

Case No. 19-56004

In the United States Court of Appeals
for the Ninth Circuit

STEVEN RUPP, et al.,
Plaintiffs-Appellants,

v.

XAVIER BECERRA,
in his official capacity as Attorney General of the State of California,
Defendant-Appellee.

On Appeal from the United States District Court
for the Central District of California
Case No. 8:17-cv-00746-JLS-JDE

**APPELLANTS' EXCERPTS OF RECORD
VOLUME IX OF XXII**

C.D. Michel
Sean A. Brady
Anna M. Barvir
MICHEL & ASSOCIATES, P.C.
180 East Ocean Boulevard, Suite 200
Long Beach, CA 90802
(562) 216-4444
cmichel@michellawyers.com

Attorneys for Plaintiffs-Appellants

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Under Federal Rules of Appellate Procedure for the Ninth Circuit, rule 30-1, Plaintiffs-Appellants Steven Rupp, Steven Dember, Cheryl Johnson, Michael Jones, Christopher Seifert, Alfonso Valencia, Troy Willis, Dennis Martin, and California Rifle & Pistol Association, Incorporated, by and through their attorney of record, confirm to the contents and form of Appellants' Excerpts of Record.

Date: January 27, 2020

MICHEL & ASSOCIATES, P.C.

s/ Sean A. Brady

Sean A. Brady

Attorneys for Plaintiffs/ Appellants

Steven Rupp, et al.

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CERTIFICATE OF SERVICE

I hereby certify that on January 27, 2020, an electronic PDF of APPELLANTS' EXCERPTS OF RECORD, VOLUME IX OF XXII was uploaded to the Court's CM/ECF system, which will automatically generate and send by electronic mail a Notice of Docket Activity to all registered attorneys participating in the case. Such notice constitutes service on those registered attorneys.

Date: January 27, 2020

MICHEL & ASSOCIATES, P.C.

s/ Sean A. Brady

Sean A. Brady

Attorneys for Plaintiffs-Appellants

Steven Rupp, et al.

EXHIBIT 64

The Gunperson's Authoritative Internet Information Resource.

THIS IS THE GUN ZONE



Small Arms History...

Last Updated 3 January 2004

A 5.56 X 45mm "Timeline"

A Chronology of Development by Daniel Watters

Author's Note: This chronology was inspired by the constant confusion on Rec.Guns regarding the intellectual and material origins of the .223 Remington (5.56x45mm) cartridge. Admittedly, Remington's prolific release of .224 caliber cartridges in the 1950s and '60s does not help. In order to provide a backstop for one of Dean Speir's newsgroup posts, I developed the following. It remains a work in progress, and the reader is encouraged to read the suggested texts for more in-depth analysis.

Alone, the saga of the .223 Remington and AR15/M16 is a long tale of "NIH" (not invented here) skullduggery, panicked R&D fixes, all-out marketing efforts, old boys network flesh-pressing, inter-service rivalry, procurement end-runs, and Congressional witch-hunts. However, the saga becomes almost epic when you consider the related weapon systems (both competitors and accessories) along with the intellectual heirs of the SCHV and SALVO concepts, including the various micro-caliber rifle experiments and the current PDW craze. A careful reader will note that many ideas, solutions, and yes, even problems keep popping up again and again as the years pass.

1894...

March: The US Army's Chief of Ordnance, Brigadier General Daniel W. Flagler, orders the construction of experimental cartridges to determine the military suitability of calibers smaller than 0.30." Based on data developed by a Lt. Dickson, Frankford Arsenal creates .22 and .20 caliber cartridges for use with modified Krag rifles. Eight rifles are modified, divided evenly between each cartridge type. The cartridges require rifling twists of 1 in 6" and 1 in 5.5" respectively.

1912...

Savage introduces the .22 IMP (later known as the .22 High-Power). Designed by Charles Newton, the cartridge is based on the .25-35 WCF case necked down for .228" projectiles.

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Links 'n' Stuff

The Gun Zone

● 5.56mm 'Timeline'

5.56mm FAQ - v1.11

5.56mm v. .223 Rem

Fléchette / SPIW

Multiplex / SALVO

Green Ammo

AmBack TGZ Forum



Daniel Watters' suggested syllabus

The Black Rifle by R. Blake Stevens and Edward C. Ezell. Second Edition. Collector Grade Publications, Toronto, Ontario, 1992.

The Great Rifle Controversy by Edward C. Ezell. Stackpole Books, Harrisburg, PA, 1984.

The History and Development of the M16 Rifle and its Cartridge by David R. Hughes. Armory Publications, Oceanside, CA, 1990.

The SPIW: The Deadliest Weapon that Never Was by R. Blake Stevens and Edward C. Ezell. Collector Grade Publications, Toronto, Ontario, 1985.

1914...

DuPont introduces the first of its Improved Military Rifle (IMR) powder line. IMR is intended to replace its earlier Military Rifle (MR) powder line, which includes the former standard powder for the .30'06: Pyro DG. However, US military use of IMR does not begin in earnest until 1925 with the standardization of the new .30 M1 Ball cartridge.

1929...

Captain Grosvenor L. Wotkyns begins work on an improved smokeless-powder variant of the .22 WCF cartridge. The test bed combines a BSA No. 12 action with a rechambered Springfield .22 LR barrel. Springfield Armory employees Captain G. A. Woody and A.L. Woodworth conduct their own experiments, working on a conversion of the Springfield Model 1922M1 training rifle. Commercial interest grows after a visit to Winchester by Colonel Townsend Whelen and Capt. Woody.

Dr. Fred Olsen of Picatinny Arsenal is hired by the Western Cartridge Company. Olsen has developed a new and safer method of manufacturing gunpowder while experimenting with methods to reclaim surplus cannon powders.

1930...

Late: The United States Cartridge Company (USCC) introduces Wotkyn's wildcat as the "US .22 WCF Improved."

1931...

Winchester introduces commercial ammunition for the .22 WCF Improved as the ".22 Hornet."

Western Cartridge Company purchases Winchester.

1933...

Western Cartridge Company commercially introduces its trademarked "Ball Powder," based on the developments of Dr. Olsen. (Over the years, the trademark has been carried by WCC's owners, Olin. In 1996, the "Ball Powder" trademark was passed along when Olin's Ordnance division was spun off as Primex Technologies. More recently, General Dynamics purchased Primex, and "Ball Powder" production continues by St. Marks Powders.)

1934...

Capt. Wotkyns begins work on a .22 caliber wildcat using the .250-3000 Savage case. This work reportedly inspires Winchester's introduction of the .220 Swift, albeit with a different parent case. This leads to the eventual nickname of .22 WOS (Wotkyns' Original Swift).

1935...

Winchester introduces the .220 Swift. Based on a modified 6mm Lee Navy case with an added semi-rim, the cartridge is the first commercial offering to break the 4,000fps barrier. It quickly gains a reputation in certain circles of being a spectacular killer of game, including large animals.

While stationed in Corregidor (Philippine Islands) during 1935 and 1936, Frank T. Chamberlin (US Army Medical Corps) conducts a series of lethality tests, pitting the .220 Swift against Army mules in a variety of scenarios. (The mules were already slated to be destroyed, so Chamberlin had a fairly free rein to do as he pleased.)

1937...

Winchester introduces the .219 Zipper. It is based on the .25-35 WCF case necked down for .224" projectiles.

Harvey Donaldson begins development of what becomes the .219 Donaldson Wasp, based on modified .219 Zipper cases.

J.E. Gebby and J.B. Smith introduce their own .22 caliber wildcats based on the .250-3000 Savage case. Due to Gebby's copyright of the name ".22 Varminter," most refer to the resulting wildcat as the .22-250.

1938...

Winchester introduces the .218 Bee. It is based on the .25-20 WCF case necked down.

1948...

September: The US Army's General Staff creates the civilian Operations Research Office (ORO) to supply the Army with scientific advice on conducting operations in an age of nuclear weapons.

1950...

Remington commercially introduces the .222 Remington as a varmint cartridge. Filling a "market gap" between the .22 Hornet and the .220 Swift, the "Triple Deuce" also gains quick acceptance in the benchrest community then dominated by the wildcat .219 Donaldson Wasp. Development of the .222 Remington is reportedly the end product of several Remington experimental cartridges, originally intended as a means to exploit existing cup blanks intended for the production of .30 Carbine cartridge cases. However, these experimental cartridges were considered too short to reliably feed in Remington's Model 722 rifle.

Summer-Fall: The ORO's research mandate quickly spreads out to conventional weapons, especially when the US enters the Korean 'police action' in 1950. One of the first projects for the "Infantry" division of the ORO is Project ALCLAD: the development of improved body armor. The head of the division, Norman A. Hitchman, reasons that in order to improve body armor, one has to know how wounds are created and where they are received. A mathematical analysis of three million casualty reports from both World Wars are entered into the ORO's computers, along with on-the-spot analysis from ORO staffers in Korea.

To Colonel René R. Studler, US Army Ordnance's Chief of Small Arms Research and Development, this sounds as though the ORO is infringing on his turf. Between his distrust of ORO's civilians and the increasing pressure applied by the British for adoption of a mid-range cartridge, Studler attempts to buttress his position supporting a 'full-power' cartridge. Studler requests that the Aberdeen Proving Grounds' Ballistics Research Laboratory (BRL) prepare its own report on the effectiveness of the infantry combat rifle.

November: Donald L. Hall of the Aberdeen BRL begins the before-mentioned study of rifle effectiveness. Much of the two year study is theoretical, but Hall also experiments with a .220 Swift firing a 60 grain bullet roughly homologous to that of the issue .30 M2 ball. The test firings are performed by William C. Davis Jr. and G.A. Gustafson of Aberdeen's Small Arms and Aircraft Weapons Section. (*Remember those names....*)

The crux of Hall's experiment is that a smaller caliber could equal (or even exceed) the performance of a larger bore. Moreover, a smaller bore weapon might have superior hit probabilities at shorter ranges. Thus, combined with the additional cartridges carried per unit weight, a soldier carrying the smaller caliber weapon would be able to inflict more casualties upon the enemy than another soldier with a larger caliber weapon.

1951...

February: *Irwin R. Barr, president and cofounder of Aircraft Armaments Inc. (AAI), publishes the proposal "Study of Ammunition Improvements." Barr promotes the use of a shotshell loaded with 37 "ice pick projectiles," properly known as fléchette.*

August: The ORO publishes the "**ALCLAD Final Report**" written by Hitchman, John H. Gardner, and Robert J. Best.

December: Edgewood Arsenal publishes the report "**Wound Ballistics of a .22 Caliber Scale Model of the .30 Caliber M-2 Rifle Ball.**"

1952...

March: Hall's study, "**An Effectiveness Study of the Infantry Rifle,**" is published.

April: Gustafson is granted verbal approval for additional experiments on "small-caliber, high-velocity" (SCHV) cartridges. However, the request is written with the stated goal of improving upon the performance of the M2 Carbine.

June: The ORO publishes Hitchman's report: "**Operational Requirements for an Infantry Hand Weapon**." Hitchman finds that the majority of combat rifle use does not exceed 300 yards, and that marksmanship is severely degraded by terrain and visibility at ranges beyond 100 yards. In fact, the chance of being struck by a rifle bullet is seen as being nearly as random as being struck by a fragment from a high explosive shell. The time and amount of target exposure had more bearing on whether a target was hit versus marksmanship skills. Given such, an infantry weapon designed to provide controllable "pattern-dispersion" within a 300 yd range might be preferable to a weapon that provides precise single shots at longer distances. Furthermore, at the shorter ranges, a smaller caliber weapon might give acceptable "wounding effects" and allow for controllable "salvo or volley automatic" fire. The key to effectiveness is control; an uncontrollable automatic weapon is seen to be no more advantageous than a semi-auto counterpart. Hitchman projects that a four round salvo with a predictable 20" spread might provide double the hit probability at 300 yards over a single shot fired from a M1 rifle. A lighter, smaller caliber cartridge would have the side benefit of allowing enough ammunition to be carried for an equivalent number of fired salvos to the individual cartridge capacity of the current rifle.

Appended to Hitchman's report is "**Analysis and Application of Results of Rifle-Range Tests**" written by Scott E. Forbush and George J. Blakemore, Jr.

July: The ORO publishes "**The Effects of Terrain on Battlefield Visibility**" written by D.F. Bayly Pike and Charles Gopel.

November: Gustafson begins a SCHV modification of a M2 Carbine on a "spare-time" basis. A .224" barrel is fitted and is chambered for a cartridge based on the .222 Remington case shortened to 1.32." (This is not to be confused with the many [wildcats of the .30 Carbine case](#), such as the 5.7mm Johnson/.22 Spitfire.) The ballistics of the .22 Gustafson Carbine (.22 APG/.22 SCHV) are approximately 3000fps with a 41 grain bullet.

Hitchman's concept of controlled "volley/burst" fire leads to the creation of the multi-agency Project SALVO. The BRL offers the most conventional design: Gustafson's modified M2 Carbine. The Office of Naval Research, in cooperation with Aircraft Armaments Inc. (AAI), creates 12 gauge shotgun shells loaded with 32 steel fléchette. In contrast, the ORO's favored platform is a single barrel rifle using [duplex or triplex loads \(2 or 3 bullets in one case\)](#). Taking the opposite approach, Springfield Armory and Winchester both create multi-barreled weapons.

1953...

August: COL Studler retires from the Army. He is replaced as Chief of Small Arms R&D by Dr. Frederick H. Carten.

September: Gustafson publishes his findings in the report "***Design and Fabricate a High-Velocity Caliber .22 Cartridge, Modify a Standard M2 Carbine to Fire the Cartridge, and Evaluate the Weapon-Ammunition Combination.***" Gustafson concludes that the .22 APG cartridge and carbine is superior to the .30 caliber M2 Carbine and may prove to be a worthy successor to even the .45 ACP submachinegun. However, Gustafson probably pushes his luck too far when he states that the modified carbine "compares favorably with the M1 rifle" against targets out to 300 yards.

1954...

Gustafson and Davis "design" a .224" 68 grain homologue to the long-range .30 M1 ball projectile. The design is produced by Sierra Bullet Company. The projectile is intended for a cartridge based on the .30 Light Rifle (7.62x51mm NATO) case necked down to .224." The ballistics are 3400fps with the 68 grain projectile. It is chambered in a modified T48 rifle (the *FN FAL*, manufactured in the US by Harrington & Richardson for the US Army's rifle trials).

March: *AAI conducts independent trials of a sabotaged fléchette rifle cartridge.*

July: *AAI applies for patents for its sabotaged fléchette cartridge designs and sabot stripper muzzle devices.*

1955...

Gustafson and Davis are denied funding for additional SCHV/SALVO designs and experiments. They have proposed the development of yet another .224" cartridge, intermediate to the .22 SCHV (M2 Carbine) and the .22 "NATO" (T48 rifle). The new cartridge would have launched a 55 grain boattail projectile at 3300fps. (*Remember those numbers....*) In his denial for funding, Dr. Carten insists that Aberdeen is in the business of *testing* weapons and ammunition, not creating them.

1956...

May: *In support of an Army contract, AAI continues to develop its sabotaged fléchette rifle cartridge designs. The stated goal is to achieve a velocity of 4,000fps. AAI creates three separate designs, each using a .22" sabot with a 10 grain fléchette. The differences lay in the exact sabot attachment method.*

Summer: The first comparative test firings of SALVO concept weapons are performed. Included are the Gustafson .22 Carbine and the modified ".22 NATO" T48 rifle.

1957...

February: Fairchild/ArmaLite officials receive their first official briefing on the 1956 SALVO trials.

March: *AAI files "Final Report - Small Arms Cartridge" concerning its fl chette development efforts. A five round burst of the sabotaged fl chette cartridge is estimated to be comparable to a single .30'06 cartridge. However, even at this early date, the issues of cartridge cost and individual accuracy are noted as potential problems.*

Winter/Spring: A copy of Gustafson and Davis' 1955 denied funding request "somehow" makes it to General Willard G. Wyman, Commanding General of the US Continental Army Command (CONARC). Wyman recommends that the Infantry Board submit a formal request for a SCHV rifle based around the Gustafson and Davis cartridge parameters. Furthermore, Wyman "hints" to ArmaLite's Eugene Stoner that a scaled-down version of Stoner's 7.62mm AR-10 rifle prototypes might fit the Infantry Board's forthcoming SCHV request.

CONARC also invites Winchester to develop and submit a SCHV rifle. Ralph Clarkson, a member of Winchester's in-house design team which developed the M-1 Carbine, takes the assignment. Clarkson borrows heavily from David "Carbine" Williams' shelved .30 Carbine design (completed two months after the adoption of the M1 Carbine).

Meanwhile, the Infantry Board has extended the original 300 yard "ideal" to 400 yards in order to pacify certain CONARC members, and once again to 500 yards, to insure acceptance at the Pentagon. The finalized request calls for a 6 pound, select-fire .22" rifle with a conventional stock and a 20 round magazine. The proposed chambering has to penetrate the issue steel helmet, body armor, and a .135" steel plate at 500 yards, while maintaining the trajectory and accuracy of M2 ball from a M1 Garand, and equaling or exceeding the "wounding" ability of the .30 Carbine.

Concurrently, Earle Harvey of Springfield Armory (father of the 7.62mm NATO cartridge) is designing a lengthened .222 Remington case to meet the new 500 yard requirement. Remington loads 10,000 unheadstamped .224 Springfield cartridges: 9500 with 55 grain projectiles and 500 with the 68 grain "M1 ball homologue." Albert J. Lizza designs a rifle around the cartridge, using the best features of Harvey's 7.62 NATO T25 and T47 rifle prototypes, along with items inspired by the T22 (a full-auto variant of the M1 Rifle) and the T44 (pre-M14). Once Dr. Carten learns of Harvey and Lizza's development, all further work on the .224 Springfield is ordered to cease. Ironically, Dr. Carten could not claim that Springfield Armory wasn't in the weapon building business as he did two years earlier with Aberdeen; however, Carten is busy shepherding the T44 rifle into what is now known as the M14. No competition for resources (or attention) would be brooked.

At the time, Stoner is more interested in developing 7.62mm NATO weapons, already working on the design of what was to

become the AR-16 rifle (father to the 5.56x45mm AR-18). Thus, ArmaLite's first SCHV prototype is designed by Robert Enewold (who also designed the ArmaLite/USAF AR-5 .22 Hornet aircrew survival rifle). Chambered in the commercial .222 Remington, Enewold's prototype is too light, which combined with the requested conventional stock, leads to difficulty in control during automatic fire. Remembering General Wyman's favorable bent towards the AR-10 design, ArmaLite assigns Robert Fremont and L. James Sullivan to scale down the AR-10 to .222 Remington.

May: Stoner provides a brief live-fire demonstration of the prototype AR-15 for General Wyman. CONARC formally requests the purchase of 10 test rifles for the Infantry Board (five days after the 7.62mm NATO M14's official adoption is announced). After a visit to Fort Benning, Stoner begins to tweak the .222 Remington round to fit the Infantry Board's penetration requirements. First, Stoner and Sierra's Frank Snow modify the .224" 68 grain "M1 ball homologue" to 55 grains by shortening the bearing length and the boattail, while maintaining the original 7-caliber ogive and 9-degree boattail. The new projectile is also produced by Sierra. Robert Hutton uses Speer's Ballistic Calculator to estimate the muzzle velocity need to provide the desired performance at 500 yards. The results indicate a muzzle velocity of 3300fps with the 55 grain bullet will be required. Hutton begins load development with IMR 4198, IMR 3031, and an unnamed Olin ball powder. Using a Remington Model 722 with a 22" Apex bull barrel and a Lyman 25x scope, Hutton successfully perforates US helmets at 500 yards during a public demonstration. However, testing also indicates that the .222 Remington cannot achieve the required velocity without excessive chamber pressure. Stoner contacts Winchester and Remington about increasing the case capacity; Remington accepts the request. (This refusal is hardly surprising since Winchester had their own SCHV rifle and cartridge in the works.) The resulting cartridge is designated the .222 Special.

The T44E4 and T44E5 rifles are adopted as "US Rifles, 7.62mm M14 and M15." (None of the heavy barrel M15 will ever be produced for issue prior to the M15 being declared obsolete in December 1959.)

The US Army reclassifies the M1 Carbine as 'Obsolete'. The USAF is the only service to retain the Carbine in use.

September: Laurence F. Moore of Aberdeen's Infantry and Aircraft Weapons Division's Development & Proof Services (D&PS) publishes the report "**A Test of SALVO Rifle Material.**"

October: Aberdeen's BRL publishes "**Penetration of an Experimental .22 Cal. Bullet in Gelatin.**"

October-December: Clarkson's design, the Winchester .224 Light Weight Military Rifle (LWMR) is demonstrated at CONARC headquarters and later, Fort Benning. However, it becomes clear that the new .224 Winchester cartridge will not meet the Infantry Board's updated penetration requirements. Like its competitors, the .224E1 Winchester uses a lengthened .222 Remington case; however, the cartridge has a fairly short overall length (OAL).

#:6335

Cartridge 224 WINE2 Quantity Per Box 20
Bullet 38 Gr. Steel " " Lot 1
Lot No. 246491 Date 6-10-58
Velocity@ 15 Ft. 3618 Ft. per sec.
Pressure, Copper 48,500 P.s.i.

**AMMUNITION RESEARCH
OLIN MATHIESON CHEMICAL CORP.
WINCHESTER WESTERN DIV.
NEW HAVEN, CONN.**

Three 38 Smith & Wesson caliber bullets are shown standing vertically against a white background. The bullets are brass-cased with copper-jacketed tips. They are arranged in a slightly staggered row, with the middle bullet being the tallest and the two flanking bullets being slightly shorter. The bullets are oriented with their tips pointing upwards.

9/88

March: Ten AR-15 rifles chambered in .222 Special are delivered to Fort Benning for the Infantry Board field trials. Due to the changes required for the new .224E2 Winchester cartridge, the Winchester LWMR is not ready. However, a number of new T44E4 (pre-production M14) rifles are included as a control. Stoner is allowed to participate since no instruction manuals are yet available for the AR-15. Embarrassingly, the T44E4 rifles turn in a malfunction rate of 16 per 1000rds. In contrast, the AR-15 displays a malfunction rate of 6.1/1000. Oddly, after all of the trouble to coordinate the development of the competing cartridges, the .224E2 Winchester still fails the 500 yard helmet penetration requirement. The tests are re-run with the .222 Special, which succeeds.

Engineering tests for the SCHV candidates are assigned to Aberdeen despite efforts by Dr. Carten to have them performed at Springfield Armory. Laurence Moore of the D&PS is assigned to conduct the tests, and William C. Davis volunteers to participate in firing testing.

In addition, examples of the candidate rifles are sent to Fort Greely, Alaska for Arctic testing.

April: *Aberdeen's BRL publishes the report "**Retardation and Velocity Histories of an 8-Grain Fléchette.**" The report is intended primarily to cover issues related to multiple fléchette canister cartridges.*

June: Winchester plays with a 38 grain steel projectile for their .224E2 cartridge. The velocity is credited as 3,618fps.

July: Winchester finally delivers their LWMR to Fort Benning for testing.

During rain tests at Aberdeen, examples of both the AR-15 and the LWMR experience burst barrels. The combination of water in the bore and the heavily fluted barrels used by both candidate rifles prove too much. Both manufacturers respond by providing unfluted barrels for subsequent prototypes. Seizing upon the issue, Dr. Carten begins a campaign to support development of an alternate .256 SCHV (6.35mm) cartridge. (The eventual pair of .256/6.35mm alternates are based on the .25 Remington case.)

August: A supplemental Infantry Board trial is held using AR-15 rifles with modifications based on the earlier Fort Benning and Aberdeen trials.

September: CONARC releases the final report of the Infantry Board's tests: "**Evaluation of Small Caliber High Velocity (SCHV) Rifles.**" The AR-15 is judged to be superior to the M14 and the Winchester LWMR. However, both SCHV candidates are faulted on their burst barrels during rain testing, among other issues. Still, the report recommends that both manufactures be allowed to submit 16 rifles each for further testing by the Infantry Board and the Arctic Test Board.

Winchester chooses to decline further development of the LWMR.

Deputy General of CONARC, General Herbert B. Powell, is ordered to assemble a general board to investigate the Army's various rifle research and production programs. (Sources disagree as to whether this was the last act of General Wyman, on the verge of his retirement, or his successor, General Bruce C. Clark.)

Meanwhile, Cooper-Macdonald, Inc, the sale representatives for ArmaLite, Colt, and Remington in Southeast Asia, is hammering out a manufacturing license agreement for Colt to manufacture the AR-10 and AR-15 rifles. ArmaLite's parent company Fairchild Engine & Airplane Corporation had been unwilling to allow ArmaLite to start their own production line, and is more than happy to pass future development risks on to Colt.

December: Stoner is asked to deliver replacement parts to the Arctic Test Board trials at Fort Greely. To his surprise, Stoner finds that many of the rifles have had parts substituted. In particular, the front sight assemblies have been removed from the barrels, and when reassembled, some of the tapered pins have been inserted in reverse while others have been replaced by pieces of welding rod. The upshot of this tinkering is that the front sight assemblies are quite loose, and do not quite line up with the barrel's gas port.

Stoner is subsequently requested to give a presentation on the AR-15 before the Powell Board. At the presentation, Powell inquires about the Arctic tests. Believing that the testing had only just begun, Stoner refers to minor problems that have been rectified. However, the Powell Board already has possession of a completed Arctic Board Test report critical of the AR-15's cold weather accuracy and reliability. In their final report, the Powell Board recommends that the .222 Special is not a suitable replacement for the 7.62mm NATO, development of an AR-15 type rifle in a .256 cartridge should be pursued, and 750 AR-15 rifles be purchased for extended trials.

Meanwhile, the Army's Combat Development Experimentation Center (CDEC) begins mock combat trials of the AR-15, Winchester LWMR, and the M14. Conducted at Fort Ord, California, the tests cover the effects of the new weapons on squad tactics and organization.

*Watertown Arsenal publishes the report "**Terminal Ballistic Study of Fléchettes.**" While inspired by research supporting multiple fléchette canister cartridges, the armor penetration characteristics should be applicable to individual fléchette cartridges.*

1959...

Fearing the confusion of so many "Triple Deuce" nomenclatures, the .222 Special is renamed the .223 Remington.

AAI receives two additional Ordnance contracts for fléchette cartridge R&D.

January: The Powell Board concludes its investigation and issues its report prior to the release of final reports from the Aberdeen engineering tests and the CDEC trials (which were not yet complete).

February: General Maxwell Taylor, Chief of Staff of the Army, upon review of the Powell Board's report and urging by the OCO, rules that "only the M14 is suitable for Army use." Furthermore, any additional Army purchases of the AR-15 should be canceled. Finally, the development of a fléchette firing rifle is approved as the All-Purpose Hand-Held Weapon (APHHW).

The final report "**A Test of Rifle, Caliber .22, AR15; Rifle, Lightweight Military, Caliber .224; and Pertinent Ammunition**" from the Aberdeen engineering tests is finally released. Moore's recommendations and conclusions are missing, reportedly excised on the order of Dr. Carten.

Within days of General Taylor's decision, Colt and Fairchild finalize their licensing agreement. Colt pays a \$75,000 lump sum, plus a 4.5% royalty on future production of the AR-10 and AR-15. Robert Freemont leaves ArmaLite to join Colt.

Subsequently, Cooper-Macdonald, Inc receives its first advance payment from Colt to begin promoting the AR-10 and AR-15. During the following "world" tour (primarily Asia), Robert W. Macdonald finds that there is very tepid interest in the AR-10. In contrast, the smaller AR-15 is an immediate hit. Small orders for the AR-15 come in from Malaya, India, Australia, Burma, and Singapore. However, some interested buyers, such as the Philippines, are ham-strung by their military assistance pacts with the US. While the AR-15 was an American rifle, it wasn't a US *military issue* rifle; thus, US military aid funds could not be used to purchase the new rifle.

March: *AAI files "Proposal for the Development of a .22 Caliber Fin-Stabilized Armor Piercing Round."*

Spring: *AAI proposes the construction of a "burst simulator" comprised of five single-shot fixtures bundled into a Gatling-type assembly. The individual fixtures are triggered electronically in a short sequence to simulate a high-cyclic rate burst from a single barrel rifle. This is intended to provide experimental data on optimum burst spread until AAI can construct an automatic weapon for its fléchette cartridges.*

May: The final report of the CDEC trials, "**Rifle Squad Armed with a Lightweight High-Velocity Rifle**," is released. It projects that a 5-7 man squad armed with AR-15 rifles would have a higher number of hits and kills than the then current 11 man squad armed with M14 rifles. The report particularly praises the reliability of the tested AR-15 rifles, and suggests that a SCHV design such as the AR-15 or LWMR should be further developed as a replacement for the M14.

The ORO publishes the papers "**Optimum Duplex Spread**" and "**Optimum Dispersion for Gaussian Salvo**."

June: Springfield Armory publishes the report "**Water Drainage Characteristics of Caliber .22/06 and 7.62mm Barrels.**"

July: Springfield Armory approves AAI's "burst simulator" design and grants a contract for the manufacture of two units.

December: AAI publishes the report "**Final Report - Research and Development Activities on Fléchette Ammunition Test Rifles.**" For the purposes of testing, ten Winchester Model 70R bolt-action rifles had been modified to fire individual fléchette cartridges.

1960...

L. James Sullivan leaves ArmaLite.

February: AAI's first firing "burst simulator" is shipped to Aberdeen' BRL. After initial adjustments, the device could simulate a cyclic rate of 2,300rpm.

