, allow easier transportation, and perhaps aid in preservation. Lifting should be utilized when there is a risk that the impression may be destroyed if the item is collected.

15.7.2 Adhesive lifters are usually vinyl adhesive lifts and fingerprint lift tape. Adhesive lifters work best on non-porous surfaces and work well with impressions that have been processed with fingerprint powder.

15.7.2.1 The adhesive lifter may be cut to be slightly larger than the target impression.

15.7.2.2 A vinyl lifter shall be labeled with identifying information which may include, but is not limited to, the following: the letter marker; the orientation, position, and location of the impression; date; case number; and initials of the person taking the lift.

15.7.2.3 To apply the adhesive lifter, place one edge of the lift on the substrate and slowly smooth down the rest of the lifter over the impression, taking care to press out any air bubbles; a roller may assist in this process. Repeat with overlapping tape lifts, if necessary.

15.7.2.4 While the adhesive lifter is in place, documentary photographs should be taken to show the lifter in place in the scene.

15.7.2.5 To remove the lift, carefully lift it by the corners.

15.7.2.6 Place the adhesive lift on a clean fingerprint card, piece of paper, transparency sheet, or other similar product, depending on which is likely to offer the best contrast for later imaging.

15.7.3 Gelatin lifters are thicker than adhesive lifters, may be used on porous or non-porous surfaces, work well with impressions that have been processed with fingerprint powder, and may work with impressions that have been chemically processed.

15.7.3.1 Gelatin lifters should be selected based on contrast between the impression and the backing color. Black gelatin lifts work well for impressions in drywall dust,

while impressions developed with dark fingerprint powder may best appear on a white background.

15.7.3.2 Best practice is to remove the gelatin lift from its package to allow it to come to room temperature for approximately 5-10 minutes prior to lifting an impression.

15.7.3.3 The gelatin lifter may be cut to be slightly larger than the target impression.

15.7.3.4 The gelatin lifter shall be labeled with identifying information which may include, but is not limited to, the following: the letter marker; the orientation, position, and location of the impression; date; case number; and initials of the person taking the lift.

15.7.3.5 To apply the gelatin lift, first remove the transparent cover. Place one edge of the lift on the substrate and slowly smooth down the rest of the lifter over the impression, taking care to press out any air bubbles; a roller may assist in this process.

15.7.3.6 While the gelatin lifter is in place, documentary photographs should be taken to show the lifter in place in the scene.

15.7.3.7 To remove the lift, carefully lift it by the corners.

15.7.3.8 Place the lift on a horizontal surface with the gelatin layer up. Best practice is to take comparison quality photographs as soon as possible, as the impression will fade over time.

15.7.3.9 Once photography is completed, the transparent cover can be affixed to the lift, being careful to avoid air bubbles.

15.7.3.10 Gelatin lifts will melt between 104-113 degrees Farenheit. Objects that have been exposed to the sun or those temperatures should be cooled before attempting to use a gelatin lifter.

15.7.4 Adhesive and gelatin lifts may be stored at room temperature, though storage in refrigeration is preferable.

15.7.5 If multiple lifts are taken of the same impression, the lifts shall be labeled in order to distinguish which was first, second, etc.

15.8 CASTING- DENTAL STONE

15.8.1 Casting is used to collect a three-dimensional impression. Three-dimensional impressions are commonly found in soil, sand, and snow. Casting may be utilized in three-dimensional impressions as there is no way to collect the impression without disrupting the substrate.

15.8.2 Equipment

Dental stone or other similar forensic casting material

Water
Bucket or disposable plastic bag
Stir stick/disposable spoon/tongue depressor
Adjustable metal forms
Flour sifter (or similar device)
Snow Print Wax

15.8.3 General casting method

15.8.3.1 All supplies should be assembled prior to mixing the casting material.

15.8.3.2 Two (2) pounds of dental stone is placed in a large zipper top plastic bag or other similar disposable container. Approximately ten (10) ounces of water is added to the dental stone (amount depends on substrate conditions). The container is closed and the components are thoroughly mixed until it has the consistency of thin pancake batter. More dental stone or water may be added to reach the desired consistency.

15.8.3.3 The amount of casting material will depend on the size of the impression. The ratio listed in 15.8.3.2 will cast an average shoe impression.

15.8.3.4 Metal forms may be placed around the impression to contain the casting mixture.

15.8.3.5 The mixture is gently poured into the impression. A stir stick or similar item may be held at the edge of the impression, with the mixture poured along the stick to direct the flow and reduce damage to the impression.

15.8.3.6 The mixture is allowed to harden. When the cast is firm but still soft, identifying marks may be scratched into the top surface. When the cast has hardened, identifying marks may be written in permanent marker.

15.8.3.7 While the cast is in place, documentary photographs should be taken to show it in place in the scene.

15.8.3.8 The cast should be allowed to dry for at least twenty minutes in warm weather and longer in cold, wet conditions.

15.8.3.9 The cast should be removed carefully. Any debris should be left in place in the cast.

15.8.3.10 The cast should be packaged in a large paper sack or a cardboard box and it should be allowed to dry for an additional 48 hours. The cast should not be packaged in plastic.

