

FIREARM & TOOLMARK SECTION STANDARD OPERATING PROCEDURES

Serial Number Restoration Protocol

Serial Number Information

INTRODUCTION

While some manufacturers have serial numbered their firearms for hundreds of years, the Gun Control Act of 1968 made the use of serial numbers on all firearms mandatory. Under current federal law serial numbers must be located on the frame or receiver of every firearm. Serial numbers (or partial numbers) can also be located on many other parts of firearms as well. Lack of a serial number with no indications of intentional obliteration are a good indicator that a rifle or shotgun was manufactured before 1968.

Firearms may be serial numbered via a variety of methods. The numbers may be stamped, rolled, punched (like a dot matrix printer) or laser etched. Some modern manufacturers are even bar coding their serial numbers. Numbers and letters used in a serial number may exhibit a variety of shapes, sizes, fonts, serifs, and appearances. It may be helpful to the examiner that is attempting to restore a serial number to find similar reference collection firearms to see what the digits are supposed to look like. It may also be advisable to check the serial numbers of previous submissions to learn what structure or formats that were used on the make and model of firearm in question.

SERIAL NUMBER LOCATIONS

REVOLVERS

Serial numbers are often located on the butt, but may also be located on the side of the frame. Some older single action revolvers have a serial number located on the frame just in front of the trigger guard. Some older top-break revolvers have serial numbers located on the top strap, beneath the cylinder. Older Smith and Wesson revolvers (made before approximately 1980) often have multiple serial numbers located on the butt, bottom of the barrel, face of the cylinder and the back of the extractor star. Colt revolvers often have the number on the crane and the frame adjacent to the crane. Charter Arms revolvers generally have the serial number on the right side of the frame just above the trigger.

PISTOLS

Serial numbers are generally located on the frame, often on the right side. Serial numbers can also be located on the back of the handle (Ravens and Davises), the underside of the slide or slide rail, on the barrel, in a plate on the bottom of the frame forward of the trigger guard (Hi-Point polymer pistols) and sometimes on the top or side of the slide. Some pistols such as the Kel-tec have the serial number on the back of the frame below the striker. Grendel pistols have the number on the left side of the frame in a small cut out area just behind the slide stop. Some early versions of the AA Arms AP-9 pistol have the number located on the tube. BATF required them to change the location to the frame and they are now located on a plate that is molded into the polymer frame similar to the Intratec Tec-9DC. Newer model Rugers often have a plate molded in to the polymer handle/grip area.

SHOTGUNS AND RIFLES

Many shotguns (Mossberg, Stevens, etc.) have the serial number located on the left side of the frame above the trigger guard. Others (Winchester) have the serial number located on the bottom of the frame forward of the loading port. Many of the old top-break shotguns have the serial number located on the inside portion of the frame as well as the barrel lug. Many of these also have a number on the forearm of the stock. Some old double-barrel

shotguns have the number located near the extractor. Lever-action rifles often have the serial number located on the top or bottom tang. Many of the M-1 carbine rifles made by various manufacturers have the serial number located beneath the rear sight. Many of the imported Eastern Bloc military surplus rifles such as the AK-47 have the main serial number on the left side of the frame, but also have numerous partial serial numbers on many other locations. It should be noted that since the parts of these firearms are so interchangeable, that many may have multiple serial numbers.

THE “OFFICIAL” SERIAL NUMBER

When more than one serial number appears on the firearm, the number stamped on the frame will be considered the “official” serial number. On those few firearms where there may be more than one number stamped on the frame, the number that appears to have been stamped by the manufacturer (rather than the importer or distributor) will be considered the “official” serial number. This double number situation most frequently occurs with Eastern Bloc pistols imported by KBI of Harrisburg, PA. If the examiner is unsure of which number to use, it is advisable to check the evidence log for previously submitted firearms of that make and model.