March: The USAIB publishes the report "**Evaluation of Single Fléchette.**" The report covers testing of AAI's "Arrow" fléchette cartridge using the modified Winchester rifles. For comparison purposes, both the short and long variants of the 6.35mm Simplex cartridges and 7.62mm NATO M59 Ball are also tested. Poor base accuracy, which deteriorated even further during use, is noted for the fléchette rifles, along with excessive muzzle flash and poor penetration against wood and sand. Comments are also made concerning the downrange hazard presented by the discarding sabot to friendly troops. The fléchette cartridges were found to be so lightly constructed that the case walls could be bent during handling. The cartridges had to be hand chambered individually, lest they be deformed during feeding from a magazine. On the positive side, the flat trajectory of the cartridge would require no sight setting changes out to 400 meters. Moreover, the future APHHW is projected to weigh roughly 3.5 pounds and possess a cyclic rate of 2,000rpm. Based on the projected characteristics, the fléchette is deemed to have a greater potential than the 6.35mm and 7.62mm NATO cartridges.

May: The Army Arctic Test Board publishes the report "**Evaluation of Single Fléchette and 6.35-MM Simplex and Duplex Ammunition.**" In these follow-up tests, AAI's "Arrow" fléchette cartridge, now designated the 5.6x53mm XM110, has been pitted against duplex and simplex versions of the short 6.35x48mm cartridge, 7.62mm NATO M59 and M80 Ball, and even the defunct .224 Springfield (.222 Rem Mag). (Additional details concerning the latter were excised.) The duplex 6.35mm cartridge is dismissed as having insufficient military value, and while the same complaints noted by the USAIB are repeated, the XM110 cartridge is deemed to be the superior choice for future development.

AAI's second "burst simulator" is shipped to Springfield Armory.

June: Colt requests new Ordnance testing of their improved AR-

15 rifle. Dr. Carten refuses the request, citing the lack of military requirement for such a rifle.

AAI publishes the report "Final Summary Report - Small Caliber Demonstration Guns."

July: In hopes of generating interest (and royalties) in the AR-15, Macdonald invites General Curtis LeMay, Chief of Staff of the US Air Force, to a combination 4th of July celebration/birthday party for Fairchild president Richard Boutelle. Boutelle and LeMay are long-time friends and fellow firearms-enthusiasts. In fact, LeMay had previously attempted to have ArmaLite's AR-5 survival rifle adopted for the USAF. At the party, LeMay is conveniently given an opportunity to shoot a new Colt-production AR-15 at a trio of watermelons. After bursting the first two melons at 50 yards and 150 yards, LeMay is suitably impressed with the terminal results. (Note: The third melon is spared the firing squad and is subsequently eaten.)

LeMay offers to recommend the AR-15 as a replacement for the USAF's aging stock of M2 Carbines, and it is arranged for three Colt AR-15 to be sent to Lackland AFB for familiarization training.

September: Dr. Carten is ordered to provide testing of the Colt AR-15 for the USAF. Ironically, the testing is requested to coincide with Ordnance testing of Dutch-production AR-10 rifles. Moreover, General LeMay and other high ranking officers from the USAF and Army will be in attendance for part of the testing.

November: Ordnance releases the Aberdeen D&PS test results on the AR-10 and AR-15 in separate reports. Once again, Laurence Moore's recommendations and conclusions are missing. However, the remaining data is encouraging. For instance, the Colt AR-15 displays a malfunction rate of 2.5/1000 rounds (less than half of the 1958 Fort Benning tests).

In a report to the Chief of R&D, Dr. Carten summarizes the AR-15 results as "reasonably satisfactory." Thus, the Colt AR-15 is approved for USAF trials.

1961...

USAF testing at Lackland AFB continues, pitting the Colt AR-15 versus the M2 Carbine and the M14 rifle. 43% of the AR-15 users score "Expert" in marksmanship qualifications versus 22% of the M14 users. General LeMay requests authority to purchase 80,000 rifles over several years to begin replacement of the M2 Carbine.

Fairchild allows ArmaLite to split off into a separate company. ArmaLite's management team purchases the right and titles to all of the ArmaLite designs with the exception of the AR-10 and AR-15. Around the same time, Gene Stoner leaves ArmaLite.

Using the AAI "burst simulator," Aberdeen's BRL estimates that the proposed APHHW could produce three times the enemy casualties versus the M14 per engagement. Based on equal rounds expended, the APHHW could be up to seven times more

January: Aberdeen's D&PS publishes another report titled "**A Test of Rifle Caliber .223, AR-15.**"

Spring: ARPA's mission is reoriented to include research regarding the conduct of counter-insurgency warfare. Project AGILE is approved to further this new mission. Combat Development Test Centers are thus opened in Bangkok and Saigon, the respective capitals of Thailand and South Vietnam.

Project AGILE member, Colonel Richard Hallock (US Army), is lobbied by Robert Macdonald regarding the virtues of the AR-15 rifle in the hands of small-statured troops.

May-June: The CDEC conducts field experiments in support of the study "**Optimum Composition of the Rifle Squad and Platoon.**" The findings indicate that all members of a squad, except machinegunners, should carry the APHHW. While AAI had finally built APHHW prototypes, a burst control device had not yet been designed or incorporated. Burst length had been simulated by loading only the required number of rounds for a given 'burst' into the magazine.

Summer: Funding for 8,500 AR-15 rifles is placed the USAF's budget proposal for the upcoming fiscal year. However, this is cut out in a Congressional committee.

Meanwhile, ARPA requests 4,000 AR-15 rifles for testing with South Vietnamese troops (ARVN). This request is denied on the grounds that M-2 Carbines were available from surplus.

October: ARPA purchases ten AR-15 rifles out of their available funds, and conducts a limited test in Saigon. Using their findings from this test, ARPA resubmits their request. They further note that the rifles will be evaluated only in terms of their usefulness for ARVN units and their US advisors, not for general US military issue.

December: General LeMay makes a personal appeal for the rifles in a meeting with President John F. Kennedy. Again, the request is denied.

Secretary of Defense Robert S. McNamara approves the ARPA request, allowing for the purchase of 1,000 AR-15 rifles, accessories, and ammunition.

1962...

Gene Stoner joins Cadillac Cage to begin work on the 7.62mm NATO Stoner 62 system.

At the World Shooting Championships in Cairo, the Russian "Running Deer Match" team uses a new wildcat cartridge, the 5.56x39mm, based on the 7.62x39mm M43 cartridge case necked down to .224." World Records are tied and broken for individual and team scores respectively in the two-shot event.

(Later, the cartridge and case are commercially manufactured by Sako of Finland as the .220 Russian.)

January: ARPA receives the first shipment of their 1,000-rifle order.

The OCO approves formal specifications for the new Special Purpose Individual Weapon (SPIW). The SPIW combines the point-fire capabilities of the APHHW with the area-fire capabilities of the 40x46mm grenade launcher.

February: Project AGILE begins operational testing of the AR-15 in Vietnam.

March: *The OCO approves the development timeline for the SPIW. Type classification of a SPIW as Standard 'A' is projected for June 1966.*

Spring: Remington submits the specifications of the .223 Remington to the Sporting Arms and Ammunition Manufactures' Institute (SAAMI).

May: The USAF's third request for the procurement of 8,500 AR-15 rifles is approved. The rifle and its cartridge are officially adopted for USAF issue. *The USAF also plays with prototypes of what becomes known as the M7 Bayonet.*

July: Operational testing of the AR-15 in Vietnam ends. ARPA releases "**Test of ArmaLite Rifle, AR-15, Report of Task 13A.**" The report concludes that the AR-15 is superior to the M2 Carbine, and better suited for Vietnamese soldiers than the M1 Garand, the M1918 BAR, and the Thompson SMG. Vietnamese troops and their US advisors reportedly considered the AR-15 "the best 'all around' shoulder weapon" then in use. The report also includes graphic details of the .223 Remington's terminal effects. The results are typically described as "explosive." ARPA recommends that the AR-15 be adopted as the basic weapon for all South Vietnamese forces.

Summer: The commander of the US advisor group in Vietnam requests 20,000 AR-15 rifles for implementation of the Project AGILE recommendations.

The US Navy orders a small quantity of AR-15 rifles for use by its SEAL teams.

August: Defense Secretary McNamara orders the reorganization of the Ordnance Corps as the US Army Weapons Command (USAWC or WECOM). It is now made part of the equally new Army Material Command (AMC). Dr. Carten is reassigned as the Chief of the Technical Evaluation Branch of the AMC's Research Development & Equipment Directorate.

Fall: *Melvin M. Johnson finishes work on his 5.7mm Spitfire. Based on a necked down .30 Carbine case, the wildcat is designed in conjunction with Lysle Kilbourn (father of the wildcat .22 K-Hornet) and with assistance from H.P. White Laboratory and the Lyman Gun Sight Company.*

September: The Systems Analysis Directorate of the Office of the Secretary of Defense (OSD) finishes a history of intermediate service rifle cartridges and related theory from the .276 Pedersen up to the current AR-15. Known as the Hitch Report (named for Charles Hitch, OSD Comptroller), the study concludes that the AR-15 is superior to the M14 and AK-47. AR-15 equipped squads are theoretically credited with the potential to inflict up to five times more enemy casualties to those issued the M14. The AR-15 is also credited with being more reliable and durable than the M14. The report further suggests that the M14 is inferior to the AK-47 and even the M1 Garand.

October: Pressured by McNamara and Secretary of the Army Cyrus Vance, a series of tactical and technical tests of the relative merits of the M14, AR-15, and AK-47 are ordered by General Earl Wheeler, Army Chief of Staff. Testing was to be performed at bases in the US, Europe, the Caribbean, and the Arctic.

WECOM briefs forty-six companies on the SPIW program. Emboldened by the positive industry response, the anticipated type classification date is moved to June 1965.

November: President Kennedy is also briefed on the Hitch Report. General Wheeler is given a deadline of January 31, 1963.

Frankford Arsenal creates a small quantity of duplex .223 loads. This consists of a forward bullet of 33 grains followed by a trailing slug of 34 grains. The velocity is quoted as 2,760fps.

Aberdeen's D&PS publishes the report "**Comparative Evaluation of AR-15 and M14 Rifles.**"

December: *Ten companies provide formal written SPIW proposals.*

1963...

"Build a Better Mouse Gun, and the World Will Beat a Path to Your Door." *ArmaLite project engineer Arthur Miller scales down Stoner's 7.62mm NATO AR-16 design into the 5.56mm AR-18. Enticed by Stoner to join him at Cadillac Gage, L. James Sullivan and Robert Fremont scale down the 7.62mm NATO Stoner 62 into the 5.56mm Stoner 63. Beretta and SIG join forces for a 5.56mm rifle project. Heckler & Koch begin development of a scaled down 7.62mm NATO G3, the 5.56mm HK 33.*

Remington commercially introduces the .221 Remington Fireball, a shortened .222 Remington.

Weatherby commercially introduces the .224 Weatherby Magnum. While supposedly under development for nearly a decade, the cartridge is roughly an improved .219 Zipper with a belt and Weatherby's radiused shoulder contour.

Johnson Guns, Inc. commercially introduces the MMJ 5.7mm Spitfire conversion for M1 Carbines.

January: Aberdeen's Human Engineering Laboratory releases the report "**Summary of Studies Conducted with the AR-15.**"

General Wheeler reports "The AR-15 is not now acceptable for the Army for universal use." Supporting arguments included that adoption of the .223 Remington cartridge would violate NATO standardization, that the M14 was superior at ranges over 400m, and that the AR-15 design was not completely debugged or reliable. In the trials, the AR-15 suffered a malfunction rate 8 times higher than that of the control M14 rifles. In addition, testing at Aberdeen and Edgewood Arsenal could not duplicate the terminal results reported by ARPA's Project AGILE.

Secretary Vance orders the Inspector General of the Army to review the Army's conduct of the testing. Some questionable decisions and outright skullduggery surfaced. For instance, the AR-15 was judged against M1 Garand-era requirements such as aimed fire out to 800m. The AR-15 rifles were required to fire full automatic, while the M14 rifles were allowed to remain on semi-auto. For comparison testing, the Infantry Board even brought out prototype match rifles and squad automatic versions of the M14 such as the M14(USAIB) (AKA: the M14E2 or M14A1). Most damning was a quote from an Infantry Board memorandum:

"The US Army Infantry Board will conduct only those tests that will reflect adversely on the AR-15..."

Admittedly, some of the AR-15's problems in testing were real, the result of rushed production of the rifles and their ammunition for the rifle trials. The biggest problem experienced was primers blown out of the case upon firing.

In a report to the OSD, Secretary Vance recommends the following: 1) Procure enough rifles converted to the M14(USAIB) standard for issue as automatic rifles to all infantry squads; 2) Procure 50,000-100,00 AR-15 for issue to Air Assault, Airborne, and Special Forces units; 3) Production of standard M14 rifles is to be reduced; and 4) The [SPIW](#) program will be scheduled to provide a "follow-on" replacement for the M14 by the end of Fiscal Year 1965. In response, McNamara announces the cancellation of M14 production, with existing contracts to end by the Fall of 1963. A "one-time" purchase of 85,000 AR-15 rifles for the Army is proposed. It is intended as a stopgap measure until the SPIW is ready for fielding.

The USAF type-classifies the .223 Remington as "Cartridge, 5.64 Millimeter Ball MLU-26/P." It also releases the report "**Exterior Ballistics of the AR-15 Rifle.**" The results of cold chamber testing at Eglin Air Force Base indicate that the ammunition cannot meet accuracy requirements in subzero temperatures. A change in the rate of twist from 1-in-14" to 1-in-12" is noted as solving the problem.

February: *Deciding to limit the SPIW competition to four candidates, WECOM awards SPIW development contracts to*

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 recently displaced M14 contractors H&R and Olin-Winchester. AAI and Springfield Armory have already begun developing their own SPIW.

March: The "Office of Project Manager for AR-15 Rifle Activities" is established. Lt. Colonel Harold Yount is appointed Project Manager. The OSD orders the military services to draft a joint set of requirements for the AR-15 and its ammunition. The number and cost of any improvements and modifications are ordered to be kept to a minimum.

Frankford Arsenal is assigned oversight of the procurement of .223 Remington ammunition. William C. Davis is assigned as "AR-15 Project Director" and is directed to prepare a technical data package.

The Inspector General's findings are released as a six volume report titled: "**IG Rifle Evaluation.**"

ARPA orders 25 Stoner 63 in various configurations.

April: The "Technical Coordinating Committee" (TCC) is formed, comprised of members of each service branch, LTC Yount, and representatives from the OSD: the Deputy Assistant Secretary for Weapons Acquisition and Industrial Readiness and a program analyst from the Directorate of Major Items, Materiel, Installations and Logistics. While LTC Yount is the titular chair of the committee, the OSD representatives have veto power over any decision made by the TCC. Within the next few months, over 130 changes are proposed for the rifle and ammunition. One of Army recommendations vetoed by the OSD is for chrome plating of the bore and chamber.

Remington is contracted to provide 600,000 rounds of .223 Remington. In addition, Remington is to provide Frankford Arsenal with the Technical Data Package (TDP) for the cartridge. It is discovered that IMR 4475 cannot reliably achieve the quoted muzzle velocity of 3,300fps within the accepted maximum chamber pressure specs. At the same time, Olin/Winchester is proposing a new cartridge, the .224E5. The .224E5 and its predecessor, the .224E4, are both based on the .25 Remington case, shortened to fit within the same action length as the .223 Remington. However, the .224E5 possesses a rebated rim so that existing .223 Remington bolt faces need not be altered. (Oddly enough, these cartridges bear more than a passing similarity to the .219 Donaldson Wasp, albeit without a rimmed case.)

USAF and USMC testing of the AR-15 indicate a "slamfire" problem. The issue is originally blamed on high primers, but this is quickly dismissed as the cause. Efforts are made to create a less-sensitive primer, but Remington and Olin indicate that they cannot reliably produce primer lots to the suggested "None Fire/All Fire" tolerances of 12 to 48 inch-ounces. (Primers for military .30 Carbine cartridges ran from 6 to 36 inch-ounces.) Potential rejection rates are estimated from 50 to 90%. Other efforts concentrate on a redesign of the firing pin. The kinetic energy of the existing firing pin ranges from 4 to 14 inch-ounces when the bolt closes.

Aberdeen's D&PS releases the report "**Evaluation Test of the Rate of Rifling Twist in Rifle, Caliber .223, AR-15.**"

Gene Stoner demonstrates the Stoner 63 to Brigadier General Lewis Walt, USMC.

May: Plans are set forth to graft a SPIW-type 40x46mm grenade launcher onto the AR15 rifle. However, this effort bogs down due to inadequate funding.

Production of Ball ammo with IMR 4475 ends at Remington.

June: William C. Davis files the report "**Investigation of Test-Weapon Chamber Configuration.**" It is found that Colt's chamber tolerances do not mesh with Remington's dimensional specifications for the cartridge. Another report, "**Investigation of Bullet Configuration,**" indicates that Remington is no longer using the original 7-caliber ogive bullet design. Instead, they have switched to a less aerodynamic 5.5-caliber ogive design. The replacement design is claimed to be easier for the company to mass-produce.

July: Deputy Secretary of Defense Roswell Gilpatrick issues a directive to the TCC to speed up the procurement. Quality control, parts interchangeability, and acceptance standards are to be relaxed as necessary.

McNamara signs off on the change of rifling twist from 1-in-14" to 1-in-12."

Summer: The USAF requests an additional 19,000 AR-15.

TCC progress breaks down, as the Army demands a bolt closure device. The USAF strongly objects, while the Navy and Marines consider it "non-essential" but are willing to accept it. Colt and Springfield Armory submit various prototypes. Gene Stoner prefers Springfield's first prototype, as it would only add two parts to the design. The Army prefers Colt second design devised by Colt's Foster E. Sturtevant.

August: The TCC formally approves the change in the AR-15's rate of twist.

September: "Cartridge, 5.56mm Ball, M193" is officially type-classified. Pushed by OSD over the objections of the TCC, it specifies the Remington-designed projectile, a muzzle velocity of 3,250fps, IMR 4475 powder, and the existing average 52,000psi pressure limit. Remington, Olin, and Federal Cartridge all refuse to offer bids.

October: Colt threatens to dismantle the AR-15 production line due to the lack of an official contract for further orders. McNamara allows the Army to order their rifles with the Sturtevant bolt closure device if necessary. The USAF can continue to order their rifles without the device.

The USAF orders 19 million rounds of MLU-26/P from Remington.

November: The Army finally awards Colt with an official contract for 104,000 rifles. DA-11-199-AMC-508 includes the 19,000 M16 ordered by the USAF and 85,000 XM16E1 for the Army and Marines. Eleven modifications are made to the rifle design prior to the start of production. These include the change to black furniture, 1-in-12" rifling, a modified firing pin, the bolt closure device, revised chamber dimensions, the switch from a triangular changing handle to the current T-shape, and the transition from steel to aluminum magazines. (Ironically, this "one-time" buy will be amended fifteen times over the next two years from 104,000 to a grand total of 201,045 rifles.)

Frankford Arsenal finalizes specifications for the M197 Proof cartridge. These are loaded with a heavy charge of Hercules Unique. Also drawn up are the specifications for the M199 Dummy cartridge.

1964...

ARPA orders sixty Stoner 63 rifles along with 20 complete systems for USMC testing. Marine Commandant General Wallace Green later becomes a proponent of the system.

Armalite goes on a marketing blitz trying to promote their new AR-18. Testing is performed at H.P. White, Aberdeen Proving Grounds, and Fort Benning (for the Infantry Board).

AR-15 co-designer, Robert Fremont rejoins Colt.

Remington commercially introduces the .223 Remington. Remington also provides the first XM195 grenade launching blanks.

January: M193 specs are given a temporary waiver. The average chamber pressure limit was increased to 53,000psi, with individual rounds allowed to test as high as 60,000psi. Remington and Olin contract to supply 500,000 cartridges apiece under this waiver. Frankford Arsenal receives permission to test production lots of 25,000rds loaded with alternative powders. Candidates include DuPont's CR 8136, Hercules' HPC-10, and Olin's WC846. (The latter was then in use by Olin for military production of 7.62x51mm ammunition, just as Remington had once done with IMR 4475.)

WECOM releases "Technical Development Plan - Special Purpose Individual Weapon." The weapon specifications are quite optimistic: less than 10 pounds while loaded with a minimum of three grenades (increased from a single grenade) and sixty fl chette cartridges. The grenade launcher is desired to be a semi-automatic repeater.

Fabrique Nationale begins development of a "Mini-FAL" in 5.56mm.

February: Frankford Arsenal draws up specifications for the M196 Tracer. Remington provides the initial production lots,

WECOM releases the completed SPIW Technical Development Plan (TDP).

March: Remington and DuPont withdraw IMR 4475 from future use in 5.56mm ammunition.

The first 300 M16-marked rifles are delivered to the USAF.

Colt discovers that six out of 10 XM16E1 rifles will exceed the 650-850rpm cyclic rate requirements when tested with ammunition loaded with WC846. Colt asks that the maximum cyclic rate limit for the XM16E1 be raised to 900rpm. (The USAF has already done so for their M16 rifles, as they had already accepted production lots of ammo from Olin loaded with WC846.)

All four vendors deliver their requested ten SPIW prototypes on time for Phase I evaluations by Aberdeen's D&PS. AAI continues to use its 5.6x53mm XM110 cartridge, Springfield and Winchester use a new 5.6x44mm XM144 cartridge, and H&R incorporates the XM144's sabot projectiles into its own proprietary cartridge design.

The H&R design is immediately rejected as too heavy, not to mention unsafe. H&R already has a bad reputation for its M1 and M14 rifles, not to mention its poor conversion of the FN FAL for earlier Army trials, and the new SPIW does nothing to dispel this reputation. H&R's SPIW uses David Dardick's revolving "open chamber" concept. Each 5.6x57mm cartridge, cutely named a "tround," is a triangular piece of plastic holding three separate sabots and fléchette with a single powder charge. Upon pulling the trigger, all three projectiles are fired at once. On the downside, each of the individual projectiles requires its own barrel, adding unnecessary weight; the weapon tops 23.9 pounds loaded. More significantly, the open chamber means that only the plastic case is available to contain the pressures of firing. Initial test shots prove that the plastic cases are not up to this task, with the walls splitting and bulging upon ignition. The testers are underwhelmed at the prospect of less than a millimeter of plastic keeping the weapon from blowing up in their face.

Twenty XM16E1 are delivered to the AMC's Test and Evaluation Command (TECOM) for comparison testing with the SPIW prototypes. Ten of the rifles are equipped with a Springfield-designed muzzle brake and five of these are also fitted with a new two-round burst device developed by Colt.

April: The TCC grants a monthly waiver of the cyclic rate maximum to 900rpm. In an internal company report, "**Chamber and Gas Port Pressures**," Colt's Foster Sturtevant notes an increase in pressure at the gas port when using WC846 versus IMR 4475. However, this is seen as a potential benefit for reliable function of the rifle.

The USAF rejects a lot of ammunition because it fails to meet their 500yd penetration requirements (0.135" of mild steel). The USAF is urged to reduce the plate penetration requirement to 450

Firing trials of the three remaining SPIW candidates begins at Fort Benning. Winchester's "soft recoil" SPIW rifle design is deemed too complicated. The barreled action reciprocates within the stock housing (in a fashion similar to the more recent HK G11 and AN94), but the receiver length is too short to allow a three round burst to be completed prior to the action bottoming out within the receiver. In contrast, Winchester's blow-forward grenade launcher is very popular due to its relatively compact dimensions. A single trigger in conjunction with a special selector button controls both the rifle and grenade launcher function. Given the rifle's unreliability in adverse condition trials, Winchester later drops the rifle project. However, they continue to produce the grenade launcher under contract to Springfield Armory.

Springfield Armory's SPIW is a bullpup design with a unique tandem magazine arrangement. A pair of 30 round magazine bodies are arranged back to back in a single assembly. The mechanism allows the rounds of the rear magazine to be held in reserve until the forward magazine runs dry. A tab in the forward magazine's follower then raises the rear magazine high enough to allow its rounds to feed. The designer, Richard Colby, could not get a conventional 60 round box magazine to feed reliably given the weapon's high cyclic rate. (AAI and Winchester used drum magazines, while H&R used a taped belt.) In any case, a conventional box design would have been excessively tall, causing problems during use in prone firing positions. The Springfield SPIW passes the length restrictions, but it exceeds the weight requirement by roughly four pounds. This is in part due to their massive magazine-fed grenade launcher design.

The AAI entry is a very slick package given how crude their previous APHHW prototypes were. Their 1961 weight predictions are found to be optimistic (by about 10 pounds), but their predicted cyclic rate is met and exceeded at 2400 rpm. However, their grenade launcher module was not semi-automatic. Instead, AAI had settled on a less bulky level-action mechanism.

May: William C. Davis and C.E. Schindler release the report **"Investigation of Alternate Propellants For Use in 5.56mm M193 Ball Ammunition."** CR 8136 and WC846 are recommended for use. However, they also note that these powders exhibit slightly higher pressure levels at the AR-15's gas port than did IMR 4475. HPC-10 is declined due to excessive pressures at extremely low (Arctic) temperatures and previous issues of bore erosion with tubular grain propellants. Before the report is even released, the two recommended powders are approved for use in M193 production. The suggested "None Fire/All Fire" primer tolerance of 12 to 48 inch-ounces is also included in the technical data package, despite Colt's transition to a lighter firing pin.

The Army begins issue of XM16E1 rifles. CONARC and the Combat Developments Command each deny responsibility for developing related training materials.

Colt unveils their "CAR-15 5.56mm Military Weapons System" to Army brass, including General Wheeler. The projected CAR-15 family includes a pair of AR15-HBAR light machineguns (the other magazine-fed M1 and the belt-fed M2), a 15" barreled carbine, a 10" barreled SMG, and a stripped down "survival rifle" for aircrews. The earliest prototypes of the CAR-15 SMG and carbine use cut-down M16 triangular forearms and buttstocks. As an added feature, the chopped buttstock of the SMG has a latch recessed in the buttplate, which allows the buttstock to be extended or retracted. These models retain the early AR15 Model 01's open flashhiders. Colt also introduces the belt-fed "Light Machine Gun 5.56mm CMG-1." *However, the CGL-4 40mm grenade launcher, designed Robert E. Roy and Karl R. Lewis, attracts the most favorable attention, particularly from General Wheeler. This official interest starts the ball rolling again for an add-on grenade launcher for the XM16E1, and the Colt CGL-4 is soon pitted against a launcher from the Ford Motor Company and another from Springfield Armory.*

June: The first documented incidents of case head separations and rim pull-through are recorded.

Federal Cartridge defaults on a contract for 200,000 M193 cartridges.

Development of blank cartridges and blank firing adapters is stopped due to lack of R&D funds.

Winchester officially introduces the .225 Winchester. Intended as a replacement for the .220 Swift, the cartridge is roughly an improved .219 Zipper with a rim sized to fit a .30'06 bolt face.

July: Army Chief of Staff General Wheeler is appointed Chairman of the Joint Chiefs of Staff.

Mass production of fl chette cartridges is simulated. Construction of the fl chette itself is noted to be very labor intensive.

August: Remington delivers M193 cartridges loaded with DuPont CR 8136. Testing at Colt results in lower cyclic rates. The monthly acceptance waiver on maximum cyclic rate is rescinded.

The USMC complains directly to the newly appointed Army Chief of Staff, General Harold K. Johnson, that their requests for procurement of the Stoner 63 are being ignored.

September: The 5th Special Forces Airborne Group submit their first monthly field report on the XM16E1. They recommend that the fragile M11 cleaning rod be replaced and that a brush for cleaning the chamber and lug recesses be issued.

The USAIB publishes the report "**Service Test of Cartridge, Tracer, 5.56MM, XM196.**"

October: After Colt once again warns of the termination of rifle production, the option clause of contract "508" is invoked to include an additional 33,500 M16 rifles for the USAF, 240 for the Navy, and 82 for the Coast Guard.

LTC Yount's title is changed to "Project Manager, Rifles" (PMR). With this, he is now responsible for the SPIW program along with the M16.

Aberdeen's D&PS releases "**Final Report of Comparison Test of Rifle, 5.56mm M16.**" While only based on a sample of five rifles, it notes that malfunctions tend to occur after 1,000rds are fired with cleaning and lubrication. It also suggests that special brushes be issued for cleaning the chamber, lug recesses, and the inside of the bolt carrier.

Frankford Arsenal completes a study on the measurement of 5.56mm case hardness.

*The OCO releases the report "**Development of Special-Purpose Individual Weapon (SPIW) System.**"*

November: McNamara proposes the closure of Springfield Armory.

Results of the SPIW Phase I evaluation are complete. While the candidates are not considered to be mature enough for Phase II full-scale engineering development, certain trends are noted. The Springfield SPIW is judged to be the most reliable and accurate. AAI's SPIW is the lightest, simplest, and considered to be most durable. However, none of the systems are considered to be particularly reliable or durable, and testers complained of the candidates' weight, rapid over-heating, and their excessive muzzle blast and flash. Finally, the cartridges themselves are still too fragile, the pressures are too high, the tactical penetration and accuracy are inadequate, and the experimental fl  chette tracer cartridge cannot provide a decent visual trace.

USMC complaints concerning the Army's position vis-  -vis the Stoner reach the OSD. The OSD then applies pressure to the Army to sort things out. General Johnson orders a new two year study of doctrine and materiel: the Small Arms Weapon Systems (SAWS) program (not to be confused with the later Squad Automatic Weapon trials). In return, the USMC agrees to abide by the final decisions and recommendations of the report.

December: Remington and DuPont withdraw CR 8136 due to the inability to maintain pressure limits from lot to lot. Remington asks and is granted permission to finish their production run using WC846. XM16E1 acceptance testing at Colt continues with remaining stocks of CR 8136-loaded ammunition.