15.8.4 Underwater casting method

15.8.4.1 Impressions that are under water may still be cast. Do not attempt to drain away any of the water as it may disturb the impression.

15.8.4.2 Place a metal form around the impression to contain the casting mixture.

15.8.4.3 Sift or lightly sprinkle dry casting material over the underwater impression until covered by about an inch of the casting material. Mix the casting material to a slightly thicker consistency than typical and carefully scoop the mixture onto the impression.

15.8.4.4 Allow to set for at least one hour.

15.8.4.5 If the impression is in very shallow water, the casting material may be mixed to a slightly thicker consistency than typical and applied as normal, as the mixture will displace the thin layer of water.

15.8.4.6 The mixture must be allowed to harden. When the cast is firm but still soft, identifying marks may be scratched into the top surface. When the cast has hardened, identifying marks may be written in permanent marker.

15.8.4.7 While the cast is in place, documentary photographs should be taken to show it in place in the scene.

15.8.4.8 The cast should be removed carefully. Any debris should be left in place in the cast.

15.8.4.9 The cast should be packaged in a large paper sack or a cardboard box and it should be allowed to dry for an additional 48 hours. The cast should not be packaged in plastic.

15.8.5 Casting impressions in snow

15.8.5.1 Method 1: Sift or lightly sprinkle dry casting material over the snow impression until a thin layer is applied. Wait 1-2 minutes for that layer to harden, then sift or sprinkle dry casting material over the impression again. Repeat until there is no more moisture for the casting material to absorb. Mix the remaining casting material with water and apply slowly to the impression.

15.8.5.2 Method 2: Spray a light coat of Snow Print Wax onto the snow impression. After that coat is dry, apply another coat. Repeat until at least three to four layers of wax have been applied. Allow the wax to set for approximately 10 minutes.

Mix casting material with water so that it is slightly thicker than normal mixture that has been cooled.

15.8.5.2.1 When applying Snow Print Wax, be careful not to hold the can so close that the aerosol damages detail in the impression.

15.8.5.2.2 The reaction of dental stone with water is exothermic. When casting in snow, use cold water or some snow when making the mixture.

15.8.5.3 Allow to set for at least one hour.

15.8.5.4 The mixture is allowed to harden. When the cast is firm but still soft, identifying marks may be scratched into the top surface. When the cast has hardened, identifying marks may be written in permanent marker.

15.8.5.5 While the cast is in place, documentary photographs should be taken to show it in place in the scene.

15.8.5.6 The cast should be removed carefully. Any debris should be left in place in the cast.

15.8.5.7 The cast should be packaged in a large paper sack or a cardboard box and it should be allowed to dry for an additional 48 hours. The cast should not be packaged in plastic.

15.8.6 Casting material comments

15.8.6.1 Once forensic casting material has hardened, it is not reversible. Use the mixture quickly after it is mixed or it may harden in the mixing container.

15.8.6.2 Thicker mixtures and warmer temperatures will cause hardening more quickly compared to thinner mixtures and colder temperatures.

15.9 CASTING- MIKROSIL

15.9.1 Casting is used to collect a three-dimensional impression. Mikrosil is a silicone casting material that is commonly used to collect tool mark impressions when photographic methods may not be appropriate.

15.9.2 Equipment

Mikrosil base (brown, black, white, gray)
Mikrosil hardener
Mixing cards/latent lift cards
Wooden mixing sticks/stir stick/tongue depressor
Snow Print Wax

15.9.3 General casting method

15.9.3.1 All supplies should be assembled prior to mixing the casting material.

15.9.3.2 Brown colored Mikrosil is preferred for casting tool mark impressions.

15.9.3.3 Place a line of Mikrosil sufficient to cover the impression on the mixing card. Place a line of harder next to the line of Mikrosil so that both lines are approximately the same length. Thoroughly mix the two components using a mixing stick for approximately one minute.

15.9.3.4 Remove the mixed Mikrosil from the card and apply to the surface, taking care to work the casting material into or on the impression, without allowing the mixing stick to come in contact with the impression. Ideally, a small amount of Mikrosil will extend out onto the surface, adjacent to the impression, to create a small flap/strip of material.

15.9.3.5 The setting time will be approximately five to eight (5-8) minutes at 68 degrees Farenheit and twelve to fifteen (12-15) minutes at 14 degrees Farenheit.

15.9.3.6 While the Mikrosil is in place, documentary photographs should be taken to show it in place in the scene/on the item.

15.9.3.7 The cast should be removed carefully to avoid damaging it. The flap/strip portion of the cast can be stapled to the front of a latent lift card or the cast can be placed in a small coin envelope/evidence box.

15.9.3.8 If utilizing a latent lift card, it should be filled out as completely as possible and shall include the date and initials of the person collecting the cast, a case number, and a description and diagram of the surface from which the impression was cast. The lift card should also contain significant information about the orientation and/or position of the impression on the surface, ideally including the location of the flap/strip.