HIDDEN SERIAL NUMBERS

While most firearms do not have hidden serial numbers, there are several exceptions. These are listed below:

1. As mentioned above, until around 1980 Smith & Wesson revolvers had numbers on the bottom of the barrel just above the cylinder rod, on the face of the cylinder, on the back of the extractor star. Some models also had serial numbers located on the inside of the grips. Care must be taken that grips can be changed, so it's a good idea to make sure at least part of the number corresponds to the number on the metal portions of the firearm.
2. The most commonly seen firearms currently with hidden serial numbers are the Hi-Point polymer framed pistols and rifles. A second serial number is located on the side of the serial number plate that is molded into the frame. On Hi-Point pistols, a portion of the polymer frame in a little window-like indentation on the left side of the pistol can be cut away with a razor blade. The hidden serial number (minus the letter “P”, which precedes the visible number) is revealed. This is true of all of the Hi-Point pistols (380, 9mm, 40 and 45 calibers).
3. Ruger Bearcat revolvers with brass trigger guards have a hidden serial number on the inside top of the trigger guard. This is not true of the Bearcats with stainless steel trigger guards.
4. 380 Auto caliber CZ model 24 (VZ) pistols have a hidden serial number on the underside of the side plate. The visible numbers are located on the frame and top of the slide.
5. Some Smith & Wesson model SW9F pistols made between 1994 and 1997 have a second serial number on a plate on the left side of the frame near the rear part of the slide rail.
6. Some older Colt revolvers have a hidden serial number on the back of the side plate.
7. Some Colt 1911 pistols have been found to have a hidden serial number on the back of the firing pin retaining plate.
8. In the settlement agreement of a law suite against several firearm manufacturers, Smith & Wesson (in 2000) agreed to put a 2nd hidden serial number on its firearms. The 1911 pistol reportedly now has a hidden serial number under the right grip and a micro serial number on the right side. Other steel S&W pistols reportedly have a hidden serial number under the left grip and a micro serial number on the left side. According to Gene Rivera NFEA student, it is necessary to use magnification to see the micro serial numbers.

Protocol for the Examination and Restoration of Serial Numbers In Metals

Many valuable items manufactured today have serial numbers for identification. These numbers are usually die stamped. This process produces a compression of the metal in the area immediately surrounding and a short distance below the penetration of the die. Serial numbers are removed and/or obliterated in a variety of ways. The serial number may be restored if the removal/obliteration is not taken past the previously mentioned compression zone.

A serial number restoration examination consists of the following four elements:

- Preliminary Inspection and Preparation
- Initial Processing Method
- Secondary Processing Method(s)
- Recording of Results and Conclusions

The examiner will utilize the *Serial Number Restoration Worksheet* when doing a serial number restoration examination. The sequence of methods and the result of each method used will be listed in order on the worksheet. Even if no number is restored, at a minimum the examiner will verify that any etchant used was working by observing whether or not the solution bubbled or discolored the metal being etched.

PRELIMINARY INSPECTION AND PREPARATION

1. Initial inspection of the serial number area for coatings, trace material, or any character remnants; as well as possibly determining the method of obliteration.
2. Record the “as received” condition of the obliterated serial number area by notation on the worksheet and/or photographs.
3. The serial number area is cleaned of any coatings by solvent, and the method of obliteration is determined, if possible, and documented on the worksheet. Examine for any character remnants.
4. See “POLISHING” below.

POLISHING

INTRODUCTION

It is desirable to remove the grinding and filing scratches (polish the surface) introduced during obliteration. The polishing procedure can be effective independently but is more often used in conjunction with various chemical restoration procedures.

SAFETY CONSIDERATIONS

The examiner should use eye protection and/or work within a fume hood. The examiner may wish to consider wearing gloves.

PROCEDURE

1. The examiner may want to take photographs of the obliterated area(s) before, during and after the polishing and chemical application processes. These photos serve as a good reminder of what was seen and may serve to record a number before it is lost as the process continues.
2. Note and record any visible characters prior to polishing.
3. Using a dremel type tool with a sanding/polishing disc, polish the area of the obliteration.
3. Depending on the extent of the obliteration, continue polishing until the surface is mirror-like removing all scratches. If the obliteration is severe it may not be possible or desirable to remove all the scratches.