The Army's Combat Developments Command (CDC) begins work on the SAWS program.

1965...

The Army orders 861 Stoner 63 in multiple configurations for the SAWS program. These are later named the XM22 rifle, the XM23 carbine, and the XM207 LMG. While considered to be an unfinished design, a total of 27 (or 29) AR-18 rifles are also

Prototypes of the HK 33 first appear. H&R imports a small number and attempts to have them included in the SAWS program. H&R marks these rifles as the T223.

Nederlandsche Wapen-En Munitiefabriek (NWM) of the Netherlands is granted worldwide manufacturing and sales rights by Cadillac Gage for the Stoner 63 system. Oddly, NWM produces only barrels for the system over its history, and only a handful of weapons are assembled using US-made parts.

Remington introduces a commercial version of the popular wildcat .22-250 cartridge.

January: Field Manual "**FM 23-9 - Rifle, 5.56mm XM16E1**" is released.

*Aberdeen's D&PS publishes the report "**Comparison Test of Rifle, 5.56-MM, XM16E1.**" The USAF releases the report "**Limited Range Test of the M16 Rifle with Eight Types of Rifle and Hand Grenades.**"*

February: The TCC requests new sources of powder for the M193 cartridge from DuPont and Hercules. The submitted powders are EX 8208-4 and HPC-11, respectively.

*Aberdeen's BRL publishes "**A Kinematic Evaluation of the AR-18 Rifle, Cal. 0.223.**"*

Ernest Vervier, father of the FN MAG58, determines that while the 5.56mm Mini-FAL is satisfactory, a stamped receiver, rotary bolt replacement for the FAL would be more successful in terms of future sales.

March: The 173rd Airborne Division deploys to Vietnam with XM16E1 rifles.

A contract is signed to provide 30 CGL-4 grenade launchers for further testing.

WECOM revises the SPIW development plan, now scheduled to span 35 months. AAI and Springfield Armory are to submit ten 'second generation' prototypes apiece for a rerunning of the Phase I evaluation process. The Army also expressed displeasure with the unconventional layout of the designs, from the bullpup to the use of an inline stock with a pistol grip. It is decided that the next generation of SPIW should have a 'conventional' stock design like the M14.

FN's Vervier follows through on his proposal. The first stamped receiver, rotary bolt prototype is chambered in 7.62mm NATO for direct comparison with the FAL and HK G3. However, Vervier indicates that the lessons learned will be applied to the construction of a new 5.56mm rifle.

May: William C. Davis is temporarily assigned to Colt as the "XM16E Engineering Project Manager." On Colt's request, Davis

designs the 68 grain GX-6235 projectile. The projectile features a 10-caliber secant ogive. This bullet requires a 1-in-9" twist; however, it shows excessive fouling when tested in a 1-in-7" twist barrel.

May-June: Colt's supply of CR 8136-loaded ammunition runs out. Acceptance testing continues with WC846 loaded cartridges. As result, Colt requests reinstatement of the maximum cyclic rate wavier. The TCC refuses. In response, Colt suspends production of the XM16E1. M16 production for the USAF continues.

The CGL-4 grenade launcher is type classified as the XM148.

June: Olin declines to submit a new powder.

In the report "**Study of Current Primer-Sensitivity Criteria for 5.56MM Ammunition**," Frankford Arsenal notes that the restrictive primer sensitivity requirements are having the predicted results, causing high rejection rates of primer lots by manufacturers.

July: Commander of US Military Assistance Command, Vietnam (MACV), General William Westmoreland asks Army Material Command to examine the issues necessary to issue M16/XM16E1 rifles to all US troops in Vietnam.

The USAF orders an additional 36,682 M16 rifles.

Springfield Armory publishes the report "**Blank Cartridge and Blank Firing Attachment for 5.56MM M16 (AR-15) Rifle.**"

Summer: *Frankford Arsenal orders five XM16E1 fitted with .17 caliber barrels. The experimental 4.32x45mm "Micro-Bullet" cartridge is loaded using Remington formed and primed cases, and appears to be the genesis of the commercial .17 Remington introduced in 1971. Two of test rifles include Colt's 2 round and 3 round burst mechanisms. Two other rifles are not equipped with burst mechanisms, while the final pair is sent to Springfield Armory for testing of micro-bore chrome plating procedures. Exploring use in unmodified XM16E1, 5.56mm cartridges are also loaded with sabot .17 caliber projectiles.*

L. James Sullivan leaves Cadillac Gage to join Sturm, Ruger & Co.

August: Reports of the XM16E1 bolt and bolt carrier seizing begin to surface from Vietnam.

Frankford Arsenal draws up the specifications for the M232 Dummy cartridge.

The Army's Arctic Test Center publishes the report "**Final Report of Service Test of Cartridge, Tracer, 5.56MM, XM196 Under Arctic Winter Conditions.**"

September: C.E. Schindler releases a report titled "**Investigation of Alternate Propellants For Use in 5.56mm Ball and Tracer Ammunition.**" DuPont's EX 8208-4 is shown to have moderate fouling, but records higher gas port pressures

than WC846. Hercules HPC-11 shows the least visible fouling, but further examination shows that heavy fouling has constricted the gas tube. The report recommends that EX 8208-4 be approved for use in M193 Ball and M196 tracer cartridges, that CR 8136 and IMR 4475 be withdrawn, and that Hercules and Olin reduce the fouling characteristics of their respective powders. However, unlike WC846, HPC-11 is not approved for current use.

At Colt, William C. Davis finishes evaluation of 5.56mm plastic training cartridges produced by Dynamit Nobel's Geco.

October: Colt's military sales manager, James B. Hall, informs General Westmoreland's staff that Colt would stop producing XM16E1 rifles in January if no further orders were made.

Springfield Armory publishes the report "**Water-in-the-bore Investigation.**"

November: McNamara orders Springfield Armory to prepare for closure by April 1968.

At Colt, William C. Davis releases the report "**Effect of Ammunition Variables on Acceptance testing of XM16E1 Rifles.**" It notes that half of the XM16E accepted with CR 8136-loaded cartridges would fail when tested with WC846-loaded cartridges. It is suggested that the maximum acceptable cyclic rate might need to be raised as high as 1,000rpm. It is also noted that bolt failures and malfunctions are more likely to occur at higher cyclic rates.

December: Bypassing Army chain of command, Westmoreland uses USAF communication assets to contact Senator Russell, Chairman of the Armed Services Committee. Westmoreland requests an additional 100,000 XM16E1 rifles. After Sen. Russell applies pressure on Secretary McNamara, a letter contract for the requested rifles is placed with Colt.

Initial testing in the Small Arms Weapon Systems (SAWS) trials also indicates that XM16E1 rifles are more likely to foul, exhibit high cyclic rates, and suffer more malfunctions as a result when using cartridges loaded with WC846 versus CR 8136.

The USMC orders 1,080 Stoner 63 rifles and accessories for use in additional testing.

1966...

FN introduces the 5.56mm CAL.

CETME begins studies for a 5.56mm rifle design.

Lake City Army Ammunition Plant begins production of the M196 Tracer.

Federal begins to offer a 68 grain 5.56mm Ball cartridge.

General Electric designs a tungsten core 5.56mm AP bullet for

ArmaLite. FN also produces a tungsten core AP projectile; the cartridge is later designated the P96.

January: Colt presents the TCC with Foster Sturtevant's latest development: the "Buffer Assembly Having a Plurality of Inertial Masses Acting in Delayed Sequence to Oppose Bolt Rebound". While intended primarily to prevent light strike misfires due to bolt bounce in automatic fire, Sturtevant's new buffer unwittingly saves the day on a second front. Since the new buffer weighs roughly three times more than Stoner's original design, it reduces the overall cyclic rate to acceptable levels.

Procurement is authorized for 2,050 CAR-15 "Submachine guns."

The Army's CDC establishes a requirement for 30 round magazines. Ideally, all future production M16-type rifles will come equipped with these. However, Colt has difficulties with their first few designs. Made with a continuous curve, the magazines would not fit properly in some mag wells given the machining tolerances in the lower receiver. (The current straight-then-curved 30 round mag design will not be ready for production until late 1968/early 1969.)

Springfield publishes the report **"Barrel Erosion Study of Rifles, 5.56MM, M16 and XM16E1--A Joint Army-Air Force Test."**

February: The requirement for the Colt CAR-15 "Commando" is increased by 765.

WECOM conducts a formal "in-process review" of the SPIW program. Neither AAI or Springfield Armory have their second-generation SPIW prototypes ready. Indeed, some items have not even been designed, much less manufactured. A 90 day waiver for delivery is given as a result.

March: *The British Ministry of Defense (MOD) tests the ArmaLite AR-18. It is found to be fairly sensitive to sand and mud.*

Cadillac Gage introduces a series of product improvements to the Stoner 63. The updated weapon is now known as the Stoner 63A.

April: In a document titled **"Improved Performance of Ammunition for the M16 Rifle,"** G.A. Gustafson recommends that the 68 grain .224" homologue to the .30 M1 Ball be revived for use in the 5.56mm cartridge. Gustafson suggests that 50,000 bullets of this design be purchased from Sierra for constructing test ammunition. He also recommends using test rifles with both 1-in-12" and 1-in-9" twist barrels. (At the time, Gustafson is assigned to Aberdeen's Test Analysis and Operations Office.)

Spring: LTC Yount is promoted to Colonel.

June: Contract DAAF03-66-C-0018 is signed with Colt for 403,905 XM16E1 rifles. The Army will receive 213,405 (including Westmoreland's request for 100,000). Another 114,000 are earmarked for Military Assistance for the South Vietnamese, and the final 76,500 will go to the USMC. The contract will be

amended 256 times before it is complete. One of the first is for an additional 15,372 rifles for the USMC.

Separate contracts for 2,815 Colt Commandos and 19,236 XM148 grenade launchers are also signed.

M193 and M196 cartridges loaded with DuPont EX 8208-4 begin to arrive for issue.

During the Infantry Rifle Unit Study (IRUS), an XM16E1 suffers a casehead rupture, extensively damaging the rifle. This is the third incident recorded during the history of the M16/XM16E1 program. Use of Federal Cartridge lot FC1830 and FC1831 is suspended. Case hardness tolerances are suspected.

Frankford Arsenal finalizes drawings for the XM195 grenade blank. The mil spec is not issued for another two months.

Aberdeen's BRL releases the report "***The Aerodynamic Properties of a Caliber .223 Remington Bullet used in M16 (AR-15) Rifle.***"

July: A casehead rupture damages a fourth rifle, this time with Remington ammo (Lot No. 5189).

August: All US Army units in Vietnam have been issued the XM16E1.

The second-generation SPIW prototypes are submitted for testing. The Springfield Armory candidate required significant redesign from its original bullpup configuration. While the new design still meets the length restriction, it also remains overweight. The dual magazine design has been changed to a side-by-side plan constructed of clear Lexan. When one side runs dry, feed is automatically switched to the opposite side. The Winchester grenade launcher is fitted; however, it now uses a preloaded, disposable magazine. One thing that proves especially difficult is the Army's insistence that both weapons be fired from the same trigger. The complex linkages involved result in the grenade-trigger option having a 25 pound trigger pull.

AAI didn't have quite as much work to convert their previous design. To met the 'conventional stock' requirement, they design a clever one-piece polymer buttstock/rear sight housing/magazine well. AAI's semi-automatic grenade launcher is finally ready, and uses a harmonica-style magazine. The magazine automatically ejects when empty. However, the overall weight still exceeds the project limit. (As an alternative, AAI proffers another grenade option, the DBCATA: Disposable Barrel and Cartridge Area Target Ammunition. The DBCATA allows the 40mm grenade to act as its own launcher. While it would lead to a major reduction in system weight, the DBCATA is considered to be prohibitively expensive. Essentially, you would be throwing a barrel away after each shot.)

Neither entry is terribly reliable, none achieve the weight goal, and the most of the pre-existing problems are still unsolved, including the various ammunition issues. (By this point, the

XM110 and XM144 had been replaced by the 5.6x57mm XM645 and 5.6x44mm XM216 cartridges.) Observers state that the blast and flash signatures even exceed those of the unmodified Colt 'Commando'.

The British MOD tests an improved model of the AR-18. It still fails in sand and mud tests.

September: The closed-end "birdcage" flash hider is approved to replace the open three-prong model. The latter was prone to snagging and breakage, and was also suspected in assisting the capillary movement of water into the bore.

Rock Island Arsenal releases the Preliminary Operation and Maintenance Manual (POMM 9-1005-294-14) for the "Submachine Gun 5.56mm, CAR-15." Colt introduces multiple improvements including a smaller telescoping stock/buffer assembly, redesigned round handguards, which were held in place with a wedge-shaped slip ring, and the "noise and flash suppressor." The suppressor incorporates multiple expansion chambers to slow and cool the propellant gases, thus reducing the muzzle blast from the short barrel. This is particularly important as safety certification was previously withheld due to the high sound levels recorded during testing at Aberdeen Proving Grounds. (However, the same device is later ruled to be a NFA-restricted "silencer" by the BATF.)

October: After widespread reports of stoppages and other malfunctions, General Westmoreland requests technical assistance. A team including Colonel Yount's assistant LTC Underwood, representatives from WECOM, and Colt are sent to Vietnam to investigate. A near total lack of maintenance and cleaning is blamed. Underwood is so appalled that he insists that Colonel Yount come to Vietnam to witness the conditions himself. Yount complies with the request. Colt's Robert Freemont is sent to Rock Island to examine rifles returned from Vietnam.

Colt reports to the TCC on the issue of reverting to 1-in-14" twist barrels. Colt indicates that existing rifle barrels already have a 10% rejection rate due to tested accuracy, despite meeting physical machining specs. Colt states that a change to the slower rate of twist would require relaxed accuracy standards.

Frankford Arsenal finalizes drawings for the M200 Blank. The official mil spec is released a month later.

With Springfield Armory scheduled for closure in 1968, WECOM realizes that no one will be left to compete with AAI for the SPIW contract. Industry representatives are invited to Fort Benning to witness SPIW testing in hopes of someone picking up the Springfield design. One of the representatives is Colt's Engineering Project Manager, Robert Roy. Needless to say, Colt is curious to see what was competing against their M16 rifle; they have even gone to the extent of creating a 5.56x45mm fl  chette load with a companion smoothbore M16.

The USMC asks Cadillac Gage to upgrade 286 of their early Stoner 63 to the 63A standard.

November: The State Department's Office of Munitions Control approves the export sale of 18,000 AR-15 and 2,300 AR-15 HBAR M1 by Colt to the Republic of Singapore. This creates a political firestorm when news of the sale becomes public. While Colt claimed that the export rifles would come from expanded production quotas, this not only angered those who thought these rifles should go to US troops, but also US allies with troops stationed in Vietnam. For instance, South Korean, Philippine, and Thai troops in South Vietnam were all armed with surplus M1 Garands.

General Nelson M. Lynde orders the PMR to supervise development and procurement of scopes and mounts for WECOM.

General Electric's Chemical Materials Department proposes a disposable polymer-bodied magazine for the M16.

The USAIB recommends to Army Chief of Staff Gen. Harold K. Johnson that the SPIW program be cut back, with greater responsibility given to AAI to develop a working model. The Office of the Chief of Staff (OCS) acts upon this recommendation, 'reorienting' the SPIW program from an engineering development program to an exploratory program under the Future Rifle Program (FRP). At the same time, the OCS announces the Army's intent to adopt the XM16E1 for standardization and issue for all US troops stationed outside of Europe.

*Frankford Arsenal files the report "**SPIW Ammunition Cost Estimate Study**." The report claims that fl  chette cartridges could be produced economically given enough study and effort.*

In an internal memo at Colt, Robert Roy reports that there was no reason to save the Springfield SPIW, as the program was unlikely to be debugged anytime soon. Moreover, such efforts would only serve take attention away from Colt's own M16.

December: Colt begins equipping new production rifles with Sturtevant's improved buffer. Retrofit of older rifles will not be complete for nearly a year.

Frankford and Rock Island Arsenals report that they cannot find a cause of the reported "blow-ups." Only cartridges loaded with inappropriate powders (handgun or shotgun-type) caused the same level of damage during testing.

The final results of the Small Arms Weapon Systems (SAWS) program are released. While the XM16E1 rifles exhibit one of the highest malfunction rates of the rifles tested (10.6 per 1,000rds), it is deemed superior for Army use. The Stoner 63 is considered attractive, but the report concludes that it does not offer enough of an advantage to warrant current adoption. Computer generated data on theoretical SPIW performance projects that it will outperform everything. On the other hand, the status of the actual SPIW prototypes is clearly nowhere close to being ready for issue.

The first XM148 grenade launchers arrive in Vietnam.

1967...

Colt introduces the belt-fed "Light Machine Gun 5.56mm CMG-2."

Howa Machinery Company of Nagoya, Japan buys the production rights to the AR-18 from ArmaLite.

Manufacture d'Armes de St-Etienne (MAS) of France begins development of a 5.56mm rifle.

At Ruger, L. James Sullivan begins work on a scaled down M14 in 5.56mm. Several years (and modifications) later, it is released commercially as the Mini-14.

Frankford Arsenal initiates the M16 Sight Enhancement Program to develop improved low-light sights, both iron and optical. Frankford's Pitman-Dunn Laboratory also begins research into caseless cartridges.

Frankford Arsenal and Lake City begin the development of gilding metal clad steel (GMCS) jackets for the construction of M196 Tracer projectiles. This was the result of reported jacket failures with the M196.

After acquiring 50,000 XM16E1-type rifles, the Philippine government purchases a production license from Colt for an XM16E1-type rifle and a 14.5" barreled carbine. Manufactured by Elisco Tool Company of Manila, Colt designates these variants, the Model 613-P and 653-P, respectively.

The Naval Ordnance Laboratory produces a subsonic 5.56mm cartridge for use by SEAL teams. The projectile is a truncated lead slug. Another effort uses Sierra hollowpoints. Both are reportedly used for shooting sentry animals, but neither provides the desired terminal performance.

Nosler constructs 500 solid steel projectiles plated with bronze. The 41 grain projectiles are intended for testing by Frankford Arsenal.

January: Colonel Yount notes an "urgent" requirement for swabs, bore brushes, chamber brushes, and cleaning rods.

The closed-end "birdcage" flash hider is included in new production M16/XM16E1 rifles.

The CAR-15 Commando is type classified as the "Submachine Gun, 5.56mm XM177" (USAF - no bolt closure device) and "Submachine Gun, 5.56mm XM177E1" (Army - w/ bolt closure device).

Colt files the report "**Delrin Charging Handle Latch Report.**" The Delrin charging handle was designed in hopes of reducing user complaints concerning the charging handle unlatching while the weapon is firings. The 'Commando' models were considered

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Mixed reports also come back concerning the XM148 grenade launcher. While M79 users quickly welcomed the rifle/grenade launcher concept, the XM148 proves completely unsatisfactory under combat conditions. Users complain that the quadrant sight was prone to snagging in brush, and worse, that the sight is difficult to use with any accuracy. Also listed as snag prone are the extended trigger and trigger bar. These can be bent or broken simply by opening or closing the rifle's receiver during/after fieldstripping. The separate cocking lever is quite unpopular due to the 30lb (~14kg) force required to cock the weapon. Within a few months, units with the XM148 are clamoring to have their M79 reissued. This is significant as most M79 users are only issued a M1911A1 pistol as backup for their grenade launcher.

384 Colt/Realist 3x scopes arrive in Vietnam for mounting on M16A1 rifles.

April: Colt has made further improvements upon the XM177-series based upon feedback and suggestions from users. One such suggestion is lengthening the barrel so that the new Colt XM148 40mm grenade launcher can be mounted. The 1.5" longer barrel also has the additional benefit of improving the consistency of pressure curve at the gas port. In addition, Colt has developed an improved version of its "noise and flash suppressor." The new version can reportedly reduce the muzzle blast to that of the standard rifle. The longer barrel variant is type-classified the XM177E2. Negotiations begin for the procurement of 510 XM177E2 for the Studies and Observation Group (MACV-SOG).

Lima Company requests that the test period for their Stoners be extended by an additional month. This request is approved. However, the Bren-style LMG is removed from issue as being redundant.

All other USMC maneuver and reconnaissance units in Vietnam have been issued the M16A1.

May: The May 13th issue of **Paris Match** magazine publishes photos of dead Marines with field stripped (or otherwise *hors de combat*) M16A1. The photos were taken by French photo journalist Catherine Leroy during the recent battles for Hills 861 and 881 (North and South) near Khe Sanh (24 April-5 May 1967).

Two days after the **Paris Match** photos are published, the Ichord Subcommittee opens hearings on the M16. Appointed by Representative L. Mendel Rivers, Chairman of the House Armed Services Committee, it is comprised of Representatives Richard Ichord (D-MI), Speedy O. Long (D-LA), and William G. Bray (R-IN).

A chrome-plated chamber is approved for the M16 rifle family. A fully chromed bore will not be approved until later.

The SEALs order an additional 36 Stoner 63A LMG. In contrast, the remainder of the Marines' Stoners are exchanged for M16A1

June: The Ichord Subcommittee visit Vietnam to examine M16 reliability issues first hand.

Retired Army Colonel E.B. Crossman files "**Report of Investigation of M16 Rifle in Combat**" with the Ichord Subcommittee. Comprised of 250 personal interviews with Army and Marine units in Vietnam, it reports that roughly 50% of the troops have experienced serious malfunctions with their XM16E1 rifle, of which 90% were failures to extract. The cause of these malfunctions was not determined.

Colonel Yount is relieved of his duties as PMR.

Springfield releases the reports "**Erosion Test on 5.56MM Rifle Barrels, Small Arms Weapon Study (SAWS)**" and "**Development of a Stellite-Lined, Chromium-Plated Barrel for 5.56MM Machine Gun.**"

US Army - Republic of Vietnam (USARV) issues ENSURE #77 requesting M16A1 sound suppressors. The Human Engineering Laboratory (HEL) at Aberdeen produces the models in question. (ENSURE: Expediting Non-standard Urgent Requirements for Equipment)

A private research firm, Planning Research Corporation, files a report claiming that given sufficient development a SPIW would be more cost-effective than other available infantry small arms. It recommends that the AAI SPIW rifle and DBCATA be chosen for further development.

The brief "Six-Day War" leaves Israel troops unimpressed by the reliability of their FN FAL and FALO. Testing for a new rifle begins. After testing the M16A1, Stoner 63, HK 33, and others, it becomes clear that nothing matches the reliability of their Arab enemies' Kalashnikov rifles. IMI sets about to create an improved clone. With the assistance of Interarms and Valmet of Finland, Israeli Galili and Yaacov Lior combine Valmet M62 receivers, Colt barrel blanks, FAL folding stocks, and a modified Stoner 63 rifle magazine to create the Galil.

June-July: The Army finally obtains the manufacturing rights and the TDP for the M16 and XM177-family. This is necessary for the establishment of additional production sources. Colt employees promptly prove the Army's point by starting a two-month strike in protest.

July: *The Army briefs representatives from private industry concerning what was to be later titled the Grenade Launcher Attachment Development (GLAD) Program. This briefing is intended to solicit interest in the development of alternative grenade launchers to the XM148. Out of 17 companies, only seven express interest.*

Lake City begins development of a steel 5.56mm cartridge case.

August: LTC Robert C. Engle assumes the position of PMR.

Yet another batch of comparison testing is conducted between 1-in-12" and 1-in-14" twist barrels. 2,000 new M16A1 rifles are used, evenly divided as to the installed barrel's rate of twist. The 1-in-14" barrels exhibit double the average extreme spread of the 1-in-12" barrels at 100m.

The Army establishes case hardness standards for the 5.56mm.

August-September: A multi-service field survey is conducted. Out of 2100 troops interviewed, only 38 wished to trade in their M16 rifles. Of these, 35 wanted an XM177-variant.

September: All new production M16 rifles and spare barrels are now manufactured with chromed chambers.

LTC Robert C. Engle is replaced as PMR by Colonel Alvin C. Isaacs.

Only three out of 17 firms are awarded GLAD contracts: Philco-Ford, Aero Jet General, and the AAI Corporation. Each of the contract winners offers a different approach. Aero Jet submits a bulky SPIW-type semi-automatic launcher. Philco-Ford offers a single shot launcher with a barrel that swings open to either side. AAI's single shot prototype is a forward opening, pump action design. Significant by its absence in the contract award is Colt, who has by this point delivered 27,400 XM148.

AAI begins in-house trials in support of their SPIW improvement program. Real progress has been made in extending functional reliability. However, the pre-existing issue of rapid heating as surfaced with actual occurrences of cartridge cook-offs. Ironically, the prototypes had never managed to function long enough to experience this problem in the past.

Fall: Colt makes a connection between gas tube fouling and calcium carbonate levels in WC846.

October: The Ichord Subcommittee releases its 600-page report. The Army and Department of Defense (DOD) are faulted on a total of 31 points. Some of the primary criticism include the use of ball powder hinting that Olin Mathieson's WC846 was given contract preference over DuPont's IMR powders, misinterpreting Olin's "sole source" status. (Olin owns the rights to "ball powder." However, Olin was not the Army's only source of gunpowder. It just so happened that no one less managed to develop an alternate powder which would reliably meet the velocity/chamber pressure spec for M193.) In addition, Army sponsored modifications are blamed for malfunctions, delays, and cost increases. This includes the introduction of new buffers and the recent decision to chrome plate chambers. The effects of OSD interference are not mentioned.

Twenty firms attend a pre-solicitation conference for M16/XM177 second sourcing. Only nine make the \$1,000 bid deposit to receive a copy of the TDP and two M16A1 rifles.

November: The Army Chief of Staff orders an "intensive review"

of Army management practices related to M16 product improvements. The DOD's Weapons System Evaluation Group (WSEG) with the assistance of the Army-funded Institute for Defense Analyses (IDA) prepares for yet another operational trial of the M16.

The "M16A1 Rifle System Test Coordinating Team" is established at Frankford Arsenal. Its job is to investigate ammunition performance and its relationship to M16 rifle function.

AAI begins a second set of in-house SPIW trials now concentrating on eliminating the cook-off problem.

December: WC846 is withdrawn for use in loading M196 tracer cartridges. WC846 is replaced by DuPont's IMR 8208M (formerly EX 8208-4).

Three additional firms place bid deposits for the M16 TDP, while four of the original bidders withdraw.

Frankford Arsenal releases the report "**Fouling Test Investigation of 5.56MM Ammunition/Weapon System.**"

1968...

L. James Sullivan leaves Ruger.

The SEALs discover a serious quirk with their Stoners: the "spin-back" jam. When in the belt-fed configuration, the Stoner ejects to the left. However, the 63A also feeds the belt from the left side. Occasionally, an ejected case will hit the drum or belt, and "spin-back" into the ejection port, causing a malfunction. On a positive note, Cadillac Gage introduces several enhancements, the most popular a short LMG barrel. This removes 6.25" in length and drops 1.56 pounds from the standard LMG barrel. Equipped with the new barrel, the LMG becomes known as the "Commando" model.

Beretta and SIG part ways on the 5.56mm rifle project over SIG Director Rudolf Amsler's insistence on using roller locking. SIG goes on to produce their SG530-1, a gas operated, roller locked design. At Beretta, Giuseppe Mazzetti, Leandro Zeneri, and Vittorio Valle set to work on a more conventional gas operated, rotary bolt design. The resulting design becomes the AR70. Both rifles still bear a fairly similar profile.

Frankford Arsenal begins experiments with the Low Noise Duplex Cartridge (LNDC). The earliest cartridges are loaded with a pair of 110gr tungsten core slugs. The initial projectiles use a blunt round-nose profile, but later efforts consist of a semi-spitzer shape.

Nosler continues to test its solid steel projectiles, now loading them in a .22-250.

January: The Army Chief of Staff creates the Army Small Arms Program (ARSAP) to handle all small arms projects. These are

subdivided into four major time spans: Continuing, Immediate (up to five years), Mid-term (up to 1980), and Long-term (up to 1990). The development projects are appropriately designated the "Future Rifle Program" (FRP). This includes projects such as the SPIW, now renamed the Serial Fléchette Rifle (SFR), the micro-caliber Serial Bullet Rifle (SBR), and other experimental cartridge concepts such as multiple fléchette loadings and caseless ammunition.

The first 120 "Noise Suppressor HEL M4" arrive in Vietnam. These require the installation of a special bolt carrier and an add-on gas deflector.

WSEG testing begins at Fort Sherman in Panama. 522 Marines test M16A1 rifles using new buffers and a mix of chromed and unchromed chambers with a mix of ammo from ball and IMR-loaded lots. M14 rifles were used as control. Ironically, M193 ball ammunition loaded with IMR 8208M exhibits the highest malfunction rates. IMR 8208M-loaded lots of M193 are suspended for use except for training. Its use in M196 tracer rounds continues.

February: The DOD's Department of Defense Research & Engineering (DDR&E) publishes a rebuttal to the Ichord report: **"Appraisal of the M16 Rifle Program."**

On contract to the Army, Comprehensive Designers, Inc. (CDI) studies the tolerance relationships in Colt's TDP for the M16/XM177. 140 areas of potential interference are found and reported to Colt along with the bidders for the second source contracts.

Frankford Arsenal releases the report **"Special Tests of 5.56mm Ammunition."** It is comprised of the results from ten tests using 150 new M16A1 rifles and 420,000 rounds of ammunition. Before testing, the chamber dimensions of all 150 rifles are checked in seven areas. Depending on the exact point of measurement, up to 77.5% of the rifle chambers were out of spec.

"Operational Reliability Test M-16A1 Rifle System, WSEG Report 124" on the Panamanian trials is classified and sealed by the OSD. This is suspected to be result of WC846's superior showing over IMR 8208M, which directly contradicted the allegations of the Ichord report.