15.9.3.9 If placing the cast in a small coin envelope, identifying information, as outlined in 15.9.3.7, should be included on the outside of the coin envelope.

15.9.3.10 Mikrosil casts may become stuck to one another if packaged in a way that they could contact one another. For this reason, each cast should be packaged separately in a small envelope or box.

15.9.3.11 Multiple casts from the same surface/location (e.g. several pry marks on a window frame) may be packaged in the

same outer evidence envelope/sack as long as the casts are contained in individual inner packages.

15.9.4 Safety

15.9.4.1 Do not allow the hardener to contact the eyes or mucous membranes. In case of contact, immediately flush with plenty of water.

15.10 TIRE EXEMPLARS

15.10.1 The tire exemplar provides a record of the characteristics present on the tire at a given time.

15.10.2 The impression a tire leaves will be slightly different depending on whether or not it is under load. If exemplars are being made for purposes other than elimination, they should include the full circumference of the tire when under load; typically this is between six and eight feet in length.

15.10.3 Partial exemplars may be collected for purposes of elimination of non-suspect vehicle tires or for documentation of an obvious exclusion based on tread design differences.

15.10.3.1 A photograph of the tire tread is a sufficient elimination exemplar; a scale should be included in the photograph. Information about the tire and vehicle should be recorded.

15.10.3.2 A white adhesive lift can be used to take a tire elimination exemplar. A large adhesive lift can pick up residual material from a tire, providing a good representation of a section of the tread design. Information about the tire and vehicle should be recorded.

15.10.4 When it is determined that the collection of tire exemplars is to be performed while processing a vehicle, the analyst should ideally first seek the assistance of a Footwear/Tire Tread examiner.

15.10.4.1 It may be beneficial to provide the Footwear/Tire Tread examiner with images of the impression and/or vehicle tires ahead of time. In some cases, the collection of full exemplars may be deemed unnecessary. This decision shall only be made by someone trained as a Footwear/Tire Tread examiner.

15.10.4.2 If comparison of individual characteristics will be requested, the collection of the tires is required even when tire exemplars have been collected. The conclusions of a subsequent comparison may be limited if the tires are not available for examination.

15.10.5 Equipment

Broom

Kraft paper

Duct tape
Work gloves
Scissors/utility knife
Chart board
Wet media film
Tape or chalk (for marking sidewalls)
Permanent markers
Cloth measuring tape

Method 1 equipment:

Petroleum Jelly or Silicone Oil
Magnetic Fingerprint Powder
Magnetic Fingerprint Powder Brush
Clear Lacquer Spray

Method 2 equipment:

Black Printer's Ink
Clear Plastic Sheeting

15.11 An appropriate facility/surface and several preparatory steps must be completed prior to beginning the collection of tire exemplars.

15.11.1 A facility or an area with an adequate surface to collect tire exemplars must be secured. A smooth area of asphalt or concrete is sufficient and should be swept clean. The size of the area needed will depend upon the vehicle and tires, but will need to be at least long enough to permit one full tire rotation with enough extra room to bring the vehicle to rest off of the exemplar.

15.11.1.1 The vehicle bays in a fire department are often sufficient for this process.

15.11.2 Roll out enough paper to keep the tires from collecting debris while moving. Secure the paper with tape.

15.11.3 Clean the tires by rubbing them lightly while wearing work gloves. Cleaning should be to remove surface debris only. Rocks in the tread or other similar items should be left in place.

15.11.4 Measure the circumference of the tire(s) of interest using a cloth measuring tape.

15.11.5 Measure the wheel base of the vehicle.

15.11.6 Mark the tire with tape at five to six points equidistant around the tire and label them alphabetically (e.g. A-F). The number of points may vary at the Tire Tread Examiner's discretion, depending on the size and design of the tire. Document the location of the labels on the tire with enough detail (e.g. close photography) that the labels can be recreated and/or replaced at a later date.

15.11.7 Record the information from the vehicle and tire side wall:
Make/model/year of the vehicle
Make/model of the tire
DOT number of the tire
P-metric tire size designation
Mold numbers (when possible)

15.12 Making exemplars using the petroleum jelly/silicone oil, fingerprint powder on wet media film method- Method 1

15.12.1 It is important to use only a small amount of petroleum jelly/silicone oil or detail will be lost or obscured. This method provides good detail and a transparent background that facilitates the comparison process.

15.12.2 Tape sections of chart board together to achieve a length slightly longer than the tire circumference, typically four to six extra inches. If using wet media film, secure a length of film on top of one of the lengths of chart board.

15.12.3 Using gloved hands, rub a very small amount of petroleum jelly or silicone oil to coat one or both of your hands.

15.12.4 Thoroughly rub the tread surface of the tire so that an even, thin coating is applied to the full circumference.

15.12.5 Place an end of chart board (with film) just in front of the tire.

15.12.6 Drive the vehicle in a continuous motion over the chart board, depositing an impression on the film. As the tire rolls, mark the locations on the exemplar where the A-F labels on the tire correspond.