4. Further (finer) polishing may be accomplished with jewelers' rouge on a shop towel. Isopropyl alcohol is used as a medium. Wet/ -Dry sandpaper may also be used.

INTERPRETATION OF RESULTS:

1. If any characters become visible note these characters on the worksheet. If a complete serial number becomes visible, move on to the Recording of Results and Conclusions.
2. If characters do not become visible, proceed to the appropriate chemical restoration procedure.

INITIAL AND SUBSEQUENT PROCESSING METHODS

INITIAL PROCESSING METHOD ELEMENTS

1. Determine serial number medium physical property, i.e. magnetic or non-magnetic.
2. When serial number medium is determined, select the appropriate restoration method/etchant and begin processing.
3. Apply magnetic particle solution (Magnaflux suspension), using a plastic pipette, to the area while applying a magnetic field through the use of the horseshoe magnet.
4. Apply the chemical solution to the area of obliteration utilizing cotton tip applicators or swabs that have been moistened with the chemical solution.
5. During processing, continually inspect the affected area and note any characters or remnants being recovered and document on the worksheet.

SECONDARY AND SUBSEQUENT PROCESSING METHODS

The secondary and subsequent processing methods are optional and are utilized as alternatives if the initial method is not working or is only partially reacting.

RESTORATION METHODS

The die stamping process is a form of "cold-working" metal. A side effect of cold-working is the decrease of that item's ability to resist chemical attack. Therefore the utilization of chemical etching will affect the compressed area of the obliterated number faster and to a greater degree than the non cold-worked area surrounding it. When a magnetic field is applied to an impressed serial number, a deformation occurs in the magnetic field; this results in localized north and south poles at opposing ends of the deformation. Magnetic particles migrate to the poles of the deformation, thereby creating an outline of the serial number.

MAGNETIC PARTICLE INSPECTION (MPI)

The Magnetic Particle Inspection Method is a non-destructive procedure suitable, in conjunction with the polishing procedure, for restoration of serial numbers in steel. MPI is also suitable to be used in conjunction with chemical etchants.

CHEMICAL ETCHANTS

The etchants listed below are in order of strongest to weakest. The preferred protocol is to begin with a weaker etchant and to subsequently move to stronger etchants as necessary. Past experience with certain types of firearms will lead the examiner with which etchant to begin.

Solution B (Fry's Reagent)

The Solution B (Fry's Reagent) procedure is a chemical etching procedure suitable, in conjunction with the polishing procedure, for restoration of serial numbers in steel. It is somewhat stronger than Solution G (Modified Fry's Reagent).

Solution G (Modified Fry's Reagent)

The Solution G (Modified Fry's Reagent) procedure is a chemical etching procedure suitable, in conjunction with the polishing procedure, for restoration of serial numbers in steel. It is somewhat weaker than Solution B (Fry's Reagent).

Cupric Ammonium Chloride Solution (Heyn's Reagent)

This procedure, in conjunction with the polishing procedure, is an effective way to restore an obliterated serial number in stainless steel or cast iron. This solution may be used in conjunction with a rectifier in order to speed up the etching process.

Solution E (Ferric Chloride)

The Solution E (Ferric Chloride) procedure is a chemical etching procedure suitable, in conjunction with the polishing procedure, for restoration of serial numbers in hard cast aluminum, soft steel or brass.

25% Nitric Acid

This procedure is a chemical etching procedure suitable, in conjunction with the polishing procedure, for restoration of serial numbers in steel, aluminum and its alloys.

Solution C (Dilute Nitric Acid)

The Solution C (Dilute Nitric Acid) procedure is a chemical etching procedure suitable, in conjunction with the polishing procedure, for restoration of serial numbers in aluminum and pot metal.

INTERPRETATION OF RESULTS

1. Note on the worksheet whether the etchant was working (bubbles/darkens the metal).
2. If any characters become visible note these characters on the worksheet. If a complete serial number becomes visible, move on to the Recording of Results and Conclusions.
3. If characters do not become visible, proceed to the next appropriate restoration procedure.