Aberdeen's D&PS releases the reports **"Final Report on Special Study of High Temperature Bore Fouling of 5.56-MM, M196 Tracer Cartridge in M16A1 Rifle"** and **"Initial Production Test of Chrome-Plated Chambers for 5.56-MM, M16A1 Rifles."**

Aberdeen's BRL releases the report "SPIW Modes of Fire." The report recommends that while the AAI's high cyclic rate burst mechanism might give a higher percentage of hits over its much lower cyclic rate in full-automatic mode, the rifle would probably gain in reliability by removing the burst mechanism and tuning the weapon for a single 'optimum' rate of full-auto fire.

March: General Motors Corporation's Hydramatic Division receives a sole source award for M16 rifle production. This award is quickly withdrawn.

Aberdeen's BRL releases the memorandum report "**Accuracy of Rifle Fire: SPIW, M16A1, M14.**" These include the results of full automatic and burst mode accuracy testing at Fort Benning between the M16A1, M14, and AAI SPIW prototypes. Of note is the performance of the test M16A1 rifles, equipped with two round burst mechanisms. These are found to improve the hit probability over controlled automatic fire in the same weapon. The M16A1 also allows for the highest number of target engagements. Not surprisingly, the SPIW is found to be the easiest to control in automatic fire, and this produces the highest hit probability per target engaged. The M14, combined with either the standard M80 Ball or M198 Duplex, is found to give a higher hit probability per target engaged than the M16A1. With the M198 Duplex, the M14 is considered to be competitive with the SPIW, at least per target engagement.

General Electric submits a proposal to continue development of Springfield's orphaned SPIW. (GE's Armament Division was already renting portions of the Springfield Armory facility.)

April: Springfield Armory is officially closed. Of 480 employees, less than 20 members of the staff agree to transfer to Rock Island Arsenal. The remainder quit. (Richard Colby, designer of the Springfield SPIW, is hired by GE's Springfield office.)

Contracts are let with H&R (DAAF03-68-C-0045) and Hydramatic (DAAF03-68-C-0048) for 240,000 M16A1 rifles apiece. In response to grumbling by the other six bidders, the Ichord Subcommittee is reestablished and the Senate Preparedness Subcommittee establishes its own "Special M16 Rifle Subcommittee" chaired by Senator Howard Cannon.

Infantry Board testing of the HEL M4 indicates chronic malfunctions with the equipped rifles, primarily double feeding.

May: AAI and Philco-Ford deliver their grenade launcher prototypes. Colt attempts to provide a completely new 40mm grenade launcher, the CGL-5, designed by Henry A. Into. Colt offers 20 free samples for testing, but the Army declines.

Rock Island Arsenal and Winchester/Western conduct testing on alternate gas systems for the M16 rifle.

June: Contract DAAF03-69-0021 is let to Colt for 740,803 M16A1 and 1,000 M16 rifles. 135,001 of the ordered M16A1 are later requested to be manufactured as M16 instead. Colt also contracts to produce 1,000 30 round magazines for initial production testing. This contract also includes the Technical Data Package for their manufacture. Delivery is projected in 6.5 months.

Aberdeen's D&PS releases the report "**Final Report on Product Improvement of Submachine Gun, 5.56-MM XM177E2.**"

June-July: *New sound suppressors, the Sionics MAW-A1 and a model from Frankford Arsenal, are tested for potential issue under ENSURE #77. The Sionics suppressor requires no modification other than the removal of the flash hider. During safety testing, a Teflon bushing melted only after the can temperature reached 1,000 degrees. In contrast, one of the Frankford designed cans bursts during automatic fire.*

Summer: *Due to Japanese export restrictions on Howa-made AR-18, ArmaLite establishes their own production line for the AR-18 at their facility in Costa Mesa, CA.*

August: The AR-15/M16 Technical Coordinating Committee (TCC) is disbanded. The Army Chief of Staff creates the US Army Small Arms Systems Agency (USASASA) at Aberdeen to manage research and development efforts related to individual and crew-served weapons up to .60 caliber. This includes the Army Small Arms Program (ARSAP), but not the PMR's office. Other responsibilities included infantry grenade launchers (but not the GLAD project), sight and fire control systems (but not electronic night sights and GLAD sights), and all related ammunition programs (except for 40mm grenades and those cartridges controlled by the PMR.)

At Frankford Arsenal, Lawrence Moore files the report "**Gas Tube Fouling characteristics of M193 Ball Cartridges in M16A1 Rifle.**"

A letter contract is awarded to AAI for their grenade launcher design. It is unanimously selected based on its performance and cost.

Major Francis B. Conway, Commanding Officer of the Army's Marksmanship Training Unit (MTU), supervises accuracy testing of the Sionics and HEL suppressors. The Sionics equipped rifle actually improved in 100m and 300m accuracy over the same rifle equipped with the standard flash suppressor. The HEL M4 suppressor did well at 100m but fell back at 300m. In spite of this, a modified HEL suppressor, the M4A, is pressed ahead for issue.

September: *100 HEL M4A suppressors are shipped to Vietnam.*

October: *Production of 960 additional HEL M4A suppressors is transferred to Edgewood Arsenal.*

AAI is awarded a letter contract for development of a Serial Fléchette Rifle (SFR). (SFR is the new name for the rifle component of the SPIW.)

November: *The AAI grenade launcher is type-classified as the XM203.*

End-user comments indicate that Colt's modified "noise and flash suppressor" for the XM177E2 is prone to rapid fouling, reducing the efficiency of the sound suppression. It is also found that the M193 ball projectile is prone to excessive yaw once this fouling

had progressed far enough. The effect on the XM196 tracer is even worse, occasionally leading to in-air breakup of the projectile. Most troubling is that cyclic rate problems caused by ball powder in the parent M16 rifle are even worse in the XM177 family. Colt estimates that a complete ballistic/kinematics study of the XM177E2 will take 6 months at a cost of \$400,000. In response, the Army suggests an in-house, 29 month, \$635,000 R&D study. However, this proves to be straw that breaks the camel's back in regards to additional procurement.

December: Hydramatic delivers its first 100 rifles two weeks ahead of H&R. Two of the H&R rifles fail 6,000 round endurance testing, one to a cracked bolt and the other due to excessive failures to chamber.

Authorization is given for 600 XM203 to be assembled and sent to Vietnam for extended testing. The great irony is that after AAI completes this 600-launcher order, all further production contracts for M203 are awarded to Colt.

1969...

Sionics loans the Army 20 MAW-A1 suppressors for field trials in Vietnam.

Lake City begins production of M196 using GMCS jackets. This is discontinued years later due to complaints of barrel erosion.

Industries Valcartier Inc. (IVI) of Canada begins production of a 68 grain 5.56mm Ball cartridge. This and a companion 800m tracer are later designated XM287 Ball and XM288 Tracer by the US Army.

Frankford Arsenal begins a three-year development effort to create a viable aluminum cartridge case for 5.56mm cartridges. Frankford also publishes test results on the solid steel Nosler projectiles. They are considered insufficiently stable, but Frankford recommends that they be studied further for their low cost and ease of manufacture.

Cadillac Gage introduces a right-hand feed mechanism for the Stoner LMG, which replaces the feed cover and feed tray. However, the existing belt boxes are only configured for left-hand feed. Thus, work on an improved belt box begins, resulting in the definitive 100 round box.

HK engineers Tilo Möller, Gunter Kastner, Dieter Ketterer, and Ernst Wossner begin work on what becomes the caseless G11 rifle.

January: Aberdeen files the report "**Analysis of Consolidated Cyclic Rate Data for M16A1 Rifle.**"

Frankford Arsenal releases the report "**A Study of the Effects of Cartridge Case Mouth Waterproofing Compound on Fouling in the 5.56MM, M16A1 Rifle.**"

The British MOD tests yet another AR-18, a Howa production model. The mud tests continue to pose problems for the design.

WECOM publicly announces its SFR contract award to AAI. GE is also issued a contract for revamping the Springfield SPIW.

February: William C. Davis and James B. Ackley file the report "**Results of a Dispersion Test of 2,000 1:12 and 1:14 Twist M16A1 Rifle Barrels.**"

Aberdeen's D&PS publishes the report "**Comparison Tests of M16A1 Rifles.**"

March: The SEALs request an official "Mark" number for their Stoner Commando LMG.

April: William C. Davis and James B. Ackley file the report "**An Investigation of Gas-Port Pressures for Two Lots of 5.56mm Ammunition Containing Two Different Types of Powder.**"

May: Aberdeen publishes the report "**Combined Initial Production and Inspection Comparison Tests of M16A1 Rifles.**"

Remington publishes the report "**Report, Feasibility Study to Investigate the Sensitivity of Certain Small Caliber Incendiary Type Bullets.**" Remington's study had been conducted on behalf of Aberdeen's BRL.

June: The Naval Training Device Center publishes the report "**Ballistic Tests on the M-16 Training Cartridge.**"

WECOM designates the AAI SFR as the "XM19 Rifle, 5.6mm, Primer Activated Fléchette Firing." At Springfield, GE has redesigned their SPIW, eliminating 58 parts from the 1966 model. GE lobbies for development of fléchette cartridges based on the 5.56mm M193 cartridge case. This would allow them the option of producing either a SFR, a micro-caliber SBR, or even a standard 5.56x45mm weapon. GE even proposes necking the 5.56x45mm case out to 6mm, especially with the sabotaged ammunition types. The larger bore volume is cited as having the side benefit of reducing flash and blast, equivalent to an extra 5 inches of barrel length. Olin-Winchester chooses a separate path, developing multiple-fléchette cartridges. (Note: The intended grenade launcher attachment for the competing rifles is to be either the XM203 or the DBCATA.)

July: The first competitive bidding for M16A1 rifles results in awards to Colt (DAAF03-70-C-0001) for 458,435 M16A1 and to Hydramatic (DAAF03-70-C-0002) for 229,217 M16A1.

AR-18 production begins at ArmaLite's Costa Mesa facility.

Representative Richard L. Ottinger (D-NY) writes the US Comptroller General concerning the General Accounting Office's (GAO) investigation of the Future Rifle Program, specifically the SPIW.

August: The Army's Marksmanship Training Unit publishes the results of accuracy testing initiated by Colt. Three standard M16 have been pitted against a trio of heavy barrel M16 rifles. Three National Match M14 rifles are used as the control. At 300m, the heavy barrel M16 rifles produce an average group of 7.6" versus 12" from the issue M16 rifle. The M14-NM rifles average 6.4." The MTU reports the obvious superiority of the heavy barreled rifles over the standard M16 rifles. However, they recommend that a heavier bullet and faster rifling twist be investigated for M16 use at ranges exceeding 300m.

Frankford Arsenal publishes the report "**M16 Gas Tube Fouling -- Composition, Properties, and Means of Elimination.**"

September: The maximum allowable level of calcium carbonate in ball powders is reduced from 1% to 0.25%.

ACTIV files the report "XM203 Grenade Launcher Attachment Development."

October: Aberdeen publishes the reports "**Operational Reliability Study of M16A1 Rifle**" and "**Engineer Design Test of 20-Round Plastic Magazine for M16A1 Rifles.**"

November: Production of XM177-type weapons is deleted from the second-source contracts.

LTC Rex Wing replaces Colonel Alvin C. Isaacs as PMR.

December: Aberdeen files the report "**Reliability Characteristics of the M16A1 and M14 Rifle Systems at Low temperatures.**"

The Army reports on tests of Colt's latest belt-fed LMG, the CMG-2. Despite using the 68 grain GX-6235, the CMG-2 was considered to not offer enough range or a high enough rate of fire.

The Stoner Commando LMG (w/ right-hand feed) is officially type classified by the Navy as the "Gun, Machine, 5.56mm Mark 23 Mod 0." 48 of these are eventually procured. (The Stoner 63A1 rifle variant is at some point designated the Mk 4 Mod 0 rifle.)

The USAF awards a contract to Colt for the construction of four Individual Multi-Purpose Weapons (IMP), as a proposed air crew survival weapon. The original goals for the weapon are a "lethal" range of 100 meters, a weight of less than 1.5 pounds, a maximum length under 13," and a minimum magazine capacity of 7 rounds. Dale M. Davis of the USAF's Armament Laboratory (Elgin AFB) is responsible the stockless bullpup design which others dub an "arm gun." The best known examples of the GUU-4/P IMP are the technology demonstrators chambered in .221 Remington Fireball. However, experimental models are constructed in a couple of .30 caliber wildcats for suppressed use. These cartridges are based upon a slightly shortened .30 Carbine case and a shortened .221 Fireball case respectively (sort of a stubby forerunner to J.D. Jones' later Whisper

experiments). There was also discussion of building different models in Frankford Arsenal's 4.32x45mm micro-caliber cartridge (.17 Remington), 7.62x51mm, and 5.56x45mm. (The latter idea is developed and marketed commercially years later by Mack Gwinn Sr. and Mack Gwinn Jr. as the Bushmaster pistol.)

1970...

Dr. Carten, still Chief of the Technical Evaluation Branch of the AMC's Research Development & Equipment Directorate, files the ironically named report "**The M16 Rifle - A Case History.**" Carten pins the primary blame for M16 malfunctions on the lack of specifications for case hardness. (Somewhere along the line, Colt reduced the strength of the extractor spring to help prevent rim shear. After it was found that this caused its own problems, Colt introduced the rubber nub insert for the extractor spring.)

CIS begins manufacture of M16S rifles in Singapore.

ArmaLite experiments with coated projectiles in hopes of reducing bore friction. The coating is a new process developed by Du-Kote. *ArmaLite also introduces the compact AR-18S.*

C4 booby-trapped 5.56mm cartridges are encountered in the Phu Yen province of Vietnam. One soldier is killed and another wounded in separate incidents. EOD personal confirmed the contents. (Note: Dean has sources which indicate that conventional rifle primers should not be sufficient to detonate C4. However, I am including this claim from David Hughes for future reference. If Hughes' claims are indeed genuine, perhaps the C4 acts as a bore obstruction for subsequent shots, inadvertently providing the desired destruction of the weapon.)

Recently transferred from the USASASA to the T.J. Rodman Laboratory (Rock Island), AAI's XM19 program continues to debug the design. Early in the year, the CDEC starts a new series of field experiments at Fort Ord using the XM19.

January: Olin admits that WC846's manufacturing tolerances have played a role in cartridge performance. WC846 best suited for use in the 5.56x45mm is at the opposite tolerance end from WC846 best suited for 7.62mm NATO cartridges. Other manufacturers were not made aware of the differences. Henceforth, WC846 suitable for 5.56x45mm is relabeled as WC844. The remainder of the WC846 tolerance range retains the WC846 label.

Fort Benning performs weather resistance testing on brass and steel cased cartridges. The cartridges are test fired after 30 days of exposure.

*General Electric's Armament Department publishes "**Proposal for Development of a Special Purpose Individual Weapon.**" This document covers their SFR/SBR developments to date. However, it appears that GE never receives any further funding to follow up on their recommendations, effecting shelving the revised GE/Springfield SPIW.*

February: Frankford Arsenal releases the report "**Elimination of Gas Tube Fouling in the M16A1 Rifle when using the M200 Blank Cartridge.**" The culprit turned out to be the use of a white lacquer used by Twin Cities Army Ammunition Plant to seal the crimp of the blank cartridge. The titanium dioxide pigment in the white lacquer caused the observed fouling. Frankford recommends that clear or organically dyed lacquers be substituted for future M200 production runs.

Frankford also releases the report "**Metallurgical Examination of Fouled Gas Tube and Flash Suppressor from an M16A1 Rifle.**"

March: The Secretary of Defense, Melvin R. Laird, announces that all US troops assigned to NATO duties would be equipped with the M16/M16A1.

In hopes of preventing rim shear, Lake City experiments with 5.56mm cartridges using a thicker rim (0.055" versus the standard 0.045")

The USAIB at Fort Benning and G.A. Gustafson at Aberdeen each file a report titled "**Product Improvement Test of Cartridges, 5.56-MM, Assembled with Steel Cartridge Cases.**"

April: Re-titled "Product Manager, Rifles," LTC Wing's responsibilities are limited to the M16A1, XM203, and related ammunition.

Frankford Arsenal releases the report "**Experimental Study of the Flow Characteristics in the Gas Tube of the M16A1 Rifle**"

May: Frankford Arsenal releases the report "**Evaluation of the 5.56mm Nosler Steel Bullet.**"

The GAO releases the report "Development and Cost of the Army's Special Purpose Individual Weapon System." It recommends that the Army does not procure any further SPIW-type weapons until the cost of the ammunition can be reduced.

June: Aberdeen publishes the report "**Initial Production Test of Magazine, 30-Round, for M16A1 Rifles.**"

The USAF's Marksmanship School releases the report "Evaluation of AR-18 Rifle."

July: *The Army approves an Advanced Development Objective for a new LMG, introducing the nomenclature "Squad Automatic Weapon." Development of the intermediate 6mm SAW cartridge begins. The body diameter of the final 6x45mm cartridge case is just shy of the .25 Remington (.410" vs. .422").*

Remington provides prototype grenade blanks for launching the RAG-B ring airfoil grenade. These blanks are later standardized as the M755.

August: Frankford Arsenal publishes the report "**Ballistic Evaluation of 5.56MM XM287 Ball (68 Grain) and Matching XM288 Tracer Cartridge for XM207 Machine Gun.**"

October: A contract is let to Colt for 751,245 M16A1 and 2,300 M16 rifles (DAAF03-71-C-003).

Aberdeen releases the report "**Military Potential Test of Short Range Cartridges.**"

The British Armament Design Establishment (ADE) at the Royal Small Arms Factory (RSAF) Enfield creates a 5x44mm cartridge (roughly a .20/223 Remington). Their most recent experiments had centered around the "50s-era prototype EM-2 rifles with its 7x43mm cartridge case necked down to 6.25mm. The change is inspired by a West German study indicating that future ideal military calibers will be 5mm or smaller. The final adopted projectile requires a 1-in-5" twist.

Olin's Winchester-Western Division publishes "Summary and Recommendations - Multiple Fléchette Weapon System Development Contract." Winchester reports that they have finalized a 9.53mm multiple fléchette cartridge with an aluminum cartridge case. The loadings include a standard four fléchette payload (4,240fps), a pair of 'ball' fléchette paired with a tracer, and even a specialized armor-piercing 'penetrator'. Despite pushing pressures of up to 75,000psi, the large bore volume limits this to a brief spike, allowing the aluminum cartridge case to remain intact.

November: The last production lot of the white lacquer sealed M200 is completed at Twin Cities.

Frankford Arsenal releases the report "**Contribution of the 5.56MM, Ball M193 Cartridge Metal Components to Gas Tube Fouling in M16A1 Rifle.**"

December: WECOM's Systems Analysis Directorate publishes the report "**Analysis of M16 Rifle Dispersion and Dimensional Data.**"

Frankford Arsenal publishes the report "**Feasibility Study of Spin-Stabilized Subsonic Projectiles.**"

1971...

ARES, Inc. is co-founded by Gene Stoner and Bob Bihun.

Remington commercially introduces the .17 Remington cartridge. (Oddly enough, H&R had already offered a production-custom line of bolt-action rifles chambered for the wildcat version of the cartridge.)

Production of the Stoner 63A ends.

HK hedges its bets with the development of a more conventional micro-caliber rifle, the HK 36 (not to be confused with the later

G36). Its proprietary 4.6x36mm cartridge is best known for its asymmetrical "Spoon-nose" projectile: the Löffelspitz. The Löffelspitz is the product of a joint Spanish/German study in methods to deliberately induce yaw once a projectile strikes flesh, while not adversely effecting its accuracy during flight.

The National Board for the Promotion of Rifle Practice (NBPRP) approves the M16 and the civilian Colt AR-15 for use in their rifle matches. (Rules and Regulations For National Matches: Change 2 to AR920-30)

January: The Commanding General of CONARC orders all major commands to field at least one M16A1 rifle team for the Army's championships.

February: ARPA, in conjunction with USASASA, awards TRW Systems a contract to develop an infantry rifle which will require far less maintenance than the issue M16A1. Appropriately, the project is named the "Low Maintenance Rifle" (LMR). An engineering team led by Don Stoehr is assigned to the project. The final design uses a gas-operated, roller-locked action, and bears more than a slight resemblance to the German FG-42 paratrooper rifle. The LMR also borrows the trigger housing of the M60 GPMG, itself an amalgamation of the FG-42 rifle and MG-42 GPMG.

On behalf of Frankford Arsenal, Colt's Technik, Inc. publishes "Feasibility Study of Fléchette Fired from Rifled Barrel." In these experiments, saboté fléchette have been loaded into standard 5.56x45mm cases and fired through M16 rifles. Conceived as a low-cost way of testing different sabot/fléchette designs, the improved accuracy results cast doubt upon the existing SFR weapon and cartridge designs.

Spring: AAI submits an unsolicited proposal for the development of a plastic cased blank.

July: Aberdeen publishes the report "**Product Improvement Test of 5.56-MM Gilding-Metal-Clad Steel-Jacketed Tracer Projectiles.**"

August: The Office of Product Manager, M16 Series Rifles is disbanded. The staff is reassigned within WECOM.

WECOM publishes the report "**Procurement History and Analysis of M16 Rifle.**"

November: The Army, through the Land Warfare Laboratory at Aberdeen, signs a contract with AAI for the development of their proposed plastic case blank.

Colt submits an unsolicited proposal to the Army for the Small Caliber Machine Pistol (SCAMP). The Colt SCAMP fires a short .224" caliber proprietary cartridge known as the .22 SCAMP.

December: The Naval Training Device Center publishes the report "**Clothing Penetration Tests for the M-16 Training Cartridge.**"

Col. R.S. Isenson of the USASASA rejects Colt's SCAMP proposal as the Army is reportedly experimenting with a parallel small arms program called the "Personal Defense Weapon" (PDW).

1972...

Rock Island's Small Arms Systems Laboratory is assigned development of a Firing Port Weapon (FPW) for the XM732 Mechanized Infantry Combat Vehicle (MICV).

The Army awards a contract with the Honeywell Corporation's Ordnance Division (now part of Alliant Techsystems) for the development of a 30mm grenade cartridge to replace the existing 40x46mm. (The actual design is credited to Picatinny.)

Aberdeen discovers that M196 Tracer cartridges loaded with IMR 8208M is clocking lower than normal cyclic rates. WC844 is tested in an experimental batch of tracer, and the cyclic rates return to normal.

Frankford Arsenal conducts a test program to optimize the hardness gradient of the 5.56mm case.

The British ADE renames their 5x44mm cartridge. It is now the 4.85x44mm (based on the diameter of the barrel's lands).

HK introduces a 5.56mm box-fed LMG, the HK 13.

February: The Army MTU prepares a lesson outline for the development of a National Match M16A1 rifle. Testing has indicated the superiority of a 1-in-9" twist heavy barrel over a 1-in-12" twist barrel of the same profile. Bullet weights as heavy as 70gr are also tested with handloads.

March: The Army issues a "Material Need" document for a "Squad Automatic Weapon, Light Machine Gun." Development contracts for 6x45mm SAW prototypes are let to Maremont (Saco) and Ford Aerospace. A design team at the Rodman Laboratory develops their own candidate, the XM235. The goal is to procure a weapon that weighs no more than 20lbs when loaded with 200rds of ammo. In addition, any weapons not chambered for the 6mm SAW must provide a ball cartridge that can defeat a helmet at 800m and a tracer that remains visible beyond the same range. Gene Stoner has advised Cadillac Gage not to bother with adapting the Stoner 63 design to the new cartridge.

April: Frankford Arsenal publishes the report "**Investigation of a Low Noise Duplex Cartridge (LNDC).**"

May: *Aberdeen's BRL releases the report "A Technique for Quality Control of Piston Primer Ammunition." Sponsored by the USASASA, the study desired to find ways of improving the reliability of AAI's primer-actuated action.*

June: *ArmaLite ceases AR-18 production at Costa Mesa.*

July: *Frankford Arsenal releases the report "**Sealing of Sabot and Primer of XM645 Cartridge.**"*

August: Aberdeen publishes the report "**Comparison Test of 5.56-MM Tracer Ammunition Loaded with IMR 8208M and Ball WC844 Propellant.**"

October: Frankford Arsenal releases the reports "**Effect of 5.56mm Primer Components on Ballistic Performance of the M16A1 Rifle/Ammunition System**" and "**Effect of Propellant Additives in Reducing Fouling and Erosion in the M16A1 Rifle.**"

November: Frankford Arsenal releases the reports "**Aluminum Cartridge Case Feasibility Study Using the M16A1 Rifle with the 5.56mm Ball Ammunition as the Test Vehicle**" and "**Investigation of the Piston Primer For Use in the XM645 Cartridge.**"

*Aberdeen's BRL releases the report "**Resume of Special Tests of the XM19 Rifle and XM645 Ammunition.**" These tests were to examine the causes of health related complaints made by troops testing the XM19. Reported ailments included severe nausea, inflammations, and even eye injuries, all apparently caused by particles from the fiberglass sabot of the fléchette cartridges.*

1973...

Twin Cities receives the first complete SCAMP production line. (SCAMP: Small Caliber Ammunition Modernization Program) The new production line includes high speed loading presses, with the goal of increasing cartridge production from 60-100rpm to 1,200rpm.

Frankford Arsenal contracts additional aluminum case testing to be performed by Thiokol Chemical Corporation. Frankford also develops an aluminum-cased blank cartridge, which Aberdeen finds to be equivalent in performance to the issue M200.

Gulf + Western Industries Inc. begins development of a plastic cased ball cartridge.

The US Army CDC approves a material need document for a Future Rifle System (FRS). In many ways, it is a restatement of the SPIW requirements, incorporating both point and area target capabilities. However, the FRS is opened up to more than the previous fléchette cartridge systems.

The Army awards a rifle development contract to ARES, Inc. In return, Stoner creates the Future Assault Rifle Concept (FARC) prototype. Oddly enough, it is Stoner's first 5.56x45mm design that hasn't started life as an earlier 7.62mm NATO design.

TRW ceases development of the LMR.

After failed experiments involving conventionally arranged bolts, HK's G11 development team happen upon a solution for providing gas obturation with caseless cartridges. Their chamber and breech will rotate about an axis at a right angle to the barrel.

HK introduces a 5.56mm belt-fed LMG, the HK 23A1.

In one of the few export sales that Colt and the US State Department approve, CIS begins delivery of roughly 30,000 M16 rifles to Thailand.

February: *Reportedly due to bullet seating issues with the 4.85x44mm, the British ADE go with a longer case neck, creating the 4.85x49mm. Work now begins on developing a corresponding rifle. The Project Leader is Col. John Weeks, and the rifle design team is lead by Sydney Hance. Hance had been chief design assistant for the EM-2 rifle. Initial work begins with the caliber conversion of existing AR-15, AR-18, and Stoner 63 rifles. The conversion also includes the belt fed Stoner 63 variant. Later, bullpup conversions of the AR-18 and Stoner 63 rifles are executed.*

March: The Army's Arctic Test Center publishes the report "**Product Improvement Test of Gilding Metal Clad Steel (GMCS) Jackets for 5.56MM Projectiles.**" The testing had been conducted on behalf of Frankford Arsenal.

May: *The Israeli Defense Forces issue its first batch of Galil rifles.*

June: Frankford Arsenal publishes the report "**A Limited Analysis of a New Ammunition Concept for Potential Future Rifle Application.**" This report concerns the FABRL "low-impulse" cartridge, created in a joint project between Frankford Arsenal and Aberdeen's Ballistic Research Laboratories (BRL). (While it is clear that the initials FABRL indicate the parent agencies, it is later explained away as: "Future Ammunition for Burst Rifle Launch.")

The original projectile shape chosen by the BRL is the "AR2 artillery shape"; however, this proves difficult to manufacture. A slightly shorter compromise projectile known as the "Von Korman" bullet is used instead. This projectile weighs 32 grains as manufactured. The idea is that if the long, low drag projectile is launched at the same velocity as the shorter 55gr M193 projectile, the two cartridges will exhibit in similar trajectories. The lighter projectile will also provide the side benefit of reducing recoil by a third in comparison to the M193. Testing indicates that the "low-impulse" FABRL cartridge could improve the average probability of incapacitation by 60% over the M193, between the ranges of 0 to 500 meters.

Since the lighter "Von Korman" projectile does not need as much propellant to reach the target velocity, it is realized that the FABRL cartridge case could be made shorter. Experiments with the shorter case leads to additional experiments with aluminum cases, achieving an overall cartridge weight of 87 grains versus the ~182 grain weight of the M193 cartridge.

MAS publicly introduces its new 5.56mm bullpup Fusil Automatique. This is better known as the FA MAS, or FAMAS.

July: The US Army Armament Command (ARMCOM) is created by combining Army Munitions Command (MUCOM) at Picatinny, the Army Ammunition Procurement and Supply Agency (APSA), WECOM, and USASASA.

Control of the SAW project is passed on to Rodman Laboratory.

August: Frankford Arsenal publishes the report "**An Analysis of Various Primer Vent Configurations in 5.56mm Ammunition.**"

Aberdeen publishes the report "**Development Test III of Cartridge, 5.56-MM, Aluminum, Blank.**"

December: Aberdeen publishes the report "**Product Improvement Test of Cartridge, 5.56-MM, Ball, M193 with Gilding-Metal-Clad Steel-Jacketed Projectile.**"

ARMCOM removes fl chette cartridges from 'immediate consideration' for use in the Future Rifle System Program.

1974...

The Soviet Union adopts the AK74 rifle and its 5.45x39mm cartridge. This cartridge uses a smaller diameter case than the .220 Russian, but has a slightly larger head than the 5.56x45mm.