15.12.7 Develop the impression by powdering it with magnetic fingerprint powder.

15.12.8 Spray three to four coats of a fixative, such as a clear lacquer, to preserve the exemplar and allow it to dry as per the manufacturer's instructions prior to handling or packaging. The impression will be damaged if it is touched before it is dry.

15.12.9 Mark the exemplar with pertinent case information that includes the location and orientation of the tire.

15.12.10 Two exemplars from each tire are recommended. The exemplars should be off-set so that they do not end in the same location.

15.12.11 Repeat the process for each tire as necessary.

15.13 Making exemplars using black printer's ink- Method 2

15.13.1 Tape sections of chart board together to achieve a length slightly longer than the tire circumference, typically four to six extra inches. Repeat this step.

15.13.2 Apply a thin layer of printer's ink to one of the sets of chart board; this will become an inking pad.

15.13.3 Tape clear plastic sheeting to the other set of chart board.

15.13.4 Line the chart board sets up so that the tire is inked and then rolls over the plastic sheeting.

15.13.5 Drive the vehicle in a continuous motion over the chart board, depositing an impression on the film. As the tire rolls, mark the locations on the exemplar where the A-F labels on the tire correspond.

15.13.6 Mark the exemplar with pertinent case information that includes the location and orientation of each tire.

15.13.7 Two exemplars from each tire are recommended. The exemplars should be off-set so that they do not end in the same location.

15.13.8 Allow the ink to dry prior to packaging; this may take overnight or longer.

15.13.9 Repeat the process for each tire as necessary

15.14 Documentation for tire tread exemplars

15.14.1 The following information shall be recorded in the case notes regarding the exemplars:
Method of exemplar collection.
Number of exemplars collected from each tire.
Tire sidewall information (as outlined in Section 15.11.7)
Vehicle information (as outlined in Section 18.2.2)

15.14.2 The following information shall be recorded on each exemplar collected:
Case #/Lab #
Date of collection.
Initials of the person collecting the exemplar.
Location of the tire on the vehicle (e.g. driver side front, passenger side rear, etc.)
Direction of travel.
Where on the exemplar the specific tire locations designated (e.g. A-F) correspond.
Direction toward the front of the vehicle.
Indication of the outside and inside edge of the impression (as the tire is mounted on the vehicle).

15.15 Tire exemplars must be completely dried prior to packaging.

15.16 Tire exemplars may be rolled for packaging. Tire exemplars should be packaged in an evidence sack, cardboard box, or other similar evidence package sufficient to hold the rolled exemplars.

16.0 Trace Evidence

16.1 Trace evidence consists of a wide variety of materials, is usually very small, and may be a fragment of a larger item.

16.1.1 Trace materials include, but are not limited to, hairs, fibers, glass fragments, metal shavings, wood shavings, paint chips, soil, and vegetation.

16.1.2 Trace materials may be easily dislodged. Care should be taken to avoid loss, contamination, and cross-contamination.

16.2 A strong white light may be utilized at an oblique angle in order to visualize trace evidence. If a particular type of evidence being searched for would react with a different wavelength of light, an alternate light source (ALS) may be utilized.

16.2.1 A flashlight or the white light setting on an ALS are the most common sources for a strong white light.

16.2.2 An ALS may only be utilized by analysts who have received training in the appropriate use of an ALS.

16.2.2.1 When using an ALS to observe an item/surface, the appropriate goggles will be used, depending on wavelength.

WAVELENGTH	CORRESPONDING FILTER
<400nm	yellow or clear UV safe
400-450nm	yellow
450-540nm	orange
>540-700nm	red

16.2.2.2 No one wavelength will affect every type of fiber. When searching for fibers, a wide range of wavelengths should be utilized.

16.2.2.3 Dark colored hairs may not react in the same way as light colored hairs. An ALS may be effective for searching for light colored hairs, but a strong white light may be preferable when searching for dark colored hairs.

16.2.2.4 Permanent eye damage can occur from reflected, refracted, or direct illumination by the ALS to the eye. Extreme care should be taken around highly reflective surfaces. An analyst should never look directly into the light or allow beams to bounce off the surface into his/her own eyes or another person's eyes.

16.3 Trace evidence may be collected using a variety of methods, depending on the type of material and the surface.

16.3.1 Individual items of trace material may be picked up using forceps.

16.3.2 Individual items (e.g. hairs) may be picked up by folding an adhesive paper (i.e. Post-It Note) around the item so that it is sandwiched between the two sides of the adhesive paper.

16.3.3 Adhesive lifts may be used to collect trace from a large surface area.

16.3.3.1 "Lint rollers" and clear adhesive lifts may be utilized to collect possible trace from large areas.

16.3.3.1.1 Clear packing tape (or similar tape) will not be utilized due to the type of adhesive material it has and the damage it may inflict to trace evidence.

16.3.3.2 The lift or roller is applied to the surface and light pressure is applied. The lift or roller may be utilized until its tackiness is reduced or until collection from the surface has been completed.

16.3.3.3 Each adhesive sheet from a lint roller should be placed in a plastic pouch/sleeve to prevent adhesion to evidence packaging. Adhesive lifts should have a clear cover affixed.