GENERAL SAFETY CONSIDERATIONS

These procedures involve hazardous materials, operations and equipment. These procedures do not purport to address all of the safety problems associated with their use. It is the responsibility of the user of these procedures to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use. Proper caution must be exercised and the use of personal protective equipment should be considered to avoid exposure to hazardous conditions. Consult the appropriate MSDS for each chemical prior to use.

The examiner should use eye protection and/or work within a fume hood. The examiner may wish to consider wearing gloves.

NOTE: ALWAYS ADD ACID TO WATER. NEVER ADD WATER TO ACID.

WARNING! Cuprous Chloride is toxic and can pose a SEVERE HEALTH HAZARD.

WARNING! Hydrochloric Acid is toxic and can pose a SEVERE HEALTH HAZARD.

WARNING! Cupric Chloride is toxic and can pose a SEVERE HEALTH HAZARD.

WARNING! Nitric Acid is toxic and can pose a SEVERE HEALTH HAZARD.

WARNING! Nitric Acid is a strong solvent possessing oxidizing properties that can pose a SEVERE HEALTH HAZARD.

WARNING! Cupric Ammonium Chloride is toxic and can pose a SEVERE HEALTH HAZARD.

This table includes mixture ratios and NFPA hazard ratings for all of the above listed reagents used for serial number restoration.

			NFPA Listing			
Solution	Chemical	Amount	Health hazard	Flammability	Reactivity	contact
Fry's Solution - Steel						
B	Cuprous Chloride	2.5 gm	0	0	0	
B	Hydrochloric Acid	16.0 ml	3	0	0	
B	Ethanol	10.0 ml	0	3	0	
B	Water	12.0 ml	-	-	-	
Dilute Nitric Acid - Aluminum & Pot Metal						
C	Conc. Nitric Acid	3 ml	3	0	0	oxy
C	Water	27 ml	-	-	-	
Ferric Chloride - Hard Cast Aluminum & Soft Steel						
E	Hydrochloric Acid	1.2 ml	3	0	0	
E	Water	20 ml	-	-	-	
E	Ferric Chloride (hydrated)	2.8 gm	1	0	1	2
Modified Fry's Solution - Steel						
G	Hydrochloric Acid	10 ml	3	0	0	
G	Water	10 ml	-	-	-	
G	Cupric Chloride	7.5 gm	1	0	0	
25% Nitric Acid Solution - Steel, Aluminum & its alloys						
25% Nitric Acid	Conc. Nitric Acid	7.5 ml	3	0	0	Oxy
25% Nitric Acid	Water	22.5 ml	-	-	-	
Heyn's Solution						
Heyn's Soln.	Cupric Ammonium Chloride	1 gm	3	1	0	
Heyn's Soln.	Hydrochloric Acid	12 ml	3	0	0	
Heyn's Soln.	Water	12 ml	-	-	-	
Other (Used for polishing)						
Isopropanol	Isopropyl Alcohol		1	3	0	

Note: Preparation of any of these reagents should be properly documented in the appropriate Reagent Log.

Plastic Restoration Methods

POLISHING

INTRODUCTION

Many valuable items manufactured today have serial numbers for identification. These numbers are usually die stamped or embossed. This process produces a compression of the plastic in the area immediately surrounding and a short distance below the penetration of the die. In attempt to conceal the rightful ownership of an item, serial numbers are removed and/or obliterated in a variety of ways. The serial number may be restored if the removal/obliteration is not past the previously mentioned compression zone. It is desirable to remove (polish) the grinding and filing scratches introduced during obliteration. The Polishing procedure can be effective independently but is more often used in conjunction with heat restoration procedures.

SAFETY CONSIDERATIONS

This procedure involves hazardous operations and equipment. This procedure does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use. Proper caution must be exercised and the use of personal protective equipment must be considered to avoid exposure to hazardous conditions.

The examiner should use eye protection or work within a fume hood. The examiner may wish to consider wearing gloves.

PROCEDURE

Note: The examiner may want to take photographs of the obliterated area(s) before, during and after the polishing and heat application processes. These photos serve as a good reminder of what was seen and may serve to record a number before it is lost as the process continues.