Dr. Louis Palmisano and Ferris Pindell begin work on modified variants of the .220 Russian, creating the .22 PPC and 6mm PPC. (PPC: Pindell-Palmisano Cartridge)

Sterling Armament Company of Dagenham, England purchases the production rights to the AR-18 from ArmaLite. Further development is reportedly stopped for a 5.56mm rifle designed by Frank Waters, Sterling's chief designer.

FN introduces Ernest Vervier's final design project, the Minimi LMG. While a pair of prototypes were assembled in 7.62mm NATO, further prototypes are constructed in 5.56mm.

Beretta introduces a carbine variant of the AR70: the SCS70.

SIG introduces the SG540 rifle. A more conventional design using a gas operated rotary bolt action, SG540 spawns a family of weapons. To circumvent Swiss export laws, the production rights are licensed off to Manurhin of France. Manurhin does make several sales to former French colonies, but their biggest coup is a stopgap sale to the French Foreign Legion to tide them over until the FAMAS is ready for issue. SG540-series production is later licensed to INDEP of Portugal and FAMAE of Chile.

Lake City begins production of M193 Ball using GMCS jackets.

These are later discontinued the same time as the GMCS jacket M196.

The US Army also experiments with thin walled steel cartridge cases as an alternative to aluminum cases.

The NRA High Power Rifle Committee eliminates the caliber restriction for NRA Match Rifles in High Power Rule 3.1. The NRA Board of Directors later approves the M16 and civilian AR-15 for Service Rifle matches.

March: Aberdeen publishes the report "**Product Improvement Test of 5.56-MM Steel-Cased Ammunition.**"

May: The testing of FPW candidates results in the decision to continue development of an M16A1-based weapon. Other contenders were the .45 ACP M3A1 SMG and a modified 5.56mm HK 33 known as the MICV. (The latter is a forerunner to the compact HK 53.) The original Rock Island design is later passed on to the Army Research and Development Command (ARRADCOM) at Picatinny Arsenal for additional work. The prototype FPWs are designated the XM231.

AAI publishes the document "Final Report - Design and Develop a Simplified Serial Fléchette Rifle." This document covers AAI's contractual progress in development of the "XM70 Simplified Serial Fléchette Rifle." Oddly, instead of removing the burst device as Aberdeen's BRL had suggested earlier, AAI has instead eliminated the full automatic option.

June: Aberdeen publishes the report "**Product Improvement Test of 5.56-MM Cartridge Case with Optimized Hardness Gradient**" and "**Plastic 5.56mm Blank Cartridge.**"

Unfortunately, when the Land Warfare Laboratory at Aberdeen is closed, AAI's plastic blank cartridge dies with it.

Summer: *Rock Island Arsenal tests An ARES FARC-2 prototype. Over 4,000 5.56mm rounds are fired. The results lead to a pair of improved prototypes designated as the FARC-3.*

October: *The Human Engineering Labs at Aberdeen pit the sole AAI XM70 Serial Fléchette Rifle (SFR) prototype against a pair of Frankford Arsenal's early experimental 4.32x45mm XM16E1. The XM70 breaks after six bursts.*

December: Development Test / Operation Test I ends for the SAW candidates. In addition to the three 6mm SAW prototypes, three 5.56mm LMGs have been tested: a Colt M16 HBAR, the FN Minimi, and the HK 23A1. A standard M16A1 was used as the control. The Colt HBAR didn't make the cut due to its mere 30 round magazine. The decision to drop the HK 23A1 for safety reasons was particularly controversial. First, the HK entry suffered numerous problems due to the experimental XM287/XM288 cartridges. The lot of IVI ammo used possessed thinner case walls than the usual M193/M196 cartridges. Aberdeen personnel also disassembled the trigger group beyond the limits of factory recommendations. During reassembly, critical parts were bent. HK co-founder and managing director

Alex Seidel complained vociferously, to no avail.

1975...

The Army Small Arms Program (ARSAP) is renamed the Small Caliber Systems Program.

After eight years of testing, Frankford Arsenal has evaluated sixty different sight systems from which five main concepts emerged. Two of these are considered significant improvements. The two concepts are early versions of iron night sights using "promethium" and non-magnifying "reflex sights." The reflex sight is considered superior. The leading model at this point is the Reflex Collimator Sight (RCS) designed jointly by Frankford's Fire Control Laboratory and AAI. The preferred reticle consists of three small yellow wedges configured in an inverted 'Y'.

A second phase of the FABRL experiments plays with adding "fumer" or "base bleed" technology to reduce the drag even further. Base drag of the "Von Korman" projectile is calculated as 63% of the total drag. Base bleed technology is estimated to give a reduction of 75% of base drag, and thus cut overall drag by half.

HK introduces the compact HK 53.

SIG introduces the SG543 carbine.

Dr. Louis Palmisano begins to trounce the competition and smash records at high-profile Benchrest matches while using rifles chambered for his new .22 PPC and 6mm PPC cartridges.

January: ARMCOM publishes the report "**System Assessment for the 5.56mm Rifle M16A1.**"

Frankford Arsenal publishes the report "**Prevention of 5.56mm Aluminum Cartridge Case Burn-Through.**"

Aberdeen publishes the report "**Product Improvement Test of CMR-170 Propellant for Cartridge, 5.56-MM, Ball M193.**" (CMR is short for Canadian Military Rifle.)

March: Frankford Arsenal publishes the report "**The Design, Manufacture, and Ballistic Assessment of Special 5.56mm Bullets.**"

April: The Republic of South Vietnam collapses. Over 946,000 M16-type rifles are lost. Many find their way into the hands of various Communist insurgent groups during the late '70s and '80s.

Summer: *The Infantry Board concludes a six-month trial of twenty-five Frankford/AAI RCS with 28 rifles, using 66,230 rounds of ammunition. Nothing more comes of the project.*

June: Gulf + Western's Advanced Development & Engineering Center publishes the report "**Final Report on Feasibility Study**

of 5.56MM Plastic Body/Metal Insert Cartridge Case."

July: Rodman Laboratory releases the report "**External Barrel Temperature of the M16A1 Rifle.**"

1976...

The 5.56 XM287 Ball and XM288 Tracer are redesignated XM779 and XM780 respectively.

Lake City receives its first SCAMP machines.

The Human Engineering Labs (HEL) at Aberdeen develops a four-shot, semi auto grenade launcher for the prototype 30mm grenade. These are then mounted to different test rifles.

FN introduces its replacement for the CAL: the FNC. The Swedish military enters the FNC in its 5.56mm rifle trials. Competitors include the Colt M16A1, the FFV 890C (a modified IMI Galil SAR), the HK 33, and the SIG 540.

Beretta introduces the AR70/78 LMG. Unlike many HBAR rifle designs, the AR70/78 possesses a quick-change barrel.

AAI introduces its 4.32x45mm Serial Bullet Rifle (SBR) prototype.

January: AMC is redesignated the US Army Development and Readiness Command (DARCOM).

February: After Army brass makes it clear that they and their NATO allies are not likely to adopt a third infantry cartridge, the Army Training and Doctrine Command (TRADOC) chooses the FN Minimi and the Rodman XM235 for future development, in conjunction with the new 5.56mm XM777 Ball and XM778 Tracer. The US XM777 is similar in construction to what we now know as the FN SS109; however, the XM777 projectile is shorter and lighter making it suitable for 1-12" twist weapons. The XM778 tracer is capable of a visible trace out to 750 meters.

March: *Aberdeen's BRL publishes the report "Computer Study and Experimental Verification of a Short Gas Tube and Floating Piston Gas System for the XM19." Arriving far too late to matter, the BRL suggests that a gas-operated action would have been preferable to AAI's long use of a primer-actuated action.*

June: DARCOM and TRADOC recommend changes to the SAW Material Need Document: 1) Indicate the re-emphasis to 5.56mm from the earlier 6mm; and 2) Reduce the tracer requirement to "up to 800 meters" from "over 800 meters."

During the Conference of National Armament Directors, ten NATO countries, along with France, sign a Memorandum of Understanding for the eventual adoption of a second standard NATO cartridge.

RSAF Enfield unveils its new 4.85mm Infantry Small Arms

System. This is comprised of the Individual Weapon (IW) and the Light Support Weapon (LSW). Both right hand and left hand versions are produced. The right hand models are named the XL64 IW and the XL65 LSW. The southpaw models are designated the XL68 IW and the XL69 LSW.

Sterling begins production of the AR-18 rifle.

August: Frankford Arsenal publishes the report "**Development of a Structurally Sound 5.56 MM Bullet with a GMCS Jacket.**"

October: The Army approves the changes to the SAW Material Need Document. DARCOM requests a bid to redesign the Rodman XM235 from 6x45mm to 5.56mm, incorporate improvements, and produce 18 prototypes. The redesigned model is renamed the XM248.

November: *For the first (but far from the last) time, HK submits its latest G11 prototype to NATO's Small Arms Test Control Commission.*

December: Funding for the SAW project is eliminated for Fiscal Years 1978 and 79.

1977...

Testing at Aberdeen confirms that the XM777 and XM778 are indeed 'superior' in performance to the issue M193 and M196.

ARMCOM is split into the Army Material Development and Readiness Command (ARRCOM) at Rock Island and the Army Research and Development Command (ARRADCOM) at Picatinny. Small caliber R&D efforts are slated to be moved from Rodman Laboratory at Rock Island to Picatinny. Arsenal is dropped from Picatinny's name.

Frankford Arsenal is closed.

Austria adopts the 5.56mm Steyr AUG bullpup rifle as the Sturmgewehr 77 (StG 77).

February: Ford Aerospace outbids Maremont, and is awarded the XM248 contract.

March: The USMC drop testing of a prototype M16 HBAR developed by Maxwell Atchisson. It was intended to serve as an interim SAW.

April: The NATO trial candidates begin technical testing.

June: The Director of Defense Research and Engineering (DDR&E) requests a review of the SAW program. A new SAW project officer, MAJ Robert D. Whittington III begs for enough funding to permit completion of advanced development and head-to-head trials.

Aberdeen publishes the report "**Product Improvement Test of cartridge, 5.56-MM Ball, XM777.**"

July: *The French General Staff announce their intent to adopt the FAMAS, and place an order for 236,000 rifles.*

August: The Deputy Chief of Staff of the Army refuses an engineering development stage for the SAW program for Research, Development, and Acquisition (DCSRADA). In addition, the program is requested to include a new M16 HBAR variant.

September: Aberdeen publishes the report "**Product Improvement Test of CMR-170 Propellant for Cartridge, 5.56-MM, Tracer, M196.**"

November: DARCOM and DCSRADA scrape up enough funds to sustain the SAW program through FY78.

December: The USMC provides additional funds for development of the new M16 HBAR-SAW.

Lake City begins production of cartridge cases using SCAMP machines. SCAMP machines are also provided to Taiwan.

1978...

The US Army and USMC begin discussions with Colt concerning the development of a product-improved M16A1 to replace their stores of severely worn rifles.

After an Infantry Board 'conceptual evaluation', the HEL 30mm grenade launcher is shelved.

Development of the ARES FARC ends.

CIS starts shopping around for alternate small designs for export sales and perhaps even domestic use. ArmaLite is approached concerning the AR-18, and are passed along to Sterling. Sterling sends Frank Waters to Singapore with the AR-18, along with his early design. The end result turns into the SAR80. On a tip from ArmaLite, L. James Sullivan also moves to Singapore and ends up developing the 5.56x45mm Ultimax 100 LMG. (This move was reportedly the byproduct of US regulatory attempts to control arms exports for even mere weapon designs, originating from the US.)

HK introduces the product improved HK 13E LMG.

January: Aberdeen's BRL is assigned development of the M16 HBAR-SAW, now named the XM106. Unlike earlier efforts, the XM106 is to incorporate a quick change barrel, a magazine capacity in excess of 80 rounds, fire from an open bolt, attach the bipod somewhere other than the barrel, and include an 800m adjustable rear sight.

March: HK offers its HK 21A1 with the 5.56mm conversion for further SAW testing. (The HK 21A1 is designed for 7.62mm NATO

May: The first XM106 SAW prototype is completed. The XM106 project never goes far, as the prototype 83 round drum and the Tri-Mag (a co-joined trio of standard 30 round magazines) are strongly disliked.

June: Field-testing begins for the NATO individual weapon entries. Testing is staged primarily at the West German Infantry School in Hammelburg. However, other test locations include the European Regional Test Center at Cold Meece in northern England, the Meppen Proving Ground in Meppen, West Germany, the McKinley Climatic Hanger at Elgin AFB, and Camp Shilo in Canada. The rifle tests continue through November. Entrants include Colt's M16A1 (loaded with XM777 Ball and XM778 Tracer), RSAF Enfield's 4.85mm XL64E5 IW, FN's FNC, France's FAMAS, HK's 4.7mm G11, and an IMI Galil SAR submitted by the Dutch as the MN1.

The control weapons are the 7.62mm NATO HK G3 and the 5.56mm M16A1 loaded with M193 Ball and M196 Tracer. The FN FNC is submitted with FN's new SS109 series of cartridges, and the remaining 5.56x45mm entries use M193-type ammunition. The SS109 projectile has a dual core design: steel forward and lead to the rear. It is the latest of a line of experimental cartridges by FN, including the SS92/1 and the SS101. (FN's M193 clone is known as the SS92.) These new ball cartridges require a 1-in-9" twist while the long L110 tracer projectile requires an even faster 1-7" twist. The faster twist offers not only a technical benefit, but a political one as well. Certain European countries, led by Sweden, see the faster twist as a means to reduce the "inhumane" terminal effects of the 5.56mm cartridge. Of course, the G11 and XL64E5 use their own proprietary cartridges.

AAI publishes the document "Proposal for the Development of Improved Small Arms Fléchette Ammunition."

August: The Army signs a contract for 18 FN Minimi for the latest SAW trials. The Minimi is now designated the XM249. DARCOM orders that the HK 21A1 be included in the testing. The HK is given the name XM262.

December: The Joint Services Small Arms Program (JSSAP) is formed.

1979...

The M231 FPW is finally adopted for use with the Bradley Fighting Vehicle's (BFV) six firing ports. Seen as the cure for BMP-Envy, 27,000 are ordered. The M231 retains a 65% parts commonality with the M16A1; however, it is full automatic only, firing from an open bolt. Lacking a front sight, it is intended for use only with M196 tracers. A collapsible wire buttstock (FSN #1005-081-4830) is originally standardized for issue with the M231, but these are withdrawn at the last moment. (The supply of these buttstocks appears to have been sold later as surplus.) While the

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HK introduces the product improved HK 23E LMG.

May: After head-to-head trials at Aberdeen and Fort Benning, DARCOM considers the FN XM249 to be the best choice on the ground of performance and cost. The HK XM262 has placed a close second.

July: USMC Commandant, General Robert H. Barrow grows tired of Army inaction and forces the issue. He directs the Development and Education Command to form a task force to decide once and for all which weapons systems the Corps requires. The task force led by LTC Richard Maresco begins by conducting "Mission Area Analysis," outlining seven major OPFOR targets/threats, and then determines which weapons can counter them.

August: The Naval Surface Warfare Center (NSWC) - Dahlgren releases "**Improved M16A1 Rifle Instrumented Tests and Results**," the results of their testing of a pair of M16A1 rifles equipped with heavy barrels and improved forearms. Two standard M16A1 are used as control. Despite all four weapons being equipped with 1-in-12" twist barrels, the rifles using heavy barrels show superior accuracy in both automatic and semi-automatic fire. The experimental rifles are also considered to have superior handling qualities. In temperature testing, the improved round forearms are found to be cooler than their original counterparts, regardless of whether the handguards are installed on heavy or standard barrel rifles. Of course, the combination of the heavy barrel and round forearm gave the best results.

September: FN is awarded a "maturity phase" contract for further development of their XM249.

FN begins series production of their FNC.

October: NATO agrees to standardize the 5.56x45mm cartridge as the 5.56mm NATO (STANAG 4172). In particular, FN's SS109 Ball cartridge design is adopted for standardization. Individual nations may adapt the design for domestic production. Individual countries also adopt the related FN L110 Tracer; however, the P112 AP and the intermediate L102 tracer cartridges appear to fall by the wayside. In the US, the SS109 and L110 become the XM855 and XM856, respectively. Canadian equivalents are the XC77 and XC78. While NATO decides not to adopt any of the candidate weapons, M16-compatible magazines are standardized for future 5.56mm NATO weapons (STANAG 4179).

November: USMC LTC Richard Maresco presents the task force's recommendations: 1) Procure the 40x53mm Mk 19 Mod 3 automatic grenade launcher; 2) Begin fuse development of HEDP warheads for the 40mm grenades; 3) Support JSSAP's development of improved AP projectiles such as the SLAP; 4) Cancel testing for 7.62mm NATO SAW candidates; and 5) Procure the .50 BMG M2(HB), a product improved M16, a 9mm NATO pistol, and a 5.56mm NATO SAW. General Barrow immediately approves the recommended items.

The US Army Combined Arms Center (USCAC) and TRADOC approve the USAIS' recommendations for M16 improvements.

The USAF's Systems Command indicates that they were not adverse to product improvements, as long as they did not require modification or replacement of their existing M16 rifles.

The US Coast Guard indicates they intend to dispose of their existing M16 rifles, in exchange for a new 9mm NATO SMG and the FN XM249.

December: The USMC approves a "statement of need" for an improved rifle. However, a product-improved M16A1 would satisfy their immediate requirements.

The Navy indicates that existing 5.56mm and 7.62mm rifles will not meet their requirements. Until such time that a suitable design can be found, they intend to keep their 7.62mm M14 rifles.

1981...

JSSAP approves a joint service rifle Product Improvement Program. Fifty experimental M16A1(PIP) are ordered for further testing. These rifles are later designated M16A1E1. These rifles include requested improvements such the 3 round burst mechanism, strengthened materials for the butt stock and forearm, a longer buttstock, the improved round/symmetrical forearm, a tapered slip ring for retaining the forearm pieces, a heavy profile barrel with a 1 in 7" twist suitable for XM855 and XM856 cartridges, and a fully adjustable 800m rear sight. Ironically, Colt had developed most of these improvements during the mid-'60s.

HK introduces their G41. It is roughly a HK 33 variant redesigned for compliance with various NATO standards.

The CETME Ameli is introduced. (Ameli is short for Ametralladora Ligera, which translates to Light Machine Gun.) Designed by CETME director Col. Jose Maria Jimenez Alfaro, the Ameli resembles a scaled down version of the German MG42.

Indonesia adopts the FN FNC. They opt for domestic production of the rifle.

Italy receives SCAMP machinery.

March: *The Swedes adopt the FNC as the Ak5. Domestic production of the rifle is given to FFV Ordnance (later absorbed as part of Bofors).*

April: Aberdeen publishes the report "**Technical Feasibility Test of German 5.56-MM Plastic Training Ammunition.**"

May: Aberdeen publishes the report "**Renovation Test of Reloaded 5.56-MM Cartridges.**"

June: Trainees at Fort Leonard Wood use one of the first lots of reloaded 5.56mm ammo. A second lot had to be pulled and

salvaged due to poor case annealing. Lake City was responsible for the remanufacturing of the two lots.

November-December: As the lead service for the program, the USMC Firepower Division at Quantico conduct a "Modified Operational Test" pitting 30 M16A1E1 rifles against 30 standard M16A1. Twenty Marines and 10 troopers from the Army's 197th Infantry Brigade participate.

1982...

South Africa fields the R4 rifle and R5 carbine, respectively a modified IMI Galil AR and SAR. Lyttelton Engineering Works (LEW), a division of ARMSCOR, handles production.

Singapore fields the Ultimax 100 LMG.

January: The FN M249 Squad Automatic Weapon is officially adopted and standardized. Original goals are for the Army to procure 49,979 and the USMC to purchase 9,974.

March: The results of the USMC rifle trials are released. Not surprisingly, the Marines are very pleased since the rifles were effectively made to order. The Mellonics Systems Group based at Fort Benning later publishes a rebuttal to the USMC report. Fault is found with nearly every change made, even the decision to modify the rate of twist for the use of XM855 and XM856 ammunition. Another bit of nit-picking decries the lack compatibility of the 1-7" twist for use with the M261 .22LR conversion unit.

April: ARADCOM's Fire Control and Small Caliber Weapon Systems Laboratory (Picatinny) publishes the first volume of a two volume report **"Investigations Concerning the Reloading of 5.56-MM Ball Ammunition."**

September: The M16A1E1 is officially type-classified as the M16A2.

Picatinny publishes the final volume of the report **"Investigations Concerning the Reloading of 5.56-MM Ball Ammunition."**

Picatinny's Fire Control and Small Caliber Weapon Systems Lab awards 25-month contracts to HK and AAI for development of an Advanced Combat Rifle (ACR). HK's entry is their 4.73mm caseless G11 rifle, while AAI pursues their own caseless rifle system, which bears more than a spitting image to the XM70. AAI's 5.56mm cartridges, developed in conjunction with Hercules Powder Company, offers a 70gr 'heavy-bullet' load along with a sabot load using the old .17 caliber micro-bullet. (This is not the same system that AAI submits for the late-'80s ACR trials.)

1983...

HK introduces the product improved HK 33E.

Elisco Tool Company purchases ArmaLite. Production of the AR-18 rifle by Sterling ends.

The SEALs remove the last of their Stoner LMGs from active duty.

February: *After trials pitting the FN FNC versus the M16A1E1, the Canadian government decides for the latter. Diemaco in Ontario is granted \$1.7 million for the Small Arms Replacement Program. 79,935 rifles and 1,565 carbines are ordered. The C7 rifle is to become a variant of the Colt M16A2, albeit retaining the full-auto mode, rear sight, and shorter buttstock pattern of the M16A1. (Diemaco claims to have eventually made 150 changes to the TDP.) The C8 carbine is closer to the profile of the old Model 653 carbine, updated to the 1-in-7" twist and other 'M16A2' improvements (except for the M16A1-style rear sight). The C8 is to retain 86% parts commonality with the C7. Colt designates these Canadian variants, the Model 715 and 725 respectively. In addition, 470,570 Thermold magazines are ordered, along with 6,500 FN Minimi built to Canadian specs as the C9.*

July: The establishment of the US Army Armament, Munitions and Chemical Command (AMCCOM) recombines ARRCOM and ARRADCOM. AMCCOM is headquartered at Rock Island. The Picatinny R&D facilities are renamed the Army Armament Research and Development Center (ARDC).

Fall: *The SIG SG541, a modified SG540, is adopted by the Swiss Army as the Stgw. 90. After later improvements, SIG renames the rifle SG550.*

November: The M16A2 is adopted as Standard 'A'.

1984...

General Richard H. Thompson renames DARCOM the US Army Materiel Command (AMC).

Australia receives SCAMP machinery.

Production of the CETME Model L rifle and Model LC carbine begins.

Beretta introduces the AR70/84 LMG, a product improved variant of the AR70/74.

Daewoo introduces the K2 rifle and K1A1 carbine.

January: The first 1,500 M16A2 rifles are delivered to the USMC Marksmanship Training Unit at Quantico for use in matches. Grumbling arises from Marine competitive shooters about the negative effects of the 3 round burst mechanism upon the consistency of trigger pull weight in semi-auto use.

April: *Indonesia finally negotiates for a production license for the FNC.*

September: The Enfield SA80-family is officially accepted by the British MOD.

1985...

The Army orders 50 M16A2 rifles for use in testing experimental sighting devices. Oddly, the Army has yet to order any rifles for issue.

Beretta submits its improved AR70/90 rifle for Italian 5.56mm rifle trials. Other competitors include the HK G41 (submitted by Franchi) and the IMI Galil (submitted by Bernadelli).

HK introduces the GR3, roughly a HK 33 with a 1.5x optic integrally formed with the receiver stamping.

Australia adopts the Steyr AUG, and opts for domestic production of the rifle.

Britain's Royal Ordnance Factories are privatized, albeit the MOD controls 100% of the shares.

August: The Under Secretary of the Army, James R. Ambrose, suspends M249 production pending the development of the Product Improvement Package. (Some XM249E1 already in the field do not receive their PIP updates until *after* the 1991 Gulf War.)

Diemaco's pre-production C7 rifles pass acceptance testing. The rifle parts are still a mix of Colt and Diemaco production, with the eventual goal of complete parts production by Diemaco.

October: The British Army issues their first L85A1 IW and L86A1 LSW.

Winter: British Royal Marines training in Norway experience a variety of problems with the L85A1 during troop trials. Besides functioning issues, at least one L85A1 discharges when dropped. The rifles are recalled to replace the trigger and trigger spring. The recall/upgrade spans roughly three months.

1986...

Picatinny's ARDC is renamed the Armament Research, Development and Engineering Center (ARDEC).

Picatinny conducts new trials for alternate case material blanks. Candidates include the aluminum XM941 by Omark and plastic cased variants from Action Manufacturing and Winchester. After a year of testing, none are adopted.

The USAIS publishes the paper "**Small Arms Strategy 2000**" (SAS 2000). Despite the ACR program's current push for caseless, duplex, and fléchette ammunition, SAS-2000 proposes that the infantry rifle has already reached its technological peak. The only way to increase the hit/kill probability of the infantryman will be to introduce individual weapons that fire

explosive/fragmentation warheads. A family of three weapons is proposed: an advanced personal defense weapon (90% hit probability with 25 meters), an advanced individual combat weapon, and an advanced crew-served weapon. Admittedly, this is less of a stretch than the "**Future Alternatives Assessment**" which indicates a need to investigate the application of directed energy (DE) and electromagnetic (EM) technology for individual weapons.

ARDEC files an industry-wide solicitation for ACR candidate submissions.

New Zealand adopts the Steyr AUG, intending to purchase Australian production rifles.

FAMAE of Chile begins licensed production of the SIG SG540 and SG543.

SIG introduces the SG551 carbine.

FFV begins licensed production of the FN FNC (Ak5).

ARES introduces the LMG-1 (AKA: the Stoner 86) as a potential sales competitor to the M249 SAW.

Spring: The Army announces their first major order for the M16A2, totaling 100,176 rifles.

April: TECOM starts the XM4 Carbine program with a direct entry into Development Test / Operational Test II. The XM4 is based on the Colt RO727 Carbine, developed for Abu Dhabi. The USMC is the first to standardize the M4, with the goal of issuing them to their Special Operations Capable (SOC) units then under development. Reportedly, the only compact shoulder weapons authorized for use by Force Recon to this point has been the M3A1 SMG (bolstered by very unofficial use of XM177E2). Unfortunately, procurement funds for the Marines' carbines are killed during Congressional review in following budgets, and the matter is eventually dropped until the 1990s. In the mean time, the M3A1 are replaced by HK MP5-N received from the Navy.

August: *FN begins work on what is to become their P90 PDW. Initial development of the companion 5.7x28mm cartridge starts with the loading of the polymer core SS90 projectile in various commercial cartridges such as the .22 Hornet and the .30 Carbine. The latter is reportedly used unmodified with sabots and in a necked-down format.*

September: The Army adopts the Dynamit Nobel (DAG) M862 Plastic Training Ammunition along with the required M2 Practice Bolt for the M16A2.

October: *Phobris is awarded a contract for the new M9 Bayonet. (Production is licensed to Buck Knives.)*

1987...

The Daewoo K2 enters service with the South Korean Army.

News of Chinese SCHV cartridge research is leaked to the West through interviews with **Soldier of Fortune** magazine. While at least 50 cartridge configurations have been examined, ranging from 5.2 to 6.2mm, a 5.8x42mm cartridge is deemed to be the early favorite. No further details are given concerning the ammunition or host weapons.

HK announces development of a LMG variant of their G11 rifle. Like the parent rifle, the LMG will be chambered for the 4.7x33mm DM11 caseless cartridge.

R/M Equipment Company introduces the M203PI (Product Improved), forerunner of the later standardized M203A1. (The M203PI's design is alternately credited to Joseph C. Kurak and Bernard White, the designer of the Desert Eagle pistol.)

March: Royal Ordnance wins the second MOD contract for production of 150,000 additional L85/L86-weapons.

Picatinny is officially redesignated as an Arsenal.

April: British Aerospace (BAe) purchases Royal Ordnance (RO). The British MOD allows BAe to reconsider the recent L85/L86 contract.

August: BAe agrees to accept the L85/L86 contract only if production is transferred from RSAF Enfield to RO's Nottingham facility.

October: The first firing prototypes of the FN P90 are tested.

1988...

Aberdeen begins trials for the XM858 short-range training cartridge. Candidates include an aluminum-cased cartridge from Omark and plastic cartridges from Federal, Winchester and the United States Ammunition Company.

FN Manufacturing, Inc. (FNMI) receives its first contracts for M16A2 and M249 production. (FNMI is FN's facility located in Columbia, SC. It was created to support 7.62mm M240 (MAG58) production for use with the M1 Abrams tank.)

The Navy SEALs begin issue of the Colt RO727 carbine.

The CETME Model L and LC enter Spanish military service.

FFV production Ak5 (FN FNC) enter Swedish military service.

CIS introduces the SR88, a product improved SAR80.

RO introduces the L98A1, a straight-pull cadet rifle conversion of the L85A1 rifle. They also introduce one of two proposed SA80 Carbines.

GIAT begins work on a PDW cartridge and weapon. The finalized Arme de Defense Rapproche is chambered for a 5.7x22mm cartridge, reportedly a based on a necked-down 7.65x21mm Luger (.30 Luger) case.

January: Ireland adopts the Steyr AUG. The AUG has beaten out the Beretta AR70/90, the Colt M16A2, the Enfield L85A1, the FN FNC, the HK G41, the IMI Galil, the FAMAS, and the SIG SG550.

HK introduces camo variants of the HK 33 and GR3. C-suffix rifles possess a woodland camo scheme while S-suffix rifles are finished in a desert scheme.

October: RSAF Enfield ceases production of SA80-related parts, and is closed soon after.

1989...