16.3.3.4 Lint rollers should be new to avoid any potential cross-contamination.

16.3.3.5 Sheets of trace material will be labeled based on the area from which it was collected. Each adhesive lift or lint roller sheet should be placed in its own envelope to avoid cross contamination.

16.4 Trace materials will be placed in an inner evidence container.

16.4.1 Due to the small nature of trace evidence, it is more likely to be lost in a standard evidence envelope if it is not contained in a smaller inner container.

16.4.2 A druggist's fold, coin envelope, glassine envelope, vial, or similar container may be used as inner packaging for individual trace evidence.

16.4.3 A large manila envelope may be used as inner packaging for adhesive lifts.

16.5 Trace material may be packaged in a variety of outer evidence containers, such as evidence envelopes or sacks, depending on the size/type of inner container utilized.

16.5.1 Multiple containers of individual items of trace evidence may be packaged in the same outer evidence container if they were collected from the same area.

16.5.1.1 For example, three individual hairs taken from the victim's right hand, each placed in their own glassine envelope, may all be placed in one evidence envelope.

16.5.2 Adhesive lifts or lint roller sheets may be packaged in the same outer evidence container if they were collected from the same area.

16.5.2.1 For example, four adhesive lifts taken from the driver's seat in a vehicle may all be placed in one evidence envelope or sack.

17.0 Firearms and Tool Mark Evidence

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- 17.4.3

18.0 Vehicle Processing

18.1 Vehicles may hold an abundance of evidence, depending on the amount of contact the suspect and/or victim may have had with the vehicle. A vehicle should be examined thoroughly and should be treated in all aspects like a stand-alone crime scene.

18.2 A vehicle should be properly documented using photography, notes, and sketches/diagrams (as appropriate) prior to searching the vehicle and collection of any evidence.

18.2.1 A vehicle should be photographed as outlined in Section 8 of this manual. Section 8.30 outlines the specific photographs that should be taken of a vehicle.

18.2.2 Notes should include the location and condition of seals, including the time they were broken. Vehicle descriptions will include the year, color, make, model, license plate number, and Vehicle Identification Number (VIN); note if the VIN plate/sticker and/or license plate(s) are missing. The general condition of the vehicle and its contents will be noted.

18.2.3 Sketches/diagrams may be utilized as appropriate, depending on case circumstances. Diagrams of a variety of styles of cars, trucks, vans, and sport utility vehicles are available and may be printed out and used for efficiency. Sketches may be utilized to supplement notes as appropriate.

18.2.4 Consideration should be made to document the location/position of vehicle components (e.g. driver's seat) in case its location/position is relevant to the investigation. During processing, components may be moved/altered.

18.3 The Vehicle Identification Number (VIN) is available on a plate affixed to the driver's side of the dashboard (near the windshield), on the edge of the driver's door, and in the engine compartment.

18.3.1 Current models of vehicles have a standard VIN of 17 characters. Vehicles manufactured prior to 1981 might have fewer characters.

18.3.2 The 10th character of the VIN indicates its model year.

- A: 1980 or 2010
- B: 1981 or 2011
- C: 1982 or 2012
- D: 1983 or 2013
- E: 1984 or 2014
- F: 1985 or 2015
- G: 1986 or 2016
- H: 1987 or 2017
- J: 1988 or 2018
- K: 1989 or 2019

- L: 1990
- M: 1991
- N: 1992
- P: 1993
- R: 1994
- S: 1995
- T: 1996
- V: 1997
- W: 1998
- X: 1999
- Y: 2000
- 1: 2001
- 2: 2002
- 3: 2003
- 4: 2004
- 5: 2005
- 6: 2006
- 7: 2007
- 8: 2008
- 9: 2009

18.4 A systematic approach to searching a vehicle may be accomplished by dividing the vehicle into areas based on the occupants/areas (e.g. driver, front passenger, rear driver side, rear passenger side, third row driver side, third row passenger side, cargo area, trunk, etc.).

18.4.1 Areas associated with the driver should be labeled as "driver", rather than as "driver's side" (e.g. driver's door rather than driver side front door).

18.5 The extent of the examination and/or processing of the vehicle will be dictated by the type of crime and/or types of evidence that may be present.

18.5.1 Areas that are often overlooked include the headliner, visors, sunroof, engine compartment, and undercarriage.

18.6 A strong white light may be utilized at an oblique angle in order to visualize small evidence. If a particular type of evidence being searched for would react with a different wavelength of light, an alternate light source (ALS) may be utilized

18.6.1 A flashlight or the white light setting on an ALS are the most common sources for a strong white light.

18.6.2 An ALS may only be utilized by analysts who have received training in the appropriate use of an ALS.

18.6.2.1 When using an ALS to observe an item/surface, the appropriate goggles will be used, depending on wavelength.

WAVELENGTH	CORRESPONDING FILTER
<400nm	yellow or clear UV safe
400-450nm	yellow
450-540nm	orange
>540-700nm	red

18.6.2.2 Permanent eye damage can occur from reflected, refracted, or direct illumination by the ALS to the eye. Extreme care should be taken around highly reflective surfaces. An analyst should never look directly into the light or allow beams to bounce off the surface into his/her own eyes or another person's eyes.