1. Note and record any visible characters prior to polishing.
2. If possible, examine the reverse side of the item to see if any characters are visible.
3. Using a dremel type tool with a sanding/polishing disc and/or wet/dry sandpaper, polish the area of the obliteration.
4. Depending on the extent of the obliteration, continue polishing until the surface is as smooth as possible, removing all scratches. If the obliteration is severe it may not be possible or desirable to remove all the scratches.

INTERPRETATION OF RESULTS:

1. If any characters become visible note these characters on the worksheet. If a complete serial number becomes visible, move on to the Recording of Results and Conclusions.
2. If characters do not become visible, proceed to the next appropriate restoration procedure.

HEAT

INTRODUCTION

This procedure, in conjunction with the polishing procedure, is an effective way to restore an obliterated serial number in plastic.

PROCEDURE

Note: The examiner may want to take photographs of the obliterated area(s) before, during and after the polishing and heat application processes.

1. Apply heat to the area of obliteration utilizing a high intensity lamp.
2. Continue the application of heat until the plastic in the obliterated area starts to liquefy.

INTERPRETATION OF RESULTS:

1. Note on the worksheet whether the method was working, i.e., the plastic is deforming/melting.
2. If any characters become visible note these characters on the worksheet. If a complete serial number becomes visible, move on to the Recording of Results and Conclusions.
3. If characters do not become visible, proceed to the next appropriate restoration procedure or note result.

RECORDING OF RESULTS/CONCLUSIONS

1. Record all recovered processed characters and/or character fragments by noting on the worksheet and, if possible, via photography.
2. With restored character fragments, render any conclusions as to possible character types or combinations
3. In case of a partially restored number, research serial number make up in attempt to possible exclude certain characters based on their location in the number. This is accomplished through various resources including previously submitted firearms in the LIMS/PLIMS or older databases or through the firearms reference collection. The ATF Tracing Center is also an option. Note the reference(s) used on the worksheet.
4. Through research and all appropriate processing methods, render a final conclusion.
5. If the serial number is complete or nearly complete, the examiner should check the result with NCIC.
6. If an NCIC hit is made, get a copy of the hit information from the records clerk and attach the documentation to the worksheet.
7. Issue a laboratory report reflecting the examiner's results and/or conclusions.

POSSIBLE RESULTS – SERIAL NUMBER RESTORATION

This section is included as a guide for the most frequently reported results. It should not be construed to be all-inclusive or limiting to the examiner in reporting examination results.

- Item XXX was examined and found to exhibit an obliterated area on the XXX (part) of the firearm.
- The obliterated area was polished and treated with (a) chemical etchant(s). This process revealed the following (partial) serial number: XXX.
- The obliterated area was polished and treated with (a) chemical etchant(s). This process *failed* to reveal a readable serial number.
- A check with NCIC of serial number XXX revealed no record of this firearm.
- A check with NCIC of serial number XXX revealed that a firearm matching the description of Item XXX was reported stolen by... (Give NCIC info)

REFERENCES

Books

1. Brandt, D., Metallurgy Fundamentals, Goodheart-Wilcox Co., Inc., 1992.
2. Doane, F.B., Principles of Magnaflux Inspection, Photopress Publishing, Inc., 1940.
3. Hatcher, J.S., Jury, F.J., and Weller, J., Firearms Investigation, Identification and Evidence, 2nd edition, Stackpole Books, Harrisburg PA, 1977.
4. Hein, Morris, et al., Foundations of College Chemistry, Dickenson Publishing Co., 1977.
5. Kegser, C.A., Basic Engineering Metallurgy - Theories, Principles and Applications, 6th edition, Prentice Hall, Inc., Englewood Cliffs, N.J. 1957.
6. Kehl, G.L., The Principles of Metallographic Laboratory Practice, 3rd edition, McGraw-Hill, New York, 1949.
7. Kotz and Purcell, Chemistry and Chemical Reactivity, Saunders College Publishing, 1991.
8. Krcma, V., The Identification and Registration of Firearms, Charles C. Thomas, Springfield, IL, 1971.
9. Matthews, J.H., Firearms Identification, Volume I, Charles C. Thomas, Springfield, IL, 1962 pp.77-80.
10. Polk, D.E., and Giessen, B.C., Metallurgical Aspects of Serial Number Recovery, Institute of Chemical Analysis-Northeastern University, Boston MA (undated).
11. Treptow, R.S., Handbook of Methods for the Restoration of Obliterated Serial Numbers, NASA, 1978.
12. Vander Voort, G.F., Metallography. Principles and Practice, McGraw-Hill, 1984.
13. Van Vlack, L.H., Elements of Materials Science and Engineering, Addison-Wesley Publishing Company, 1985.