BAe/RO purchases Sterling Armament and then closes its facilities soon afterwards.

Japan adopts the Howa Type 89.

GIAT offers to provide the TDP for its 5.7x22mm cartridge to other designers and companies.

April: The six submitted ACR designs are narrowed to four by Aberdeen's Combat Systems Test Agency. The remaining four candidates are then cleared for the 9 month field experiments at Fort Benning. Colt's ACR is most the conservative, being merely a flattop M16-variant with an improved hydraulic buffer, a more ergonomic collapsible stock, and a new muzzle brake/compensator/flash hider assembly designed by Reed Knight. The oddest addition is the forearm, featuring a tall sighting rib. (However, even this is not a new concept from Colt.) The Colt ACR is submitted with an Olin-designed duplex 5.56mm load. The two projectiles weighed 35 grains (front) and 33 grains (rear), giving a velocity of ~2900fps. The rifle retains the ability to use the issue M855 cartridge.

HK's ACR is yet another variant of their G11 caseless rifle. Most will note the change in cartridge nomenclature: 4.92x34mm versus 4.73x33mm. However, this is merely a matter of semantics; the projectile size remains the same (0.194").

AAI's ACR entry harkens back to their '70s-era SBR. However, instead firing micro-caliber cartridges formed from a 5.56x45mm parent case, AAI loads a standard 5.56x45mm case with a sabotéd fléchette (similar in principle to Frankford Arsenal's earlier experiments). Unfortunately, while the AAI ACR's magazine is specially sized to prevent insertion of standard 5.56mm NATO cartridges, a standard cartridge could still be manually chambered in the rifle. Combined with the fléchette-tuned gas system, such a mix-up could result in a very serious mishap (*kaBOOM!*). As with earlier AAI fléchette rifles, users complain of the high noise levels. However, the addition of a sound moderator/muzzle brake brings the muzzle blast down

Steyr's ACR outwardly resembles their flagship AUG family; however, the internal mechanism of their ACR is quite radical. Nearly the entire design, from the "raising chamber" mechanism to the completely cylindrical, synthetic-cased fléchette (SCF) cartridge, is credited to Ulrich Zedrosser (later known for his SBS rifle action). Upon firing, the chamber slides down and a separate piston strips a new cartridge from the magazine into the chamber. As the new cartridge enters the chamber from the rear, it pushes the fired case forward out of the chamber to eject it. Then the chamber rises in line with the barrel for firing. The extremely high chamber pressures quoted for the system (60,000-70,000psi) cause some concerns; however, there is no hard data to indicate that any real problems develop. While the light fléchette/sabot combination allow for the very high cyclic rate to remain controllable, both Steyr and AAI have limited their designs to three round bursts.

ARES fails to perfect their own belt-fed, bullpup ACR design in time, and withdraws their entry. Designed by Gene Stoner and developed by Francis Warin, the ARES Advanced Individual Weapon System (AIWS) fires a conventional 5mm projectile (weighing 45 grains) from a synthetic cased cartridge, using a raising chamber design similar to the Steyr ACR. McDonnell Douglas' fléchette-firing ACR entry has been rejected for "technical issues." Evoking comparisons to H&R's 1962 SPIW entry, the McDonnell Douglas ACR uses a plastic-cased, multiple fléchette cartridge. However, unlike the triangular Dardick Tround, the ACR cartridge is described as a 'chiclet.' This would seem to indicate a relationship to the Hughes family of 'Lockless' cartridges. (McDonnell Douglas had years earlier bought out Hughes' armament division.)

NATO publishes document AC225, outlining a new requirement for a Personal Defense Weapon (PDW).

September: *Special Operations Special Technology (SOST) Modular Close Combat Carbine Project is funded. (This is the forerunner to the terminology "Special Operations Peculiar Modification," SOPMOD for short.)*

The US Army Infantry Center (USAIC) publishes a new edition of the Small Arms Master Plan (SAMP). The SAMP continues to outline objectives for a new family of infantry weapons. These are now named the Individual Combat Weapon (ICW), Personal Defense Weapon (PDW), and Crew Served Weapon (CSW). The ICW is to weigh no more than 10 pounds fully loaded, and be effective out to 500 meters versus troops wearing body armor. The ICW is also intended to be effective against vehicles and low flying aircraft. *The PDW is projected to weigh no more than 1.5 pounds, and be capable of defeating troops wearing body armor at 50 meters.*

1990...

IMI introduces the Negev LMG.

CIS introduces the SR88A, a product improved SR88.

GIAT purchases FN. With this, GIAT quietly shelves their 5.7x22mm PDW project.

April: *HK and Dynamit Nobel develop an experimental 4.7x25mm caseless cartridge, essentially a short variant of their DM11 caseless rifle cartridge. HK plans to use it for the development of a new PDW project known internally as the NBW (Nahbereichswaffe: Close Range Weapon).*

May: *The British MOD introduce a product improvement kit for the L85/L86 family. Changes include a redesigned trigger, cross bolt safety, and a number of other small parts, pins, and assemblies. (However, less than half of weapons will have been upgraded by 1993.)*

June: *Italy adopts the Beretta AR70/90.*

1991...

ADI-Lithgow begins licensed-production of the FN Minimi (F89) for the Australian military.

Given ARDEC's Bursting Munitions Program revival of their earlier 30mm grenade experiments, Alliant Techsystems sponsors the Individual Grenade Launcher System (IGLS), a 10 round semi-auto launcher designed by Knox Engineering.

March: *BAe/RO purchases HK.*

1992...

The Army announces that the ACR trial candidates have all failed to provide the required 100% improvement over the M16A2.

A Solider Enhancement Program (SEP) is initiated for a 5.56mm AP cartridge to be designated the M995. The desired cartridge, produced by Bofors, uses a tungsten core projectile.

The Navy SEALs begin issue of the M16A3, an M16A2-style rifle with full automatic capability instead of 3 round burst. (Note: The Navy's M16A3 is not the same configuration as Colt's "M16A3," which simply indicates a flat-top M16A2-type rifle.)

Colt unveils the CQB Carbine, a single rail adapter system for the attachment of the M203, a breaching shotgun, or other accessories. Colt also introduces the M203H, a stand-alone adapter for the existing M203.

A.R.M.S., Inc. introduces the Swan Extended Rigid Frame Sleeve (SERFS) System, an early forerunner to their current Selective Integrated Rail (SIR) System.

Diemaco receives a follow-on contract for the production of C7A1 upper receivers, along with a smaller number of complete

weapons, for the Canadian military. The A1 configuration is flat-top variant intended for mounting the ELCAN C79 optic. The C79 is purchased in equal numbers for issue to Canadian forces.

The "Future Technology Conference" reorients from concentration on directed energy weapon applications to exploring Non-Lethal technologies.

May: *The MNS for the SOPMOD kit is signed.*

1993...

The US Army Infantry Center (USAIC) publishes the fourth edition of the SAMP. The SAMP outlines objectives for a new family of infantry small arms. This translated into the following project name: Objective Family of Small Arms (OFSA). Requirements include the Objective Individual Combat Weapon (OICW), Objective Personal Defense Weapon (OPDW), and Objective Crew Served Weapon (OCSW). *The OPDW is projected as a lightweight system (less than 1.5 pounds) with a 100 meter effective range, and capable of defeating body armor at 50 meters.* There is also discussion of an Advanced Medium Machinegun (AMMG) requirement.

The Modular Weapon System (MWS) program is introduced as a SEP.

SIG introduces the SG551-1P (AKA: SG551 SWAT).

CZ introduces the Lada family of 5.56mm and 5.45mm weapons. It is later renamed the CZ2000.

India introduces the INSAS rifle and LMG. The INSAS (Indian Small Arms System) has been in development since the mid-'80s.

In the UK, the House of Commons Defence Select Committee begins investigations of the L85A1 and L86A1's reliability issues.

NATO forms Sub-Group 1 under Panel III. The Ad-Hoc PDW Working Group is tasked with determining whether FN's 5.7x28mm cartridge meets NATO's PDW criteria (D/296). Preliminary specifications are also drawn up for two types of PDW-class weapons: a pistol that weighs less than 1 kilogram (700 grams or less is desired) for engagements out to 50 meters, and a shoulder-stocked weapon weighing less than 3 kilograms capable of engaging targets out to 150 meters. Each is desired to possess magazine capacities of no less than 20 rounds, with a higher capacity considered as ideal for the larger weapon.

September: *The ORD for the SOPMOD kit is validated. (The ORD will be amended four times leading up to 1999.)*

1994...

The USMC approves "Operational Requirements Document 1.14." This document repaves the long and twisting path for the

eventual adoption of the M4 Carbine by Force Recon and other units with need of a CQB weapon more capable than the current pistol-caliber SMG (HK MP5-N).

KAC produces a very small quantity of cropped M4A1 variants, dubbed the M4A1K, for use by SOCOM helicopter aircrews. (By early 1997, less than two dozen have been produced.)

IMI introduces the Galil Micro (AKA: Galil MAR). The South Africans introduce a similar variant as the R6 along with a 5.56x45mm conversion for their SS77 GPMG.

GIAT introduces the product improved FAMAS G2. Intended primarily for export sales, the G2 variant offers a STANAG 4179 mag well along with other modifications. (A transition model, the G1, did not possess the STANAG mag well.)

FN introduces the Minimi Mk2, which roughly parallels the improvements from the US M249 (PIP). On the 5.7x28mm PDW front, FN replaces its existing SS90 plastic core projectile with the improved 31 grain SS190, which uses a dual core of steel and aluminum. While offering a large increase in performance against armored targets, this change reportedly required a redesign of the P90's magazine. FN also begins to release new details of their long-awaited 5.7x28mm pistol.

At the 1994 ADPA Small Arms Systems Division's annual conference, Chinese representatives from the PLA's Changping Research Institute confirm the development of a 5.8x42mm weapon family.

March: *The Dutch military adopts the Diemaco C7/C8 family, with an initial contract for more than 58,000 weapons. The majority are the standard C7. A small number of C7A1 are procured for Army rapid-deployment troops and Marines, along with C8 Carbines for their Air Force. Dutch Marines also receive the C7A1 LSW (Light Support Weapon) variant.*

June: The OICW Phase 1 design study begins with three competing teams led by AAI, ATK, and Olin. AAI's team includes:

- Dyna East (Warhead development)
- Dynamit Nobel
- Hughes Aircraft (Fire control and Training)
- Mason & Hanger

ATK's team includes:

- Contraves (Fire control)
- Dynamit Nobel
- HK

Olin teams solely with FN.

August: The US Army officially adopts the M4 and M4A1

Carbines.

December: The OICW Phase 1 design study is completed. The teams headed by AAI and ATK are chosen to proceed to Phase 2, the system design and critical subsystem technology demonstration stage. AAI's team reorganizes. Dynamit Nobel and Mason & Hanger leave while Olin, FN, and Omega Systems join.

1995...

The Armament Research, Development, and Engineering Center (ARDEC) at Picatinny is reassigned to the Tank-Automotive & Armaments Command (TACOM).

The German Bundeswehr officially adopts the HK G36 rifles, choosing it over the Steyr AUG. Later in the year, the Bundeswehr's Special Operations Command (KSK) requests the development of a carbine variant, which becomes the G36K.

Denmark purchases a quantity of Diemaco C7A1 rifles for troops assigned to UN Peacekeeping duties. These are reportedly designated the G M/950P.

Royal Ordnance assigns HK to examine the issue of L85A1 and L86A1 reliability.

Bofors introduces the CGA-5/C2, a compact variant of the Swedish military's Ak5 (itself a FN FNC variant).

Oak Ridge National Laboratories hosts an industry conference concerning OPDW technologies.

The US Army type-classifies the M5 collapsible buttstock for the M249. This is the same buttstock used for the Minimi Para.

March: FNMI is awarded a contract modification for an additional 4,089 M249.

June: The Army's SAMP is updated and accepted by JSSAP as the Joint Services Small Arms Master Plan (JSSAMP). *The OPW (formerly OPDW) is now described as a concealable lightweight system (less than 3 pounds), with recoil no greater than a 9x19mm pistol, an effective range out to 200m, and a low magnetic signature.* Requirements for an Objective Sniper Weapon (OSW) are also added.

August: *KAC receives a contract award for production of their Rail Interface System (RIS) forearm to meet SOCOM's MWS requirements.*

FN officially announces the development of the 5.7x28mm "Five-seveN" pistol.

December: *The French Navy orders 20,000 FAMAS G2.*

1996...

FNMI introduces the Floating Integrated Rail Mount (FIRM) system, their contender for the Army's MWS requirement. They also announce development of what is to become the M249 SPW (Special Purpose Weapon).

Colt begins work on the 5.56x30mm MARS (Mini Assault Rifle System). In many ways, the cartridge is a throwback to the .22 Gustafson Carbine (.22 APG/.22 SCHV) cartridge. LTC Michael R. Harris (US Army, Retired) and James F. Taylor are responsible for the new design. The cartridge uses pistol powders in the WW296/H110 range to achieve 2,600fps with a 55gr bullet. Reportedly, the bullet specified is similar to the original Sierra 55gr projectile used in early .222 Special testing. The new cartridge is mated with a bisected Colt Commando. (In some pictures, you can see the welded seem in the upper and lower receivers.)

Germans troops assigned to the NATO Rapid Reaction Force are issued the HK G36 family. Other Bundeswehr units are issued the G36 as quantities permit.

The Danish military adopts the Diemaco C7 and C8 for general issue.

Spain begins new rifle trials to replace the CETME Model L. Candidates include the Diemaco C7, the FN FNC, the HK G36E, the IMI Galil, the SIG SG550, and the Steyr AUG.

February: The OICW Phase 2 system design and critical subsystem technology demonstration stage is completed.

March: Awards are given to support the OICW Phase 3 Advanced Technology Demonstration program. This involves the fabrication of prototype systems for non-firing Dismounted Battlespace Battle Lab experiments.

The "M995, 5.56mm, Armor Piercing Cartridge" is officially type-classified.

June: FN publicly introduces its 5.7x28mm "Five-seveN" pistol prototype.

September: *The XM68 Reflex Collimator Sight (AKA: Close Combat Optics or CCO) is type-classified. (The XM68 is an Aimpoint Comp-M red-dot sight.)*

November: A Live Fire Test and Evaluation (LFT&E) for the M995 AP cartridge is approved.

December: A detailed test plan for the M995 cartridge LFT&E is approved.

1997...

The USAF begins to convert older M16 rifles to a M16A2-type configuration using modification kits.

FN is awarded a contract to provide M5 collapsible buttstocks for the M249.

The L85A1 and L86A1 are withdrawn from NATO's Nominated Weapon List.

Vektor introduces the CR-21, an inspired bullpup conversion of their standard R4 rifle. (Vektor is the successor to LEW.)

February: *The first M68 CCO are issued.*

April: The M995 cartridge LFT&E is completed.

July: The M16A2E4 (AKA: M16A4), the XM4 and XM5 Rail Adapter Systems (KAC's RAS for the M4 and M16), "Sight, Reflex with Mount, M68," "XM145 Telescope" (ELCAN 6x), and M203A1 grenade launcher are all type-classified. The XM145, later renamed the M145 MGO (Machine Gun Optic), is intended for use on the M249 and M240B. The M203A1 is designed for use on the M4 carbine.

The Chinese 5.8x42mm weapons family is publicly unveiled with the handover of Hong Kong from British to Chinese control. The bullpup rifle system carried by the Chinese troops is dubbed the Type 95. Export variants chambered for 5.56x45mm are dubbed the Type 97.

August: The JSSAMP is updated yet again. *The Objective Personal Weapon (OPW) is now described as a selective fire lightweight system (less than 3 pounds) capable of "immediate incapacitation" against personnel wearing body armor within 50 meters, and an effective range of 200 meters.*

The Navy approves a Material Needs Statement from the SEALs for a new 5.56mm LMG. The goals include a weight under 13lbs, SOPMOD kit compatibility, and high corrosion resistance.

Steyr introduces the A2 variant of the AUG. Instead of requiring two separate receivers, one with the integrated carry handle/optic and a second with a sight rail, the AUG A2 features a single receiver that can be equipped in either configuration, interchangeably.

November: The Belgian region of Walloon purchases FN from GIAT.

1998...

The US Army announces its intent to gradually replace the M16A2 with a flattop M4 carbine equipped with the M4 RAS. (Some sources indicate that this variant is known as the M4E2/M4A2.)

Norwegian Special Forces (FSK) adopt the Diemaco C8A1.

HK releases the results of its testing on the L85A1 and L86A1. Included are recommendations on potential fixes. HK is

encouraged to modify a small number of weapons and test them again.

IMI introduces the bullpup Tavor family.

SIG introduces the SG552 "Commando."

February: OICW Phase 3 is completed with the demonstration of prototype systems.

March: ATK's OICW system candidate is picked over AAI's for advancement to the Phase 4 live fire simulation and field tests.

April: *The M4 and M5 RAS are standardized.*

July: *Spain announces its intent to adopt the HK G36E. The intent is for an initial purchase of German manufactured rifles followed by domestic production by Empresa Nacional Santa Barbara.*

October: *The first issue of the M4 and M5 RAS begins.*

The JSSAMP is updated yet again. This is reportedly the last fully staffed JSSAMP.

1999...

After more than a decade of wrangling, USMC Force Recon, Fleet Antiterrorism Security Teams (FAST), and Military Police Special Response Teams finally receive their long awaited M4 Carbine variants, dubbed the CQBW.

The M4 and M5 RAS, the M16A4 rifle, and the M995 AP cartridge are all approved for full materiel release.

HK begins work on the compact G36C in hopes of winning a GSG-9 contract.

CIS introduces the bullpup SAR-21. Despite the earlier SAR-80, SR-88, and SR-88A, the SAR-21 becomes the first rifle to officially replace the aging M16S in the armed services of Singapore.

The Canadian military initiates a PDW requirement to replace the Inglis No. 2 Mk. 1 pistol (WW2-era license-production FN GP35) and the Diemaco C8 carbine. Projected quantities have ranged up to 10,000 units. Over the years, the CF PDW candidates have included 5.56x45mm entries such as Military Manufacturing (M2) Corp.'s M16X and M16C (4" and 6" barrels respectively), and the Diemaco CQB (a Colt Commando variant). The specialty caliber PDWs such as FN's P90 and HK's MP7 have also been considered.*

The "M95, Munition, Rifle, Non-Lethal, 5.56mm" is type-classified. The muzzle-mounted M95 contains fifteen rubber-coated, steel spheres that are launched with a M195 blank cartridge.

January: The first M16A4 are issued.

May: The SOPMOD Program Management Office (PMO) receives a directive from the commander in chief of SOCOM (USCINCSOC) and Program Executive Office - Special Programs (PEO-SP) to study and improve the basic M4A1 Carbine platform.

July: The SOPMOD PMO begins fielding of M4A1 Extraction Parts Set #1 (EPS-1) to Navy and Air Force units.

August: *PEO-SP orders the SOPMOD PMO to plan unrestricted evolutionary block upgrades for the SOPMOD kit.*

September: *HK publicly unveils its new 4.6x30mm PDW (later designated the MP7).*

October: *The SOPMOD kit's ORD is Amended for the fifth time, adding requirements for the Enhanced Combat Optic Sight, Carbine (ECOS-C), the Mini Night Vision Sight (MNVS), the Special Purpose Receiver (SPR), the Universal Pocketscope Mount (UPM), and new soft and hard cases. The SOPMOD's Basis of Issue Plan (BOIP) is increased from 1961 kits to 2972. (One kit supports four weapons.)*

November: The Navy receives product samples for the SEALs new LMG program. The only competitors are FNMI's M249 SPW and KAC's Stoner 96, an updated version of the ARES Stoner 86. Testing continues through April.

December: A production contract is awarded for M249 feed covers equipped with a MIL STD 1913 rail (AKA: Picatinny Rail).

The British MOD receives the final trials reports concerning the performance of HK's modified L85A1/L86A1.

2000...

The NSW Crane begins work on the Close Quarter Battle Receiver (CQBR), a Colt "Commando"-sized, upper receiver fitted with a KAC M4 RAS. These are intended for use on M4A1 carbine lowers.

Diemaco's C8A1-SFW (Special Forces Weapon) beats out the HK G36 and SIG SG551 for a British Special Forces contract. The weapon receives the designation L119A1.

With Canadian Forces' C7A1 rifles facing an impending 'Inspection and Repair as Necessary' program (IRAN), the Director of Land Resources (DLR-5) and the Directorate Soldier Systems Program Management (DSSPM-5) begin to formulate a mid-life improvement package. The proposed changes for the 'C7A2' include a C8-style collapsible buttstock, a modular rail system, and colored polymer furniture (anything other than black).

January: *The British MOD issues a solicitation for a PDW with a projected order of 15,000 units. The goal is for a weapon less*

than 500mm in length, with a loaded weight of no more than 3 kg, and the ability to defeat CRISAT (20 layers of Kevlar and a 1.6mm titanium trauma plate) protected targets out to a range of 150 meters.

May: FNMI is awarded a contract to produce the M16A4.

Summer: *128 AN/PSQ-14 Grenade Launcher Day/Night Sight Mounts (GLD/NSM) are evaluated by NSW for inclusion in SOPMOD kit. The test samples are later forwarded to the Army for their own testing as part of their SEP requirements for the XM203E2 MWO.*

June: The Navy awards FNMI a contract for improved versions of the M249 SPW.

HK is awarded a £80 million contract to refurbish the L85A1 and L86A1. The refurbished weapons will be redesignated the L85A2 and L86A2. Part changes and modifications include:

- Bolt
- Bolt Carrier
- Extractor
- Extractor spring
- Ejector
- Recoil spring
- Firing pin
- Cocking handle
- Magazine Assembly
- Gas plug and cylinder
- Hammer
- Barrel extension
- Barrel (LSW only)

July: The Squad Designated Marksman rifle program is approved as a SEP. Proposed by the USAIC, the rifle's design parallels those for the SOPMOD SPR.

August: ATK is awarded a four-year contract for OICW Program Definition and Risk Reduction (PD&RR). ATK is to incorporate lessons learned from its first three advanced technology prototypes. The PM Small Arms manages the PD&RR with support from ARDEC.

A contract is awarded for a M249-compatible RAS.

September: FNMI delivers its improved M249 SPW, now known as the Mk 46 Mod 0 LMG, for further Navy testing. The testing continues through December.

At the request of a Joint SOF Requirements Working Group (RWG), a Vendor Technology Demonstration of Grenade Launchers is conducted at NSWC-Crane. Nine vendors demonstrate their grenade launchers to an audience of thirty-two SF operators. Three grenade launchers are judged to superior to the existing M79 and M203. Due to the interest generated, Congress approves an additional \$5 million for general procurement of SOPMOD kit items, along with ~\$873,000 earmarked for R&D of a 40x46mm Enhanced Grenade Launcher Module (EGLM).

October: *The "Close Combat Mission Capability Kit" program is started. This is intended to procure Simunition FX cartridges and kits for use with the M4, M16, M249, and M9 pistol.*

November: An improvement program is initiated for the M249 bipod and handguards.

2001...

The Army begins major fielding of the M16A4 along with the M4 and M5 RAS.

The SEALs begin issue of the Mk 46 Mod 0 LMG.

FN introduces the bullpup F2000 rifle.

NATO's Land Group 3 commissions France's Etablissement Technique de Bourges (ETBS) to conduct a comparative evaluation of the FN 5.7x28mm and HK 4.6x30mm PDW cartridges. The testing continues through 2002.

March: *A meeting of the SOPMOD Program Integrated Product Team (PIPT) / Requirements Working Group (RWG) was convened to revise the evolutionary acquisition plan to cope with projected budget shortfalls.*

May-June: *SOPMOD PMO releases Commercial Area Announcements (CAA) regarding priority programs for SOPMOD Block 2:*

- *Platform Modifications (PMOD) for Rifles and Carbines*
 - *CQBR*
 - *SPR*
 - *Improved RIS (RIS II) in support of EGLM*
 - *Extended Life Barrel (ELB)*
 - *High Reliability Magazine (HRM)*
 - *Other Parts Improvements*
- *Enhanced Combat Optical Sight - SPR (ECOS-SPR)*
- *Family of Muzzle Break/Suppressors (FMBS)*

- Enhanced Combat Optical Sight - Carbine (ECOS-C)
- Enhanced Grenade Launcher Module (EGLM)
- Clip-on Night Vision Device (CNVD) to replace the AN/PVS-17 MNVS
- Enhanced Indirect Fire Munitions (EIFM)
- Visible Bright Light (VBL) improvements (formerly Visible Light Illuminator (VLI))

June: The CF C7A2 update proposals are briefed to A Company, 1st Battalion, Royal 22nd Regiment (A Coy, 1 R22eR).

July: The SOPMOD IPT hosts an industry conference.

September: NSWC Crane awards a contract to Aimpoint for the purchase of up to 15,000 CompM2. Classified as the ECOS-N (not to be confused for the ECOS-C), the CompM2 will replace the Trijicon Reflex within the SOPMOD kit.

HK introduces the MG43 LMG (later type-classified as the MG4).

October: Congress adds a Miniature Day/Night Sight (MD/NS) requirement for the SOPMOD kit, funding an additional \$1,600,000 R&D effort. Under this package, the SOMOD PMO has piggy-backed development of:

Backup Iron Sight II (BIS II)

CNVD

ECOS-C

Integrated Pointer Illuminator (IPIM) to replace/combine the AN/PEQ-2 IR Pointer Illuminator, AN/PEQ-5 Visible Laser, and possibly even the VBL/VLI.

RIS II

VBL III to replace the VBL II and VLI.

November: The CF C7A2 update proposals are briefed to the 3rd Battalion, Royal Canadian Regiment (3 RCR).

December: Selected US military units in Afghanistan receive the HRM. The HRM is reportedly a steel-body magazine designed and produced by HK in support of their L85A2/L86A2 modifications.

2002...

The ATK OICW is designated the XM29.

The Navy SEALs begin issue of the Mk 12 Mod 0/1 Special Purpose Rifle (SPR). The SPR is a designated marksman rifle. Built by NSWC Crane armorers, the upper receiver is a mix of military and commercial parts, which is then mated to a M16A1

lower. The Mk 12 Mod 0 is recognizable primarily from its Precision Reflex, Inc (PRI) free-float forearm. The Mk 12 Mod 1 use a KAC free-float RAS forearm. The Mod 1 is broken down into the SPR/A and SPR/B depending upon which Leupold scope is mounted (3.5-10x versus 2.5-8x). Army armorers also build their own version of the SPR, reportedly known as the SPR/C.

The issue ammunition for the Mk 12 SPR is the 5.56mm Special Ball, Long Range Mk 262 Mod 0 (using the 77 grain Sierra Match King). The Mk 262 is the end product of accuracy testing which started with 27 different commercial match projectiles. The projectile choice was eventually narrowed to three: the 73 grain Berger LTB (Length Tolerant Bullet), the 87 grain PRL (Powell River Laboratories), and the 77 grain Sierra Match King. Availability issues with the first two manufacturers resulted in the Sierra Match King being chosen. To date, Black Hills Ammunition is the sole source of the Mk 262 Mod 0; however, there are indications that Lake City will begin loading the ammunition. The Mk 262 Mod 1 will reportedly use either the 77 grain Sierra Match King or the 77 grain Nosler Custom Competition (formerly, the J4 OTM). The main difference will be the introduction of a cannelure. Use of the Mk 262 Mod 0/1 has since filtered down to other 5.56x45mm weapons in SOCOM's inventory. The Mk 262 Mod 1 has also been adopted by certain USMC units for use in their M4/M4A1 Carbines.

February: *The initial draft specifications for the EGLM are released for industry comment.*

The USMC's Systems Command (MARCORSYSCOM) announces its intent to purchase twelve of HK's 4.6x30mm PDW (MP7) for testing and experiments conducted by the Marine Corps Warfighting Laboratory (MCWL). (One source claims that a dozen FN P90 have also been purchased for the purposes of head-to-head testing by the MCWL.)

March: *NSWC Crane awards Wilcox Industries a contract for the M203 GLD/NSM (AN/PSQ-18). Passed along to the Army for their MWO testing, the AN/PSQ-18 also sees combat in Afghanistan and later Iraq.*

May: The SOF Weapons Program is spun off from SOPMOD. Among the projects moved include the Mk 12 SPR, the SPR MBS, the Mk 262 cartridge, and certain M4A1 carbine platform upgrades such as the EPS-2, HRM, and the Sloping Cheekweld Buttstock (SCB).

The CF C7A2 update proposals are briefed to the 3rd Battalion, Princess Patricia's Canadian Light Infantry (3 PPCLI).

July: *Reports surface regarding the unreliability of the refurbished L85A2 and L86A2 in Afghanistan. The price of the upgrades has now topped £92 million.*

August: Picatinny's PM-Small Arms (PMSA) is reorganized as PM-Soldier Weapons (PMSW).

PEO-SP recharterers the SOPMOD program. Now all future

accessory upgrades must consider compatibility with other weapons in SOCOM inventories.

September: The USMC announces its intent to replace the M16A2 with the flattop M16A4.

October: ARDEC awards Alliant Techsystems (ATK) with a contract modification to the XM29 OICW program. The 5.56mm NATO KE Module is to be developed further into the XM8 Lightweight Assault Rifle. The XM8 is intended to replace the M4 carbine for issue to the "Objective Force Warrior." The MWS equivalent for the XM8 is later titled the Multiple Attachment Point System (MAPS).

The EGLM project office issues a combined synopsis/solicitation seeking working demonstration samples of EGLM candidates. Only two candidates are submitted: HK's AG-C (a AG36 variant) and a model from ISTECH Services Ltd.