18.7 Trace evidence may be present on the interior surfaces of the vehicle and/or on items found in the vehicle.

18.7.1 Trace evidence should be examined and collected as outlined in Section 16 of this manual.

18.7.2 One piece of adhesive collection material may be used to collect trace evidence from one area in a vehicle (e.g. driver's seat cushion/backrest, rear passenger side floorboard, cargo area floor, etc.).

18.8 Biological stains may be present on the interior and exterior surfaces of the vehicle and/or on items found in the vehicle.

18.8.1 Biological evidence should be examined and collected as outlined in Section 11 of this manual.

18.8.2 Presumptive blood tests should be conducted as outlined in Section 9 of this manual.

18.9 Latent prints may be present on the interior and exterior surfaces of the vehicle, and/or on items found in the vehicle.

18.9.1 Latent print processing should be conducted as outlined in Section 14 of this manual.

18.10 Gunshot residue (GSR) may be present on the interior and exterior surfaces of the vehicle, and/or on items found in the vehicle.

18.10.1 Collection of GSR samples should be conducted as outlined in Section 17 of this manual.

19.0 Human Remains and Buried Body Excavations

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20.0 Entomology

20.1 Insect activity that takes place in, on, and around a dead body may assist a forensic entomologist in determining time since death.

20.1.1 In the absence of a forensic entomologist on scene, responders can collect specimens to be sent for later analysis.

20.2 Flies may begin laying eggs on the body within 20 minutes of death. Flies target any warm, moist areas of the body.

20.2.1 Flies will lay eggs in the nostrils, eyes, mouth, or any opening that is available on the body. If eggs are present in an area that is not a natural opening to the body, it is likely the site of an injury.

20.2.2 Eggs develop into larvae (i.e. maggots). The maggots will be present together in a mass. When the maggots mature, they leave the body.

20.2.3 When the maggots leave the body, they enter the soil or other surrounding areas where they will pupate, forming a hard casing from which a fly will later emerge.

20.2.4 With careful collection of both living and preserved maggots, pupae casings, and adult flies, a time of death may be determined.

20.2.5 Usually, half of the specimens are preserved, while half are kept alive in order to allow them to mature.

20.3 Collection of specimens should occur immediately upon discovery, as adult flies will relocate quickly once the body is disturbed.

20.3.1 Collection of larvae

20.3.1.1 The temperature of the larval mass should be noted. Larvae (~50-60, minimum) can be collected with forceps or by using a moistened paint brush.

20.3.1.2 Live samples (~20-30) should be placed in a container with moisture and a food source (e.g. piece of liver and moistened paper towel).

20.3.1.3 The same approximate number of larvae (~20-30) should be collected for preservation. They should be placed in vials of ethyl or isopropyl alcohol.

20.3.1.4 The site of collection from the body should be noted.

20.3.2 Collection of pupae

20.3.2.1 Pupae are usually found in drier environments, away from the maggot mass; they may be found in clothing and surrounding soil.

20.3.2.2 Live specimens require moisture and air, but also demand careful sealing, as adult flies can emerge from the pupae at any time.

20.3.2.3 Samples collected for preservation should be placed in vials of ethyl or isopropyl alcohol.

20.3.3 Collection of adult flies

20.3.3.1 An insect net can be utilized to catch adult flies.

20.3.3.2 Live specimens require moisture and air, but also must be carefully sealed to avoid escape.

20.3.4 Soil samples from a variety of areas, including beneath the body and at distances of approximately three feet around the body, should be collected and placed in small containers. The location of collection should be noted on the container.

20.4 Considerable notes should be taken to document the environment in which the insects have been living.

20.4.1 Note if the area is shaded or sunlit, the nature of the foliage (e.g. wooded, grassy), the weather conditions (including soil and air temperature), and the condition of the body (e.g. buried, partially buried, clothed).

20.4.2 Each specimen should have a notation as to the date and time collected, the stage of development, and the specific location on the body.

20.5 Entomology samples may be packaged in a variety of outer evidence containers, such as evidence sacks or boxes, depending on the size/type of vial or collection container used.

21.0 Fire and Arson Investigation

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- 21.3.3

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- 21.4.1
- 21.4.2
- 21.4.3

22.0 Documentation and Evidence Collection from Victims, Subjects, and Suspects

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22.1.2

22.1.3

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23.0 Validation

23.1 Procedures for the validation and/or performance verification of methods used in ISP Forensic Services are outlined in the ISP Forensic Services Quality/Procedure Manual.

23.2 Validation/performance verification data, results, and summaries for methods employed for Crime Scene will be maintained in that section.

24.0 Forms

24.1 Form note pages may be utilized to supplement the note-taking process. The use of forms is not required and may be utilized based on responder preference.

24.2 Forms that are being tested may be stored on a shared computer drive. Approved forms are stored in the quality system.