Professional Journals

1. Katterwe, H., "Modern Approaches For the Examination of Toolmarks and Other Surface Marks," Forensic Science Review, Vol. 8, No. 1, Jun. 1996, pp. 46-71.
2. ---. "The Recovery of Erased Numbers in Polymers," Journal of Forensic Science Society, Vol. 34, 1994, pp. 11-16.
3. Krcma, V., "The Identification of Pistols by Serial Numbers and Other Markings," Journal of Forensic Sciences, 1961.
4. "Metallurgy vs. Crime," FBI Law Enforcement Bulletin, Vol. 19, No. 11, Nov. 1950, p. 8.
5. "Restoring Altered and Obliterated Markings on Metal," FBI Law Enforcement Bulletin, Vol. 25, No. 7, Jul. 1956, p. 13.
6. Thorton, J.I., and Cashrnan, P.J., "The Mechanism of the Restoration of Obliterated Serial Numbers by Acid Etching," Journal of the Forensic Science Society, Vol. 16, No. 69, 1976.
7. Turley, D.M., "Restoration of Stamp Marks on Steel Components by Etching and Magnetic Techniques," Journal of the Forensic Sciences, Vol. 32, No. 3, May 1987.

8. Young, S.G., "The Restoration of Obliterated Markings by Ultrasonically
9. Induced Cavitation in Water," Journal of Forensic Sciences, Vol. 19, No. 4, 1974, p. 820.