The 10th Mountain Division, deployed in Afghanistan, issues an "Urgent Operational Need" statement requesting a shotgun attachment for their M4 Carbines. Such an attachment would eliminate the need to carry a separate weapon to support non-lethal and door-breaching requirements.

November: The USAF begins accepting delivery of flat-top M4 fitted with the M68 CCO to replace their stocks of M16/M16A2 rifles and GAU-5/GUU-5 carbines. (Note: The USAF's GAU-5 series started with the original XM177, and consists of four variants differing primarily in barrel length. The models are the GAU-5A, GAU-5A/A, GAU-5A/B, and GAU-5P. Only the GAU-5A/B possessed a forward assist; they appear to be surplus XM177E2 absorbed into USAF inventory. The GAU-5P is the longest, equipped with a 14.5" barrel. Many of the older weapons were eventually converted to this variant when the individual weapon required rebarreling. Several years back, the GAU-5 still in USAF service were eventually upgraded with a 14.5" M4-configuration barrel using a 1-7" twist. These upgraded models were redesignated GUU-5P.)

NATO's Conference of National Armament Directors (CNAD) is forced to cancel the scheduled selection of a PDW cartridge for NATO standardization. Due a lack of consensus on how to evaluate the ETBS report and questions regarding ETBS' conduct of the trials, the NATO Army Armaments Group (NAAG) is forced to form a Quick Reaction Team (QRT) to independently examine the report and conduct further testing as necessary.

December: A consortium of German investors purchase HK from BAe/RO.

2003...

Several changes are afoot; many in part due to run up to and aftermath of the Second Gulf War. The OICW's grenade cartridge is slated from 20mm to a 25mm Low Velocity variant of the OCSW's 25mm grenade cartridge. New SEP inspired by Urban

Operations (UO) include an improved 40mm grenade launcher, to be named the XM320. (Not surprisingly, a variant of the HK AG36 is being pushed as a companion for the G36-based XM8. The eventual winner in SOCOM's EGLM trials will be a likely shoo-in for the XM320 contract as well.) C-More's Lightweight Shotgun System (LSS) is being revived for use in door-breeching. Candidates for the Multipurpose Optic (MPO) requirement appears to be a C-More produced 1-5x variable scope and the Leupold Mk 4 CQ/T 1-3x variable. The MPO concept is to mix the short-range advantages of the M68 CCO with the longer-range capabilities of a Trijicon ACOG, while knocking out the disadvantages of either.

SOPMOD PMO receives an unrequested \$3,600,000 from Congress for the purchase of additional AN/PVS-17A MNVS.

The CF C7A2 update is assembled from the following parts: an Accuwedge, ambidextrous controls (charging handle/mag latch/selector switch), a C8 telescoping stock, green furniture, a one-piece gas ring, and the Diemaco Triad I, an accessory mount which clamps to the existing gas block/front sight base. The ELCAN C79 sight is also to be upgraded with a green cover, an upgraded mount spring, and replacement tritium inserts. The complete upgrade package is due for user testing late in the year.

Daewoo introduces the bullpup DAR-21 rifle.

January: NSW Crane issues a RFI for a SOF Combat Rifle (SCR) to replace the M4A1 carbine. The design is to be modular, allowing for multiple caliber conversions and configuration modifications to match divergent mission needs. "Draft" Key Performance Parameters of the SCR include:

Requirements	(threshold)	(objective)
Corrosion Resistance	4 days	10 days
Mean Rounds between Stoppage	2,000	4,000
Mean Rounds between Failure	15,000	30,000
Accuracy (MOA)	1.5 @ 300 meters	1 @ 400 meters
Effective Range		
Point Targets	500 meters	600 meters
Area Targets	600 meters	700 meters
Life Cycle (time before	15,000 rounds	90,000 rounds

overhaul)

Modularity

(Caliber) 5.56mm TBD
(7.62x39mm/5.45X39/6.8x43mm)

(Mission) Adaptable to SOF mission scenarios:
CQB/OTB/General Combat/Long-range
Precision fires.

India announces a \$20 million contract with IMI for the bullpup Tavor rifle. The Tavor is intended to replace the troubled INSAS rifle along with a large number of Romanian AKM rifles purchased as a stopgap in 1995.

February: *Israel announces the adoption of the IMI Tavor by the IDF.*

March: *Aberdeen begins developmental testing of the C-More LSS (Lightweight Shotgun System).*

The NAAG's QRT hears formal presentations from FN and HK regarding ETBS' report, which evaluated their PDW cartridges. This leads to the commissioning of Switzerland's Defence Procurement Agency in Thun to conduct further trials of the cartridges.

April: The SCR is relabeled the SCAR (SOF Combat Assault Rifle). Now, the desired level of modularity includes larger cartridge conversions such as 7.62x51mm and a proposed .338 Short Magnum. The 7.62mm NATO-length configurations would be known as the SCAR-H (Heavy), while the 5.56mm NATO-length configurations would be the SCAR-L (Light). As such, these variants would replace the KAC Mk 11 Mod 0, the M14, the Mk 12 SPR, the SPR-V/KAC SR47, the CQBR, the M16A3, and the standard M4A1. The threshold accuracy loss is 1 MOA @ 300m, with an objective of 0.25 MOA at the same range. The desired objective range for area targets is increased to 800 meters for the SCAR-L. Threshold ranges for the SCAR-H are 600m point and 800m area, increasing to 800m/1000m as the objective. Barrel lifetime is specified as 10,000/50,000 rounds with the objective MRBS and MRBF increased to 8,000 and 50,000 rounds respectively.

The Army's PM-SW intends to negotiate with USSOCOM's PM-SOF Weapons regarding a potential role within the SCAR project, up to and including becoming the lead PM Office. Ideally, the Army would like to combine the SCAR with the XM8 as a spiral development project.

The JSSAMP is updated for the fourth time. Near term goals (Next 8 years) include improvements to current "legacy" systems, along with development projects such as the XM8, the XM25 Airburst Weapon (ABW: a stand-alone version of the OICW's grenade launcher), and the XM29 Integrated Airburst Weapon (IABW: formerly the OICW). These entail the introduction of lightweight ammunition such as the polymer-case

5.56mm cartridges currently under development by Natec, integrated electronic systems such as combined thermal/image intensification optics and multi-function lasers, and improved warhead technology such as thermobarics for the 25mm HEAB munitions and the 40x46mm grenade (XM1060 Multipurpose).

Mid term goals (8-15 years) include ultra-lightweight ammunition, a family of lightweight weapons (most likely based on the XM8), steerable/course-correcting munitions, and further fire control improvements including target hand-off capabilities. The far term goals (15 years +) once again include directed energy systems, ideally with scaleable effects for Lethal and Non-Lethal applications.

May: *SOPMOD PMO is ordered to plan yet another transformation under the terms of the Joint Capabilities Integration and Development System (JCIDS). Likely, the SOPMOD PMO will become responsible for merely sustaining the existing M4A1, M203, and the contents of the SOPMOD kit as it currently stands, until its eventual replacement. Planned SOPMOD accessory upgrades such as the EGLM, FMBS, MDNS, Shot Counter, and SCAR will turn into their own independent programs, probably under the aegis of PM-SOF Weapons.*

June: *Aberdeen finishes developmental testing of the C-More LSS.*

With the results of the Swiss testing, the NAAG's QRT recommends NATO standardization of the FN 5.7x28mm cartridge. Predictably, the German delegation protests the recommendation, citing issues with the Swiss trials and the QRT report. Foremost is the refusal to test HK's latest 4.6x30mm cartridge variant, optimistically named the "Ultimate Combat" round.

July: *Israel confirms the purchase of IMI Tavor rifles by the IDF.*

August: LTC Matthew Clarke, Project Manager - Individual Weapons (PM-IW), announces an order of 200 XM8 for testing by TECOM.

NSWC-Crane releases "**Draft Performance Specification: SOF Combat Assault Rifle Light.**" The caliber conversion requirements for the SCAR-L have been removed in favor of optimizing the weapon for the use of 5.56x45mm ammunition. (The proposed caliber conversions, such as 7.62x39mm, are instead intended to be passed along to the larger 7.62x51mm SCAR-H.) The SCAR L is to possess the ability to interchange barrels to create three basic sub-variants: a Close Quarters Combat (CQC) variant with a 9-12" barrel, a Standard (S) variant with a 13-16" barrel, and a Sniper Version (SV) with an 18-20" barrel. All of the barrels will be free-floating and interchangeable at the unit level (or user interchangeable as an objective). The barrel lifetime requirement has been increased to 15,000 rounds.

The Standard model will possess a multi-position collapsible or foldable stock giving an overall weapon length of 33.6" extended and 29.9" collapsed/folded (or less as an objective). It will weigh

no more than 7.725 lbs unloaded (less than 6.6 lbs unloaded as an objective). The multiple-position collapsible/folding stock will carry over to the CQC, but the SV will be equipped with a fixed stock with limited adjustments for length of pull. They should use STANAG-4179 compliant magazines, but alternate magazine designs of similar size would be considered if they offered a significant improvement in reliability and durability. There is also an objective for a standard length, expanded capacity magazine, ideally offering an 60 round capacity. A large emphasis is placed upon totally ambidextrous controls and use. Bullpup designs are ruled out. Accessory rails are to be integral, and the bottom handguard rail needs to be able to withstand the launching of a 40x46mm grenade from an attached EGLM.

September: *NSWC-Crane releases draft copies of revised performance specifications for the EGLM and a proposed EGLM Operational Requirements Document (ORD) Annex to the main SOPMOD ORD.*

NSWC-Crane also releases a pair of amendments to the MDNS solicitation. Revised proposals are requested from specific offerors for the RIS II and the ECOS-C.

TACOM-ARDEC issues a solicitation notice for an upcoming Broad Agency Announcement (BAA) regarding the development and system integration of a Small Arms Lightweight Family of Weapons and Ammunition (LFWA). As the "lethality component" of the Objective Force Warrior (OFW) program, the LFWA program will initially focus on the development of a lightweight machine gun and ammunition. The primary goal is a reduction in volume and weight, ranging up to a 30 to 40 percent decrease over existing systems. The designs may use a "clean slate" approach with no concern given to backwards compatibility with existing weapons and ammunition. Two major demonstrations of the new LFWA system are currently planned. The first will be a non-firing demo in mid FY06 to support the OFW Advanced Technology Demonstration (ATD). The second demonstration will be an operational live-fire assessment, scheduled for late FY07. The program is projected to include three Phases: nine months for Phase 1, twenty-eight months for Phase 2, and five months for Phase 3. Down-select criteria may be used for either Phases 2 or 3 if multiple awards are made.

Indonesia's military orders 5,000 Pindad SS-2 rifles. The SS-2 is a lightweight, optic rail-only variant of the Pindad SS-1 (the domestic production model of the FN FNC).

October: USSOCOM issues a solicitation for SCAR candidates, followed later in the month by revised copies of "**Draft Performance Specification: SOF Combat Assault Rifle Light**" and "**Draft Performance Specification: SOF Combat Assault Rifle Heavy**." The barrel change requirement is modified to allow exchanging of complete upper receiver assemblies. The objective MRBF is reduced to 35,000 rounds, and the same figure is also given as the objective barrel lifetime. The maximum threshold weight for the SCAR-L is reduced to 7.25 lbs. The Standard SCAR-H model will possess a multi-position collapsible or foldable stock giving an overall weapon length of

40.2" extended and 30.3" collapsed/folded (or less as an objective). It will weigh no more than 9 lbs unloaded. Offerors will be required to provide product sample SCAR-Ls as part of their proposals, consisting of three standard SCAR-L rifles, one CQC conversion, and a SCAR-H technical approach. The due date for submissions is given as June 19, 2004.

Thirty HK XM8 Lightweight Modular Weapon Systems (LMWS) are delivered to Aberdeen. The Multiple Attachment Point System (MAPS) has since been renamed Picatinny Combat Attachment Points (PCAP).

TACOM-Rock Island, in support of PM-Soldier Weapons, issues a 'Sources Sought' announcement in preparation for second-sourcing M249 production.

The USMC announces its desire to issue the M4 carbine with MWS forearms to replace the M9 pistol and M16A2 rifles carried by personnel such as small unit leaders and vehicle crew members. However, the M16A4 will remain be the primary issue weapon for Marine riflemen. *Based upon its experience in Iraq, the Corps also intends to issue a magnified Rifle Combat Optic (RCO) to all riflemen.*

NSWC-Crane announces its intent to hold an EGLM-related Integrated Product Team (IPT) meeting with industry, scheduled for early November. The purpose of the IPT meeting is to refine the before-mentioned EGLM ORD Annex and the performance specification drafts.

The US Army's Dismounted Battlespace Battle Lab (DBBL) announces that it has begun operational inspection and test firing of 200 C-More LSS for potential field trials in Afghanistan by the 10th Mountain Division. By the end of the month, 199 of the LSS are approved and packaged for shipment.

The long rumored 6.8x43mm Remington SPC (Special Purpose Cartridge) is finally unveiled to the public at the annual meeting of the Association of the US Army (AUSA). Intended for use in converted 5.56x45mm weapons and using existing magazines, the 6.8x43mm SPC launches a 115 grain projectile at 2,650fps from a 16.5" barrel. As rumored, the case is derived from the .30 Remington (albeit in an even shorter form than the .224E4/E5 Winchester and the FA-T116 6.35mm SCHV.) Also introduced are drop-on M16/M4 upper receiver conversions for the 6.8mm SPC built by Barrett and PRI.

TACOM-ARDEC reissues its solicitation notice for the upcoming BAA regarding the Small Arms Lightweight Family of Weapons and Ammunition (LFWA).

November: The JSSAMP is scheduled for yet another update.

The 199 C-More LSS arrive in Afghanistan. Redesignated the XM26 12 Gauge Modular Accessory Shotgun System (MASS), the weapons will be used through the end of the 10th Mountain Division's deployment. Results of the testing will be evaluated to determine whether the XM26 MASS will be issued throughout the

Army under the Rapid Fielding Initiative (RFI) program.

HK unveils a prototype of its 4.6x30mm UCP (Ultimate Combat Pistol), the companion handgun to the MP7 PDW.

December: TACOM-ARDEC issues a pair of pre-solicitation notices regarding the XM8 Lightweight Assault Weapon System. The first regards design improvement efforts, including back-up iron sights, a visible bright light, a folding or collapsible buttstock, and an Automatic Rifle variant. The other concerns development and testing of seventy-two Safety Blank Firing Adapters.

USSOCOM issues drafts of Section L (Proposal Requirements) and Section M (Evaluation Factors for Award) for the SCAR Performance Specification documents.

The Marine Corps Systems Command (MARCORSYSCOM) issues a sources sought notice for a Combat Assault Sling (CAS). The CAS will possess the following characteristics:

Adapt to the M16A2 Rifle, M-4 Carbine, M16A4 Rifle, and the Joint Service Combat Shotgun

Long enough to suspend the weapon across the body (back or front) when carried by a combat equipped Marine

Versatile enough to be shortened as needed for normal weapons carry when not in a tactical posture

Must not obstruct Marine Corps Marksmanship firing position

Must be capable of ambidextrous use.

Later in the month, MARCORSYSCOM issues a combined synopsis/solicitation notice for the procurement of Rifle Combat Optics (RCO). Intended for the M16A4, the RCO will be fixed power optic in the 3.5 to 4.5x magnification range. Certain other requirements, such as the preferred reticule design, would appear to favor the Trijicon ACOG family. The prospective order is to fall between 3,000 and 10,000 units, filled over a period of three years.

(To be updated as necessary...)

by **Daniel E. Watters**, Small Arms Historian

Other of Watters' learned works-in-progress for **TGZ** include **A Brief History of Fléchette and Project SPIW**, as well as **.30 Carbine Wildcats** and **Miniguns and the Movies**.

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This snaphaunce pistol features a folding stock to enable its owner to conceal it under a cloak.

Fabbrica d'Armi Pietro Beretta S.p.A., the world's oldest gunmaking and industrial firm, has been producing firearms in northern Italy since the days of Leonardo DaVinci and Christopher Columbus. Evidence suggests that Bartolomeo Beretta, a master barrel maker, operated an iron forge in the Val Trompia Valley as early as 1500. Beretta-manufactured arms were used by the Venetian Republic in its war with the Ottoman Turks in 1570, and after the region was occupied by France in 1797, the Berettas were awarded a "Good Service Certificate" from Napoleon Bonaparte for their part in supplying 40,000 muskets annually for the French Emperor's Grande Armee. Over the past four hundred years, the company has produced every type of firearm from arquebuses to wheel lock and flintlock pistols to modern automatic rifles, semi-automatic pistols, and fine sporting arms, as well as machinery used in the manufacture of guns. Many arms from Beretta's early period survive in museums and private collections.

During the 20th century, Beretta has furthered its reputation as a maker of high-quality shotguns. These range from simple but functional pump-action guns to highly embellished handcrafted presentation-grade pieces. The company continues to provide firearms for military and police forces, both in Italy and abroad. During the First World War, Beretta manufactured a blowback-operated 9mm semi-auto pistol chambered for the Glisenti cartridge. This was followed by a .32 ACP version in 1922.

Both of these pistols featured internal hammers, but later pistol designs featured an exposed hammer. Among these are the the M1923, M1931, and Modello 1934, chambered for the 9mm Corto (.380 ACP), which became the standard sidearm of the Italian Army during the Second World War. Beretta is presently known as the manufacturer of the Model 92FS/ M9 9mm Parabellum semi-automatic combat pistol currently serving with U.S. and other armed forces and law enforcement agencies. Shotguns and pistols account for a large percentage of Beretta's sales, but the gunmaker has also manufactured submachine guns and battle rifles, including the 7.62 NATO caliber BM-59, a licensed copy of the famous M1 Garand which features a detachable box magazine.

The company's first submachine gun was produced in 1917 in a joint venture with Fiat. This dual-barreled 9mm Parabellum arm was capable of firing 3000 rounds per minute. This arm was ineffective, but it started Beretta on a path that has led to the production of .223 caliber M70 rifle and 9mm caliber M12 submachine gun. After nearly 500 years and sixteen generations, Fabbrica d'Armi Pietro Beretta S.p.A. is still a family-operated business, headed by Ugo Gussalli Beretta and his sons, Pietro and Franco. Presently, Beretta manufactures a wide variety of custom firearms, pistols, shotguns, bolt-action and semi-automatic rifles, and military arms in state-of-the-art facilities in Brescia, Italy, and in other locations in Europe and the Americas. Beretta U.S.A. Corp. was founded in 1977 in Accokeek, Maryland, and the company has been manufacturing firearms at this location since that date.

EXHIBIT 66

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TITAN A .177 PRE-CHARGED AIR RIFLE, SERIAL NUMBER NOT VISIBL...

More About this Item

Item Overview

Description: LESOINNE ET PILOT FILS, LIEGE
A RARE .69 PERCUSSION RIFLED SINGLE-SHOT CARBINE, MODEL 'DELVIGNE PATENT', no visible serial number, circa 1840, with round tapering 15 3/4in. barrel rifled for Delvigne's Patent expanding bullet, bead fore-sight, octagonal breech-section with elongated top-tang encompassing a click-adjustable notch rear-sight, boomerang-shaped sidelock signed 'N. M. LESOINNE ET PILOT FILS A LIEGE'; plain hammer, figured walnut half-stock with squared iron heel-plate, bag-shaped pistol grip with iron grip-plate of similar form to the lockplate and lanyard ring to base, asymmetric trigger-guard bow retaining one end of the under-barrel stirrup, double-ended iron ram-rod, iron nose-band to fore-end, brushed bright finish throughout

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EXHIBIT 67



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The Warning Signs that Could Have Prevented the Virginia Tech Shootings

After Columbine it didn't seem possible that an even bigger school violence tragedy was possible, but unfortunately the Virginia Tech massacre proved to be just that, going down as the deadliest shooting by a single gunman in the history of the US. In April of 2007, a Seung-Hui Cho who was a senior at Virginia Tech, killed 32 people in a matter of a couple of hours and then went on to kill himself.

Cho started his killing spree in one campus residence in the early hours of the morning, then went back to his dorm to change his clothes which were covered in blood. While the police were dealing with the shootings only a building away, Cho took the time to delete his emails and remove his computer's hard drive. He then went to a nearby post office where he mailed a package containing things he had written as well as some video to NBC News. That was almost 2 hours after the initial shooting rampage. He then continued on to another building on campus holding a backpack that contained more than 400 rounds of ammunition, 2 guns, a knife, hammer and several chains and locks. While in Norris Hall, Cho locked three of the main exists using the chains and locks and included a note on the door that claimed a bomb would explode if anyone attempted to open the door. He went on to fire approximately 174 rounds during that second attack that lasted only approximately 10 minutes. During that time he revisited many of the rooms that he had already shot into earlier and then killed himself with a gunshot to the head. By the time the day was over, Cho had killed 27 students and 5 faculty members, wounded 17 more people with gunshots and 6 more were injured as a result of trying to escape.

One of the most difficult aspects of the Virginia Tech massacre was that the gunman had a known history of being mentally unstable and possibly dangerous, yet continued to attend the school as his condition only deteriorated and made him a bigger threat to himself and others. He had been diagnosed with a form of social anxiety disorder and depression in the eighth grade and went on to receive treatment for the next few years from doctors, counselors and other professionals. He voluntarily stopped receiving treatment a few years later. Sadly, none of his history was shared with Virginia Tech due to privacy laws. During his junior year of college various professors encouraged him to seek counseling after finding his behavior and his writing to be disturbing. He also was investigated for the stalking and harassment of two students that led to his being declared mentally ill and ordered to go to therapy by a special justice in Virginia. Again, none of these serious warning signs were followed up on before the day of the shootings.

School Violence Laws

Students Role

Go

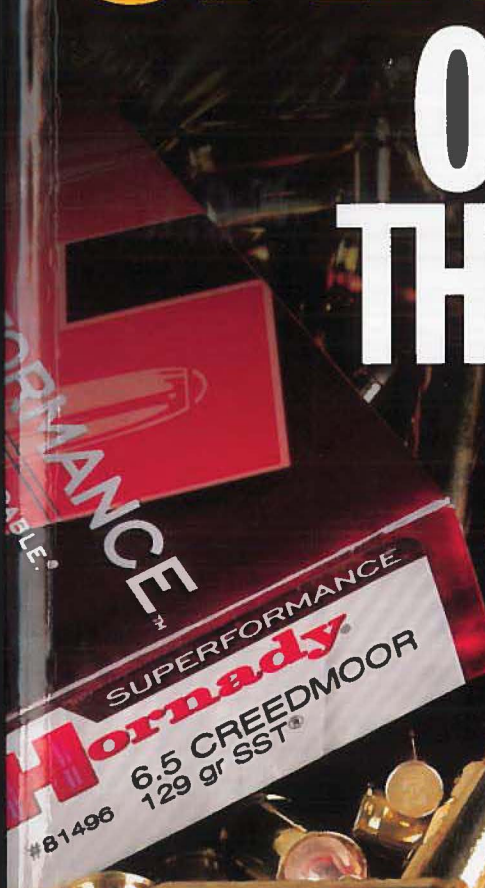
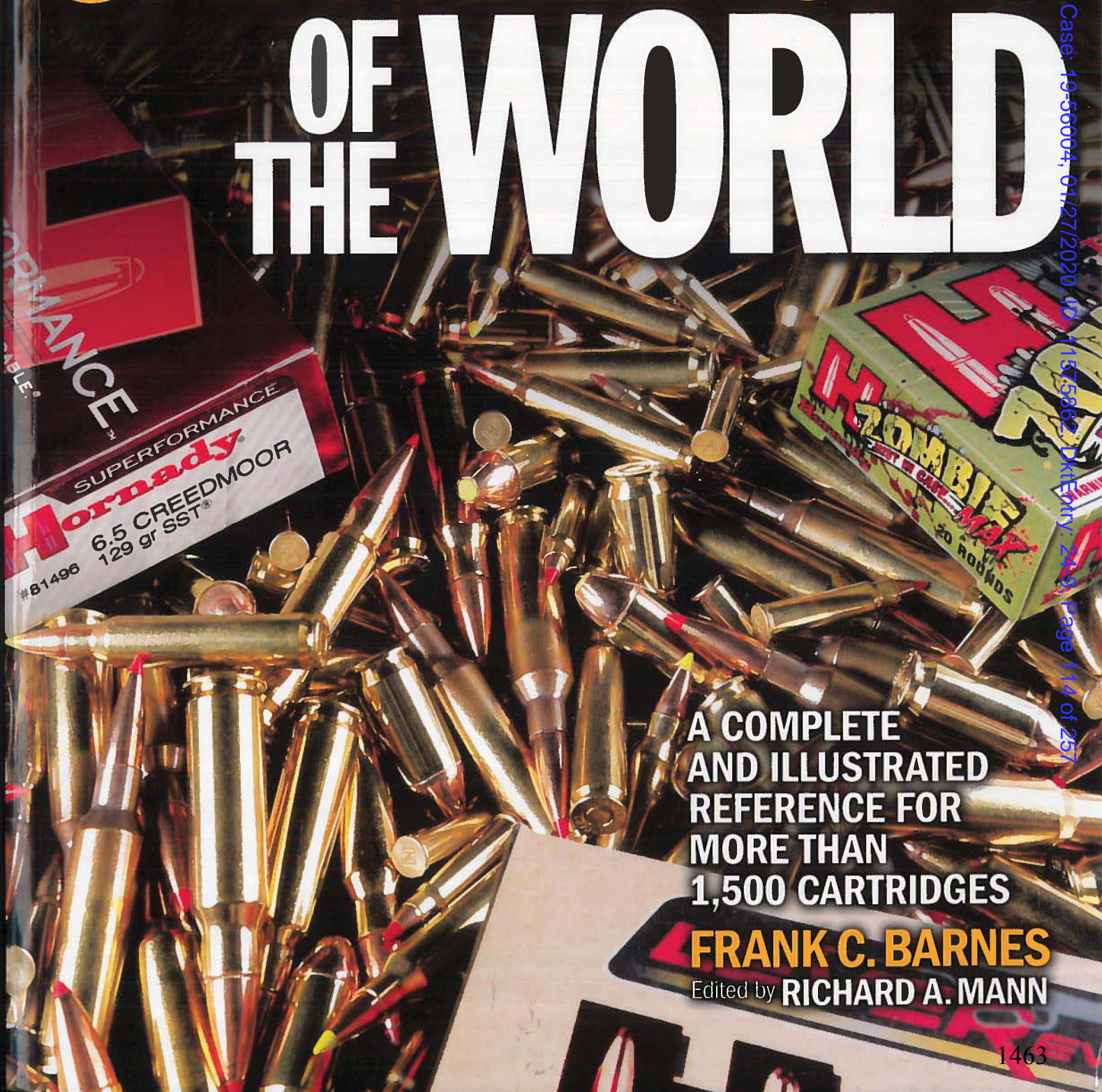
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13th Edition

CARTRIDGES OF THE WORLD

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A COMPLETE
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1,500 CARTRIDGES

FRANK C. BARNES

Edited by **RICHARD A. MANN**

Nosler now offers a .224-caliber, 60-grain version of the famous Partition bullet, Barnes offers several different weight Triple Shock bullets, and Swift has the excellent 75-grain Sirocco bullet. Any of these bullets are totally adequate for use on animals that weigh up to 250 pounds or so, as long as impact velocities are high enough to ensure complete expansion, about 2300 fps or so. However, these bullets are often too long to work with standard twist rates common to the .222 Remington cartridge, so to find acceptable accuracy, a new barrel with a faster twist rate is often needed. Also, with regards to the statement "it has been outlawed for deer hunting in many of the 50 states," as of 2012, 38 states currently allow the hunting of deer with a centerfire .22-caliber round.—R.A.M.

.222 Remington Loading Data and Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source/Comments
35 V-Max	H4198	22.0	3591	1000	Hodgdon
40 HP	IMR 4198	20	3300	967	Speer, Sierra
40 HP	W748	26.3	3400	1027	Speer, Sierra
45 SP	H335	24.5	3100	960	Hornady, Speer
45 SP	IMR 4198	21	3300	1088	Hornady, Speer, Sierra, Nosler
50 SP	W748	25.8	3100	1067	Speer, Sierra, Hornady
50 SP	RE 7	20.9	3150	1102	Hornady, Speer, Sierra
50 SP	IMR 4198	20	3200	1132	Speer, Hornady, Sierra
55 SP	H335	24	3200	1174	Sierra, Speer, Hornady, Nosler
55 SP	IMR 4320	25	3000	1099	Hornady, Speer
55 SP	IMR 4895	24.5	3000	1099	Speer, Hornady, Sierra
55	Varget	25.0	2095	1170	Hodgdon
60 HP	IMR 4895	23	2900	1121	Nosler, Hornady, Speer
50 SP	FL		3140	1094	Factory load
55 FMJ	FL		3020	1114	Factory load

.223 Remington (5.56X45mm)



Historical Notes:

The .223 Remington first appeared, in 1957, as an experimental military cartridge for the Armalite AR-15 assault rifle. In 1964, it was officially adopted by the U.S. Army as the 5.56mm ball cartridge M193. It is used in the selective-fire M16 rifle, which is based on the original AR-15 design. The cartridge was the work of Robert Hutton, who was technical editor of *Guns & Ammo* magazine and had a rifle range in Topanga Canyon, California. One of the requirements for the cartridge was that the projectile have a retained velocity in excess of the speed of sound (about 1080 fps at sea level) at 500 yards, something that could not be achieved with the .222 Remington. Working with Gene Stoner of Armalite, Bob Hutton designed a case slightly longer than the .222 and had Sierra make a 55-grain boat-tail bullet. This combination met the design requirements. All this was documented in the 1971 issue of the *Guns & Ammo* Annual.