24.3 Approved forms:

- Crime Scene Notes Check List
- Evidence Collection Notes page
- Presumptive Blood Testing Notes page
- Vehicle Diagrams
- Clan Lab Notes Check List

25.0 Equipment Calibration and Maintenance

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- 25.4.2
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26.0 Chemicals, Supplies, and Reagent Preparation

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- 26.1.3

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- 26.2.2
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- 26.3.1
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- 26.3.3

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27.0 Report Writing

27.1 Crime scene documentation and report writing will be according to the ISPFS Quality Manual.

27.2 Reports will be entered in the Field Services matrix of the case assignment in the ILIMS system.

27.3 Reports shall be as clear and concise as possible, but shall include enough detail to adequately describe the scene, evidence, and activities performed. The reader should be able to clearly understand the scene from the report, without having to reference photographs or sketches.

27.4 Reports will be written in the first person and will be in an active voice. If multiple people performed tasks, the report will indicate which people performed which tasks. Only the tasks performed by ISPFS personnel will be included in the report.

27.5 All time notations will be in military time and will include the time zone abbreviation (e.g. MST, PST).

27.6 Reports will not contain any information that is not represented in the crime scene notes, which includes the crime scene sketch.

27.7 Reports do not need to be broken down into sections with headings, unless the report is so complicated that the additions of section headings would help the reader to better understand the report.

27.7.1 If headings are used, recommended headings would be “Scene Description”, “Victim(s)”, “Evidence”, and “Scene Activities”.

27.8 Reports will be organized in the following order, including only those sections and information relevant to the activities performed:

27.8.1 Basic scene and response information, including date, time, names of analysts responding to the scene, location, type of investigation, personnel who were present at the scene, how the scene was secured, and environmental conditions.

27.8.2 Description of vehicles, buildings, and other scenes

27.8.2.1 Vehicle descriptions will include the year, color, make, model, license plate number, and Vehicle Identification Number (VIN). The vehicle’s location and the condition of any seals will be noted, including the time the seals were broken. The general condition of the vehicle and its contents will be noted.

27.8.2.2 Building descriptions will include the type of building, the number of stories, the direction it faces, the type of location, and the number and types of rooms contained therein. The general condition of the building and rooms of

importance will be noted. Specifically note any damage that may be pertinent to point of entry or exit.

27.8.2.3 Other types of scenes will be described using cardinal directions referenced from a landmark or location or described generally, including GPS coordinates.

27.8.3 Description of rooms of importance

27.8.3.1 Starting with the doorway to the room, moving around the room (either clockwise or counterclockwise), describe the furniture and items in the room, including structures. For fixed items, like doors and windows, use *present tense* to describe. For items that are moveable, use *past tense* to describe, as the report only indicates their location at the time you were on scene. Note condition of lights (on, off), window shades (up, down, open, closed), appliances, etc.

27.8.4 Description of Victim(s)

27.8.4.1 Describe the body's position in the scene. Describe all clothing, visible jewelry, and accessories. Note the location of any visible injuries and note the presence of apparent blood or other fluids, if present.

27.8.5 Description of items of evidence in the scene

27.8.5.1 Describe the item of evidence sufficiently that it can be distinguished from other similar items of evidence. Use serial numbers or identifying numbers, brands, or labels, as applicable. Include evidence markers with descriptions.

27.8.5.2 If the investigating agency assigns their own item number to an item of evidence, that number may be included so that the items can be easily correlated with that agency's reports.

27.8.6 Scene Activities

27.8.6.1 Photography

27.8.6.1.1 Include a general statement that the scene or vehicle was photographed for overall location, identification, and condition.

27.8.6.1.2 If any victims, suspects, or subjects were photographed, note that they were photographed for overall identification and condition. If there is something specifically photographed that is pertinent to the investigation, it should be specifically included in the report.

27.8.6.1.3 If any photographs are taken of fingerprints, footwear, tire tracks, or tool marks, make note that comparison quality photographs were taken of that evidence, and from what location(s) in the scene.

27.8.6.2 Presumptive Test for Blood

27.8.6.2.1 All items that were tested must be noted. If there are a small number of items, they may be listed individually. If there are a large number of items, they may be grouped to indicate a number of items from a particular location within the scene.

27.8.6.2.2 Positive results will be reported by individual items, if there were few items, or by quantity and location, if there were numerous items.

27.8.6.2.2.1 Positive results will use the term "indicating" in regards to the presence of blood.

27.8.6.2.3 Negative results will either be reported indicating that for all other items tested, blood was not detected, or that for specific items/areas, blood was not detected.

27.8.6.3 Evidence Collection

27.8.6.3.1 Each item of evidence that is collected from the scene will be listed in the report.

27.8.6.3.2 If multiples of the same type of evidence were collected (e.g. swabs, adhesive lifts, latent lift cards, etc.), they may be grouped to indicate the number of items from a particular location within the scene.

27.8.6.3.3 If the location of a particular piece of evidence is significant, its measurement to a reference point will be included in the report.