AFTE Journal

1. Barabash, T., and Fahey, R.T., "Non-Destructive Methods of Restoring Defaced Serial Numbers," 1977; 9(1):23.
2. Brundage, D.J., "Surface Preparation for Serial Number Restoration," 1982; 14(4):9.
3. Cantor, A., "Serial Number Restoration with Image Enhancement on the FBI Drugfire Computer," 1997; 29(2):223-230.
4. Collins, J.M., "Modern Marking and Serial Numbering Methods," 1999; 31(3): 309-317.
5. Cook, C.W., "Chemical Etching Reagents for Serial Number Restoration," 1975; 7(2):80.
6. Deats, B., "Serial Number Restoration Information," 1980; 12(3):82.
7. Desrochers, C. et.al., "Serial Number Restoration in Plastic using a Heat Gun," 2000; 32(4):367.
8. Dragan, P., "Abrasive Wheels for Serial Number Restoration Preparation," 1996; 28(1):21.
9. Garland, P.V., "Training the Firearms Examiner," 1971; 3(1):32.
10. Gibson, W.M., "Serial Number Restoration in Plastic," 1999; 31(3):378.
11. Hall, James, M., "'Hidden Serial Number' on a VZ 24", *AFTE Journal*, Volume 27, Number 1, pages 72-73.
12. Harden, L.R., "Reader Reporter," 1988; 20(2): 171-173.
13. Heflin, T.M., "Examination of Serial Number Over-Stamp," 1984; 16(3):12.
14. Hueske, E.E., "Browning Firearms Serial Numbering System," 1988; 20(1):59-60.
15. Jinks, Roy G., Letter to AFTE Journal Editor, Volume 12, Number 2, page 14.
16. Keisler, M.A., "Smith and Wesson Model SW9F and the Hidden Serial Number," 1997; 29(2): 186-187.
17. Keisler, M. & Fazio, J., "Hi-Point Firearms Hidden Serial Number", Volume 33, Number 3, pages 273 – 274.
18. Knowles, M., "Instant Recovery of Obliterated Serial Numbers," 1985; 17(3):63.
19. Lee, F.R., "Helpful Hint," 1977; 9(2):37.
20. Lutz, M.C., "Evaluation of New Fiber Optics System," 1986; 18(1):12.
21. Massiah, E.E., "Compilation of Techniques and Chemical Formulae Used in the Restoration of Obliterated Markings," 1976; 8(2); 26.
22. Matthews, John, W., "A 'Hidden' Serial Number on the Ruger Bearcat", Volume 13, Number 1, pages 44-45.
23. Miller, J., "Book Review: The Law and Forensic Ballistics by T.A. Warlow," 1997; 29(2):239, 173.
24. Miller, K.E., "Current Assist for Die Stamp Impression Restoration," 1972; 4(3A):38.
25. Montgomery, J.L., "New Process Restores Filed Serial Numbers," 1975; 7(3):80.
26. Nielson, B.C., "Restoration of Die Stamped Impressions on Metal," 1972; 4(3):32.
27. O'Reilly, W.E., "Magnetic Restoration of Serial Number," 1970; 2(3):26.
28. Pahalke, A.R., "Restoration of Serial Number," 1969; 1(4):38.
29. Polk, D.E., and Giessen, B.C. "Metallurgical Aspects of Serial Number Recovery," 1975; 7(2); 38.
30. Roberts, V., "Restoration of Serial Numbers in Plastic," 1981; 13(4):40.
31. Schaefer, J.R., "Serial Number Restoration Observation," 1987; 19(3):276-278.
32. Sherlock, W.E., and Keating, D.M., "Obliterated Serial Number Tracking Program," 1995; 27(4):264-280.
33. Stephenson, James S., "Hidden Serial Number on Hi-Point Pistols With the Polymer Frames", *AFTE Journal*, Volume 28, Number 4, pages 241-242.
34. Taulbee, D., "3x5 Card File of Die Stamped Impressions on Metal," 1973; 5(3):18.
35. Thompson, R.W., "Second Serial Number on Tams Model 80 Revolvers," 1980; 12(2):18.
36. Vaughan, R.T., "Serial Number Restoration on a Radar Warning Device," 1987; 19(3):304.
37. Wagoner, A "Griffin's Reagent For Serial Number Restoration in Stainless Steel," 1999; 31(4) 497.
38. ---. "Obliterated Serial Numbers," 1975; 7(1):27.
39. ---. "Obliterated Serial Numbers," 1989; 21(2):166-167.
40. ---. "Metallurgical Aspects of Serial Numbers Recovery," 1989; 21(2):174-181.
41. ---. "Technique for Restoring Obliterated Serial Numbers on Plastic Cards," 1981; 13(2):30.

Miscellaneous Sources

1. Evans, Will, "Gun Company Agrees to Safety Standards", The Daily Californian (Online), March 20, 2000. (and other web sources)
2. BATF National Firearms Examiners Academy unknown student, Smith & Wesson Firearm Factory Tour, August 21, 2003, 2003 NFEA Trip Reports, BATF, 2003.
3. Rivera, Gene C., NFEA Smith & Wesson Factory Tour trip notes, August 21, 2003.
4. Illinois State Police, Firearm & Toolmark Procedures Manual, FA-IVA-1 – FA-IVA-5, 1997.
5. BATF Laboratory Serial Number Restoration Course Guide, undated – received in 2003.

Issue Date	History
03/31/00	Original Issue
01/30/04	Added new Firearms Examiner Gene Rivera, added Introduction, Location and Hidden serial number sections, photo statements
03/28/08	Fixed formatting errors and typos. No new or changed content.
06/17/11	Updated footers for ISO 17025
06/01/12	Updated procedures to include new worksheet and noting the results of each method used and to note the effectiveness of each etchant used.
4/4/14	Added Magnaflux and updated for PLIMS.

Approval

Director _____ Date:
Matthew C. Mathis

Issuance

Chief Criminalist _____ Date:
Todd J. Nordhoff

Criminalist _____ Date:
Gene C. Rivera

Criminalist _____ Date:
Jennifer A. Pohlheber