27.8.6.3.4 Note the person to whom evidence was turned over and at what time.

27.8.7 Final Notes

27.8.7.1 Note the time that you cleared the scene.

27.8.7.2 If digital images were transferred to the investigating agency, note the person/agency and the time that the images were transferred.

27.8.7.3 Note that all digital images were uploaded to the digital imaging system.

27.8.7.4 If a CD/DVD/thumb drive of images was made for the agency, indicate which type of media was used, to whom it was given, and on what date/time.

27.9 The following are basic report writing examples. There may be situations that do not fit the examples given and wording will be developed as the need arises. (Blanks and items in parentheses indicate a choice or description should be entered).

Basic Scene Information

On (date), (other analyst title/name and) I responded to (location – address, city, county, Idaho) to assist with a (type) investigation. (People/agency) were present upon my arrival and the scene was (cordoned off with crime scene tape/secure). The weather was _____ and the temperature was approximately _____ degrees F.

Description of Scene- Vehicle

Vehicle 1 (V1) is a (year) (color) (make) (model), (license plate state/number), VIN: (17 characters, tenth character is vehicle year). V1 was located at (location) and (each door/trunk/hood) was sealed upon my arrival; I broke the seals at (time).

Description of Scene- Building

(Location) is (single/two/three) story home that faces (direction) in a residential neighborhood. The house consists of (number and type of rooms).

(Location) is a(n) (apartment/condominium) that faces (direction) in a multi-unit complex.

(Location) is a commercial building that faces (direction). The building consists of (number and type of rooms).

Description of Scene- Other

…an undeveloped area (direction) of (landmark, location).
…a (desert/wooded/etc.) area at (GPS coordinates).

Description of Rooms of Importance

The door to the master bedroom is in the northeast corner of the room. South of the doorway, on the east wall, there is a closet door and the door to the master bathroom. There are two windows on the south wall. A freestanding mirror was in the southeast corner of the room, south of the bathroom door. A bed was against the west wall, extending eastward into the room. A nightstand with a lamp (powered on) was against the west wall, north of the bed.

Description of Body

The victim, tentatively identified as (First Last) was lying on the floor, north of the bed, with his head to the west and his feet to the east. His head was turned so that the right side of his face was against the floor. His right arm was bent at the elbow, his right hand resting palm side up, next to his right hip. His left arm was straight at his left side. His right leg was straight, and his left leg was bent slightly at the hip and the knee. The victim was wearing a dark blue hooded sweatshirt, blue jeans with a black belt, gray socks, and gray athletic shoes. A gold colored chain was visible around his neck. There was an area of apparent blood on the left side of his mouth and on his right hand, at the base of his thumb.

The victim, an unidentified (female/male)…

Description of Items of Evidence in the Scene

In the master bedroom, there was a Glock G43 semi-automatic handgun (SN ABC123) on the nightstand (Marker 4/ PPD Item 2), a box of ammunition on the floor (Marker 5), and one cartridge case on the floor (Marker 6). Swabs of apparent blood were collected from the closet door exterior handle (Marker 12), closet door frame (Marker 13), and baseboard south of closet (Marker 14).

Photography

I photographed the (scene/vehicle) for overall location, identification, and condition.

I photographed the (victim/suspect) for overall identification and condition.

I took comparison quality photographs of (footwear/tire track/fingerprints) from (location in scene)

Presumptive Test for Blood

I performed a presumptive test for the presence of blood on (number) items from (locations). Positive results, indicating the presence of blood, were obtained on (number) stains from (locations). Blood was not detected on the other items tested. Swabs were collected from (locations).

Results from presumptive chemicals tests for the presence of blood were (negative/inconclusive) for (locations).

Evidence Collection

I collected twelve latent lifts: four from exterior of the window east of the front door, six from the master bedroom, and two from the kitchen. I collected three (gel lifts) of footwear impressions (Markers A-C) from the floor east of the front door of the residence.

All evidence collected was turned over to (person/agency) at (date/time).

Final Notes

I cleared the scene at (time).

I transferred digital images to (person/agency) on (date).

I uploaded all digital images to the digital imaging system and provided a (CD/DVD) of the images to (person/agency) on (date).

28.0 Review

28.1
- 28.1.1
- 28.1.2
- 28.1.3

28.2
- 28.2.1
- 28.2.2
- 28.2.3

28.3
- 28.3.1
- 28.3.2
- 28.3.3

28.4
- 28.4.1
- 28.4.2
- 28.4.3

29.0 Proficiency Testing

29.1
- 29.1.1
- 29.1.2
- 29.1.3

29.2
- 29.2.1
- 29.2.2
- 29.2.3

29.3
- 29.3.1
- 29.3.2
- 29.3.3

29.4
- 29.4.1
- 29.4.2
- 29.4.3

30.0 Safety

30.1
- 30.1.1
- 30.1.2
- 30.1.3

30.2
- 30.2.1
- 30.2.2
- 30.2.3

30.3
- 30.3.1
- 30.3.2
- 30.3.3

30.4
- 30.4.1
- 30.4.2
- 30.4.3