Originally an alternative military cartridge, the .223 (5.56x45mm) is now the official U.S. and NATO military round; additional information will be found in Chapter 6 covering military cartridges. We should note here that NATO forces, including the United States, have standardized a new 5.56X45mm round with a heavy bullet, and the M193 is no longer standard.

Shortly after the military adopted this cartridge, Remington brought out the sporting version, which has largely replaced both the .222 Remington and Remington Magnum in popularity. Practically every manufacturer of bolt-action rifles has at least one model chambered for the .223. In addition, there are a large number of military-type semi-auto rifles available in this caliber. At one time, the Remington Model 760 pump-action was available in .223.

General Comments:

The .223 Remington is nearly identical to the .222 Remington Magnum, the only difference being that the .223 has a slightly shorter case. The two are not interchangeable, although the .223 will chamber in a .222 Magnum rifle. The result, though, creates a gross headspace condition, and the .223 case can rupture if fired in the .222 Magnum chamber.

The .223 has proven to be an effective military cartridge for fighting in jungle or forested areas and for close-in fire support, and has been improved lately by NATO with heavier (SS109 designed by FN of Belgium) bullets fired through fast-twist (1:7) barrels. As a sporting round, it is just as accurate as any of the other long-range, centerfire .22s. Military brass cases are sometimes heavier than commercial cases, so maximum loads in military brass should be reduced by at least 10 percent and approached cautiously. That is because the reduced case capacity results in a higher loading density and increased pressure with the same powder charge. The .223 Remington can be classed as an excellent medium-range varmint cartridge at ranges out to 250 yards.

In 1979, SAAMI cautioned shooters that 5.56x45mm military chambers and throats differ from .223 Remington sporting rifle chambers. Therefore military ball ammo may produce high chamber pressures in sporting rifles.

13th Edition Update: In 1965, it was considered foolish by most hunters to use a .22-caliber centerfire on deer or similarly sized game. Things have changed. Nosler now offers a .224-caliber, 60-grain version of the famous Partition bullet, Barnes offers several different weight Triple Shock bullets, and Swift has the excellent 75-grain Sirocco bullet. Any of these bullets are totally adequate for use on animals that weigh up to 250 pounds or so, as long as impact velocities are high enough to insure complete expansion—about 2300 fps or so. However, these bullets are often too long to work with standard twist rates common with older .223 Remington rifles, so, to find acceptable accuracy, a new barrel with a faster twist rate or a more modern rifle with a faster twist rate is often needed.

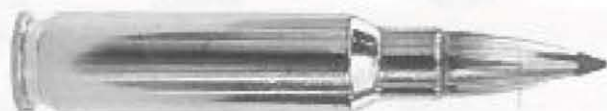
There has also been a great deal of confusion on the interchangeability between the .223 Remington cartridge and 5.56x45mm NATO/Military ammunition. Dimensionally, these two cartridge cases are identical. However, 5.56 NATO ammo is generally loaded to a higher pressure than commercial .223 Remington ammunition. In a bolt-action rifle of quality manufacturer, this is a non-issue, but, in a semi-auto rifle, problems can be experienced. These can be as minor as reliability issues, and as unsafe as blown primers and even firearm damage and shooter injury. The difference between these two cartridges is pressure and the difference in the rifles is the way the lead—the section of the chamber in front of the cartridge case is cut into the barrel; 5.56 NATO chambers have a longer lead. Maybe the simplest way to explain the difference is to say that the 5.56 NATO round is a +P version of the .223 Remington.—R.A.M.

.223 Remington Loading Data and Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source/Comments
40 SP	IMR 3031	25	3300	1140	Sierra, Speer
40 SP	IMR 4198	22	3200	995	Sierra, Speer
40 Nos BT	Varget	28.0	3674	1195	Hodgdon
45 SP	IMR 3031	25	3300	1162	Hornady, Sierra
45 SP	IMR 4198	22	3200	965	Hornady, Sierra, Speer
50 SP	IMR 3031	25.2	3250	1250	Sierra, Nosler, Hornady, Speer
50 SP	IMR 4198	21.5	3200	1155	Nosler, Hornady, Speer, Sierra
55 SP	IMR 3031	24.5	3200	1330	Hornady, Nosler, Sierra
55 SP	W748	25	3000	1110	Hornady, Nosler, Sierra
55	Varget	27.5	3384	1395	Hodgdon
60 HP	IMR 3031	24	3100	1130	Hornady, Sierra
80	Varget	25.0	2869	1460	Hodgdon
55 SP	FL		3240	1280	Factory load
55 FMJBT	FL		3250	1290	Military load
40 HP	FL		3650	1185	Federal factory load
62 Fusion	FL		3000	1239	Fusion Factory Load
60 Nosler Partition	FL		3160	1330	Federal Factory Load
75 BTHP	FL		2930	1429	Hornady Superformance

170 Hornady FN	IMR-4064	39.3	2416	2201	Hodgdon
180 Hornady FTX	FL		2660	2511	Hornady
140 Hornady Mono-Flex	FL		2800	2437	Hornady

.30 TC (Thompson/Center)



- Historical Notes:** The .30 TC was developed by Hornady for Thompson/Center and introduced in that company's Icon rifle. Basically a shortened version of the .308 Winchester case with a sharper 30-degree shoulder angle, it has less powder capacity than that cartridge and yet, due to the utilization of Light Magnum technology previously developed by Hornady for other cartridges, it exceeds in performance standard loadings of the .308 Winchester and equals the performance of the .30-06 Springfield when the three cartridges are loaded with a 150-grain bullet. As this is written, in early 2009, only the T/C Icon rifle is chambered for the .30 TC and only Hornady loads the ammunition.
- General Comments:** Despite impressive velocities for its size, the .30 TC is rather an odd duck, to say the least, and this has raised questions about its existence among hunters and shooters. The Icon rifle was introduced with a short action, and had the action been too short to handle the .308 Winchester, the .30 TC would have made sense—but this was not the case. Not only is the short version of the Icon action long enough to handle the .308 Winchester, it was one of the first chamberings offered in the Icon rifle. And, while it is true that, in its factory loading, the .30 TC delivers higher velocity than standard loadings of the .308 Winchester, it is also true that Light Magnum loadings of the .308 Winchester from Hornady are just as fast. When both are handloaded with bullets of the same weight and to the same chamber pressure, velocity will be a bit lower with the .30 TC, due to the smaller capacity of its case.

.30 Thompson/Center Data and Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source
135 Sierra HPBT	H335	47.0	3127	2928	Hodgdon
150 Hornady IB	IMR-3031	42.5	2856	2714	Hodgdon
165 Barnes TSX	W748	46.0	2748	2764	Hodgdon
180 Hornady SP	H335	42.0	2580	2658	Hodgdon
150 Hornady SST	FL		3000	2994	Hornady

.308 Winchester (7.62x51mm NATO)



- Historical Notes:** Introduced by Winchester as a new sporting cartridge, in 1952, the .308 is nothing more than the NATO 7.62x51mm military round. This was a very smart move, to tack the Winchester name onto what was sure to become a popular sporting number. Practically every manufacturer of high-powered sporting rifles chambers the .308, since it will work through medium- or standard-length actions. The Model 70 bolt-action and 88 lever-action Winchesters were the first American sporting rifles so chambered. It was adopted as the official U.S. military rifle cartridge, in 1954, although guns for it were not ready until 1957.
- General Comments:** In power, the .308 Winchester is superior to the .300 Savage and almost equal to the .30-06. It delivers about 100 fps less muzzle velocity than the larger .30-06 with any given bullet weight. Most authorities consider the .308 suitable for most North American big game, although it's on the light side for moose or brown bear. This chambering is a favorite of target shooters and has a reputation for excellent accuracy. It is the basis for a number of wildcat cartridges that have been adopted as factory chamberings: .243 Winchester, 6.5-08, 7mm-08 Remington, .358 Winchester, and the rimmed versions of the .307 Winchester and .356 Winchester. All major domestic and foreign ammunition companies offer this cartridge.

#6431

The first 5.45mm Soviet cartridges publicly available to western military intelligence were brought out of Afghanistan by writer Galen Greer, while on assignment for Soldier of Fortune magazine, in 1980, and the first information made public was in the October 1980 issue of that magazine. Until that time, the existence of a new Russian military cartridge had mostly been rumor. Later, the round was withdrawn from service in Afghanistan. Cases are lacquered steel with Berdan primers.

General Comments: The Russians apparently designed this cartridge as a result of experience on the receiving end of the U.S. M-16 rifle and 5.56mm round, in Vietnam. The 5.45mm Russian is a well-designed cartridge, for its intended purpose. The long, thin, boat-tail bullet reduces aerodynamic drag to the minimum and results in a higher retained velocity at long range. The bullet is designed to be stable in flight and provide good accuracy at all ranges out to maximum, but unstable on contact, so as to tumble easily, which enhances lethality. It is a better designed military bullet than the original used in the United States M193 5.56mm cartridge. However, the new 5.56mm SS109 (M855) NATO standard round, with its heavier bullet and improved shape, probably has an edge over the Soviet bullet.

5.45x39mm Russian Factory Ballistics

Bullet (grains)	Powder	Grains	Velocity	Energy	Source/Comments
54	ML		2950	1045	Military load (SBT Ball)

5.56x45mm NATO



Historical Notes: The 5.56x45mm cartridge was originally developed for the Armalite AR-15 rifle. It was first tested by the U.S. Air Force as a possible replacement for the M-1 Carbine, in 1960-'61. The AR-15 later evolved into the selective-fire M-16 adopted by the U.S. military, in 1964, after several years of testing by the U.S. Continental Army Command at Fort Monroe, Virginia. The rifle and cartridge were first combat tested in Vietnam, in the early 1960s.

General Comments: As initially loaded, the 5.56x45mm Ball cartridge had a 55-grain spitzer boat-tail bullet at a muzzle velocity of 3250 fps. It was the standard U.S. military loading, until 1984. In 1980, the 5.56mm, FN-designed, 62-grain SS109 bullet was adopted by NATO. Designated the M855 in the United States, the new load uses a spitzer boat-tail bullet with a mild steel penetrator in front of the lead base. Muzzle velocity is 3100 fps. Adoption also involved changes in 5.56mm rifles to a quicker rifling twist of 1:7, to stabilize the longer, heavier bullet. This much improved bullet resulted in higher retained velocity and greater accuracy at long range. It also has much improved penetration characteristics over the old M193 55-grain projectile at all ranges.

The 5.56mm case is similar in configuration to and interchangeable with the commercial .223 Remington, although SAAMI warns that dimensional differences between military chambers and commercial chambers may make it unsafe to fire military ammunition in sporting rifles. Additional information and loading data can be found under that listing in Chapter 2.

5.56x45mm NATO Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source/Comments
55 FMJ-BT M193 Ball	ML		3250	1325	U.S. Military load, old
62 FMJ-BT M855 Ball			3100	1325	NATO load, new

5.8x42mm Chinese

Historical Notes: Surprisingly, in the mid-1990s, the Chinese military introduced a new, indigenous, 5.8x42mm Small-Caliber High-Velocity (SCHV) assault rifle round and a new family of small arms to use it. This was the result of research spanning more than two decades. Like the Russians, the advantages of SCHV assault rifle ammo observed in Vietnam War battle reports did not go unnoticed by the Chinese military. So, in March, 1971, the Chinese military logistic department commenced a small arms research project, in Beijing, known as the "713 Conference," in order to develop the design criteria for an indigenous SCHV assault rifle cartridge.

.30 Army (.30-40 Krag)



Historical Notes: The .30 U.S. Army, or .30-40 Krag, was the first small-bore military cartridge adopted by the U.S. Army. It was adopted, in 1892, for the Norwegian-invented, American-modified, Krag-Jorgensen bolt-action rifle. Original loads used 40 grains of smokeless powder with a 220-grain full metal jacket round-nose bullet. The .30-40 Krag cartridge remained in service only a few years, before being replaced, in 1903, by the rimless .30-03 cartridge, predecessor to the .30-06.

General Comments: In 1893, Winchester began offering its High Wall single-shot rifle chambered for the .30-40 Krag, thus becoming the first commercial producer in the United States to offer a small-bore, smokeless-powder sporting cartridge. This was nearly two years before the smokeless powder .30-30 loading was offered.

Editor's note: A glance at the following ballistics might suggest, to the astute reader, that original loads used pressures that would today seem excessive for the Krag rifle. Indeed, this seems to have been the case, as the rated velocity was routinely achieved in production rifles and, considering the limited case capacity and characteristics of contemporary domestic smokeless powders, pressures had to have been rather brisk, perhaps exceeding 55,000 psi. It seems at least possible that use of such unusually high-pressure loads contributed to the subsequent problems that earned the single locking lug Krag action a reputation, perhaps undeserved, for weakness.

.30-40 Krag Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source/Comments
220 FMJ-RN Ball	ML		2200	2365	Military load, special

7.62x51mm NATO (.308 Win.)



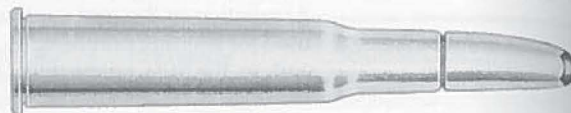
Historical Notes: For the NATO small arms trials, in the early 1950s, the U.S. submitted its new T-65 cartridge. This was basically a shortened .30-06 case using the same caliber bullet and similar case head dimensions. Case length was reduced from 63 millimeters in the .30-06 to 51 millimeters for the 7.62mm T-65. This allowed a lighter, more compact cartridge and rifle. Some of the other NATO Allies submitted entries that were far more advanced than the T-65 cartridge. However, the U.S. used its considerable influence to override all Allied objections, in order to have the 7.62x51mm NATO cartridge adopted; it remains a NATO standard to this day. In 1957, the U.S. Army adopted the M-14 rifle in 7.62x51mm. The M60 machine gun is also chambered for this cartridge, as are various sniper rifles.

General Comments: During the Vietnam War, the U.S. military adopted the 5.56x45mm cartridge for the new M-16 rifle, which greatly upset the other NATO Allies. A new series of NATO tests was begun in the late 1970s, which resulted in the 5.56x45mm cartridge being standardized, in 1980. Both 7.62x51mm and 5.56x45mm remain NATO standard rounds. Recent tendencies have been to chamber infantry assault rifles for the 5.56x45mm, leaving the 7.62x51mm cartridge for machine guns. Nearly all NATO Allies manufacture the 7.62x51mm cartridge. Many non-NATO countries, such as Japan, Australia, Brazil, Taiwan, South Africa, and others also use this cartridge. Ball, tracer, match, armor piercing, and frangible types exist.

7.62x51mm NATO Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source/Comments
150 FMJ-BT Ball	ML		2750	2520	Military load, M80
168 HP-BT Match	ML		2680	2680	Military load, M852

.30 Army (.30-40 Krag)



Historical Notes: The .30 U.S. Army, or .30-40 Krag, was the first small-bore military cartridge adopted by the U.S. Army. It was adopted, in 1892, for the Norwegian-invented, American-modified, Krag-Jorgensen bolt-action rifle. Original loads used 40 grains of smokeless powder with a 220-grain full metal jacket round-nose bullet. The .30-40 Krag cartridge remained in service only a few years, before being replaced, in 1903, by the rimless .30-03 cartridge, predecessor to the .30-06.

General Comments: In 1893, Winchester began offering its High Wall single-shot rifle chambered for the .30-40 Krag, thus becoming the first commercial producer in the United States to offer a small-bore, smokeless-powder sporting cartridge. This was nearly two years before the smokeless powder .30-30 loading was offered.

Editor's note: A glance at the following ballistics might suggest, to the astute reader, that original loads used pressures that would today seem excessive for the Krag rifle. Indeed, this seems to have been the case, as the rated velocity was routinely achieved in production rifles and, considering the limited case capacity and characteristics of contemporary domestic smokeless powders, pressures had to have been rather brisk, perhaps exceeding 55,000 psi. It seems at least possible that use of such unusually high-pressure loads contributed to the subsequent problems that earned the single locking lug Krag action a reputation, perhaps undeserved, for weakness.

.30-40 Krag Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source/Comments
220 FMJ-RN Ball	ML		2200	2365	Military load, special

7.62x51mm NATO (.308 Win.)



Historical Notes: For the NATO small arms trials, in the early 1950s, the U.S. submitted its new T-65 cartridge. This was basically a shortened .30-06 case using the same caliber bullet and similar case head dimensions. Case length was reduced from 63 millimeters in the .30-06 to 51 millimeters for the 7.62mm T-65. This allowed a lighter, more compact cartridge and rifle. Some of the other NATO Allies submitted entries that were far more advanced than the T-65 cartridge. However, the U.S. used its considerable influence to override all Allied objections, in order to have the 7.62x51mm NATO cartridge adopted; it remains a NATO standard to this day. In 1957, the U.S. Army adopted the M-14 rifle in 7.62x51mm. The M60 machine gun is also chambered for this cartridge, as are various sniper rifles.

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7.62x51mm NATO Factory Ballistics

Bullet (grains/type)	Powder	Grains	Velocity	Energy	Source/Comments
150 FMJ-BT Ball	ML		2750	2520	Military load, M80
168 HP-BT Match	ML		2680	2680	Military load, M852

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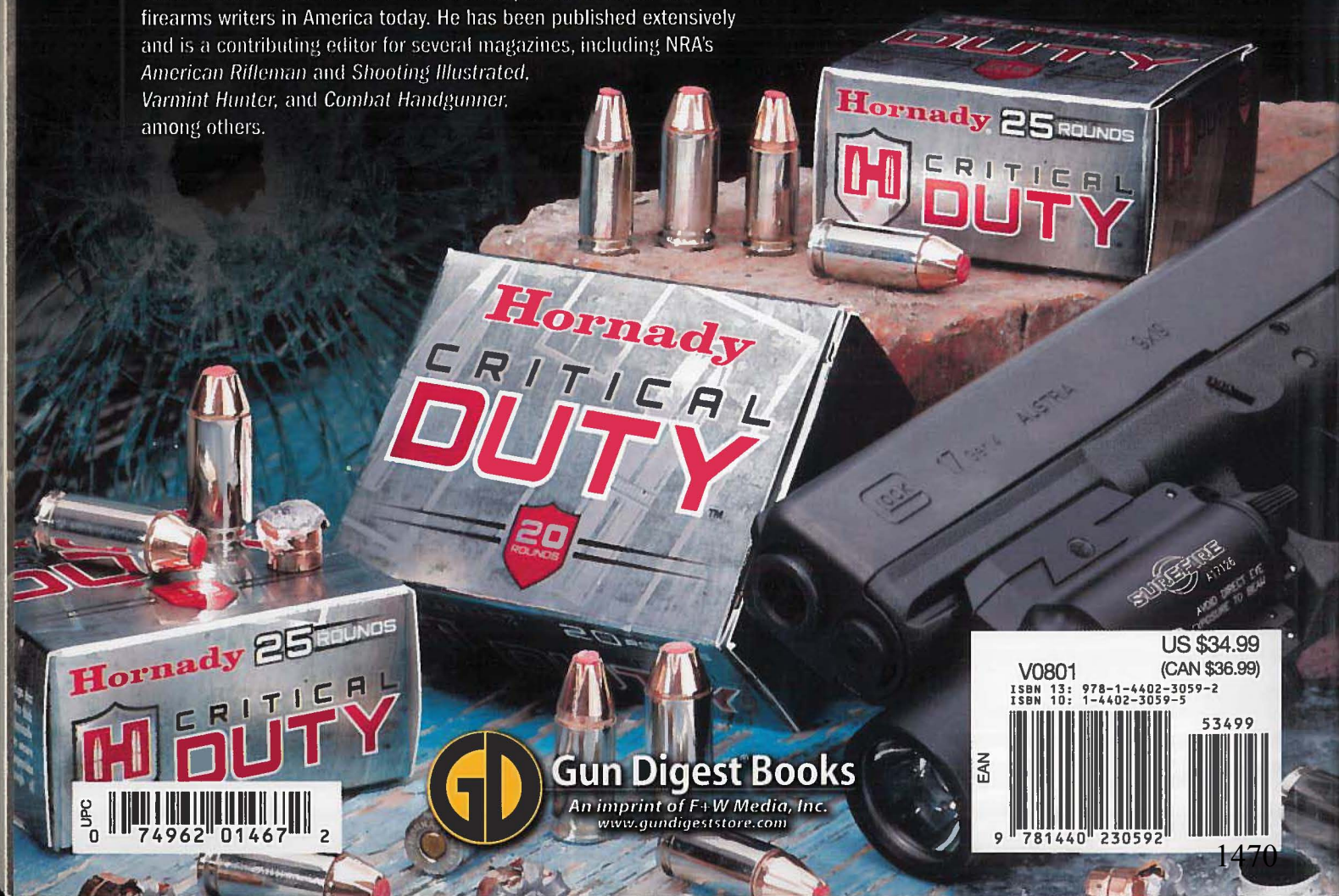
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EXHIBIT 69



The Impact of State Firearm Laws on Homicide and Suicide Deaths in the USA, 1991–2016: a Panel Study

Michael Siegel¹, Molly Pahn¹, Ziming Xuan¹, Eric Fleegler², and David Hemenway³

¹Department of Community Health Sciences, Boston University School of Public Health, Boston, MA, USA; ²Division of Emergency Medicine, Boston Children's Hospital, Boston, MA, USA; ³Harvard T.H. Chan School of Public Health, Boston, MA, USA.

BACKGROUND: Firearm injuries are a major cause of mortality in the USA. Few recent studies have simultaneously examined the impact of multiple state gun laws to determine their independent association with homicide and suicide rates.

OBJECTIVE: To examine the relationship between state firearm laws and overall homicide and suicide rates at the state level across all 50 states over a 26-year period.

DESIGN: Using a panel design, we analyzed the relationship between 10 state firearm laws and total, age-adjusted homicide and suicide rates from 1991 to 2016 in a difference-in-differences, fixed effects, multivariable regression model. There were 1222 observations for homicide analyses and 1300 observations for suicide analyses.

PARTICIPANTS: Populations of all US states.

MAIN MEASURES: The outcome measures were the annual age-adjusted rates of homicide and suicide in each state during the period 1991–2016. We controlled for a wide range of state-level factors.

KEY RESULTS: Universal background checks were associated with a 14.9% (95% CI, 5.2–23.6%) reduction in overall homicide rates, violent misdemeanor laws were associated with a 18.1% (95% CI, 8.1–27.1%) reduction in homicide, and “shall issue” laws were associated with a 9.0% (95% CI, 1.1–17.4%) increase in homicide. These laws were significantly associated only with firearm-related homicide rates, not non-firearm-related homicide rates. None of the other laws examined were consistently related to overall homicide or suicide rates.

CONCLUSIONS: We found a relationship between the enactment of two types of state firearm laws and reductions in homicide over time. However, further research is necessary to determine whether these associations are causal ones.

KEY WORDS: community health; firearms; health policy; injury; prevention; public health.

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INTRODUCTION

From 1991 to 2016, the average annual firearm death rate in the USA was 11.4 per 100,000 individuals.¹ This amounts to 859,871 lives lost due to a single cause of preventable death over a 26-year period.¹ Although numerous studies have evaluated the impact of state firearm laws on homicide or suicide rates (Online Supplemental Tables S1, S2), a major limitation is that most examined the impact of only one type of policy. Because states that enact one type of law are also more likely to enact others,² it is difficult to isolate the effect of one law without considering the simultaneous impact of other policies.

To improve our ability to draw causal inferences, a stronger study design would examine the relationship between the enactment of *multiple* types of state firearm laws over time and differences in fatality rates between states. However, we are aware of only one multi-year panel study of homicide rates that examined multiple laws and included data from the past decade; this study was conducted at the level of urban counties, and only 34 states were included.³ We are not aware of any panel study at the state level that used data within the past decade to assess simultaneously the effect of multiple state firearm laws on homicide or suicide death rates.

One reason why many previous studies have focused on a single type of law is the absence of a comprehensive national database of state firearm laws. For most previous studies, researchers had to track down the status of state firearm laws by conducting their own legal research, a painstaking process that precluded a single study of a large range of gun-related policies. We recently created a novel database in which we recorded, quantified, and classified the largest-to-date compilation of firearm provisions by state over a 26-year period.² In this study, we examine the simultaneous impact of 10 different types of state firearm laws on overall homicide and suicide rates over a 26-year period using the same model specification.

METHODS

Data Sources

We ascertained the annual presence or absence of 10 state firearm laws in all 50 states from 1991 to 2016 using the State Firearm Law Database, which provides a panel of firearm-related laws in each state, for each year.² The database was

compiled using the Thompson Reuters Westlaw database of state statutes and session laws and a database assembled by Everytown for Gun Safety.⁴

We obtained homicide and suicide mortality data from the Centers for Disease Control and Prevention Web-Based Injury Statistics Query and Reporting System (WISQARS), which are derived from the vital statistics death registry of the National Center for Health Statistics.¹ WISQARS reports annual state-specific, age-adjusted fatality rates for homicide and suicide.

Study Population

We assembled annual, state-specific age-adjusted total homicide and suicide rates in each state from 1991 to 2016. We excluded homicides due to legal intervention (1% of firearm deaths), unintentional firearm fatalities (2.5% of firearm deaths), and fatalities of undetermined intent (1% of firearm deaths) from our analysis.

Outcome Measures

The main outcome measures were the annual, age-adjusted homicide rate and age-adjusted suicide rate in each state over the study period. Because there were 50 states and 26 years, the total number of possible observations was 1300. However, the CDC does not report death rates when the absolute number of deaths in a state during a given year is less than 10. For this reason, we did not have a complete panel of homicide data for three states: North Dakota, Vermont, and Wyoming. We therefore excluded these states from the homicide analyses, yielding a total of 1222 observations. There were no missing data for suicide death rates, so there were 1300 observations for analyses involving this outcome.

Main Predictor Variables

From the state law database, we selected 10 laws to analyze based on several considerations: (1) laws that are currently being considered by state legislatures; (2) laws that have been examined in prior research; and (3) laws that were enacted by at least two states during the study period. We analyzed the following 10 laws (defined in detail in Table 1): (1) universal background checks, either through point-of-purchase checks or a permit to purchase requirement; (2) ban on handgun possession for people convicted of a violent misdemeanor; (3) age 21 limit for handgun possession; (4) “shall issue” laws; (5) permitless carry laws; (6) prohibition against gun trafficking; (7) ban on “junk guns”; (8) “stand your ground” laws; (9) assault weapons ban; and (10) ban on large-capacity ammunition magazines. Laws were lagged by 1 year in the analysis; that is, we considered the potential effect of a law only in the full first year after its enactment.

Data Analysis

Unlike many earlier analyses in the public health literature, we employed a difference-in-differences approach to the analysis

of policy outcomes,^{5, 6} an approach that is widely used in the econometric and criminology literature on the effect of state firearm laws and was first introduced by Lott and Mustard in their classic 1997 paper.⁷ Using multivariable linear regression, we evaluated the association between the firearm law provisions in each state (which were time-varying) and the homicide and suicide rates over the study period, while controlling for several other time-varying state-level factors. We included year and state fixed effects and estimated cluster-robust standard errors, which account for the clustering of observations, serial autocorrelation, and heteroskedasticity.⁸ By including state fixed effects, our analysis focuses on the time series of observations within each state, comparing changes in homicide or suicide rates within a state from before to after the implementation of a particular firearm law, using states without that law as controls. Because the outcome variables are not normally distributed but skewed, we log-transformed the homicide and suicide rates.

Our final model was as follows:

$$\ln(\mu_{st}) = \alpha + (B \cdot LAW_{st}) + (C \cdot CONTROL_{st}) + S + T + e,$$

where μ_{st} is the homicide or suicide rate in state s in year t , LAW_{st} is a dummy variable for the presence or absence of a particular state firearm law in state s in year t , $CONTROL_{st}$ is a vector of control variables, S represents state fixed effects, and T represents year fixed effects.

We controlled for the following time-varying state-level factors, chosen because of their association with homicide or suicide rates in the published literature and their association with both death rates and the adoption of firearm laws in our data set: (1) the percent of the population that is black; (2) the percent of population ages 15–29 that is male; (3) per capita law enforcement officers; (4) the violent crime rate (excluding homicide); (5) the divorce rate; (6) the unemployment rate; (7) the poverty rate; (8) per capita alcohol consumption; (9) the incarceration rate; (10) population density; (11) log of population; and (12) household gun ownership percentage.

Because annual survey data of household gun ownership at the state level are not available, most previous studies have used the ratio of firearm suicides to all suicides (FS/S) as a proxy for household firearm ownership.⁹ This proxy is highly correlated ($r = 0.80$) with state-specific measures of firearm ownership on a cross-sectional basis.¹⁰ Recently, we developed a new proxy measure that improves the correlation with survey-measured gun ownership from 0.80 to 0.95.¹⁰ This new proxy measure incorporates a state’s hunting license rate in addition to FS/S.¹⁰ In this study, we used this new proxy.

Per capita law enforcement officers and violent crime rates were obtained from the FBI Uniform Crime Reports,¹¹ incarceration rates were obtained from the Bureau of Justice Statistics,¹² and per capita alcohol consumption was obtained from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) for 1991–2015¹³ and from Statistica¹⁴ for 2016. Hunting licensing data were obtained from the U.S. Fish and Wildlife Service.¹⁵ The remaining variables were obtained

JGIM Siegel et al.: The Impact of State Firearm Laws on Homicide and Suicide Deaths in the USA, 1991–2016: a Panel Study

Table 1 Description of State Firearm Laws Examined

Law	Brief description	Detailed description	States with law in 1991	Additional states with law in 2016	Law changes from 1991 to 2016
Universal background checks	Background checks conducted through permit requirement for all firearm sales or through required background checks for all sales)	Individuals must undergo a background check to purchase any type of firearm, either at the point of purchase or through a license/permit application. This may or may not include exemptions for buyers who have already undergone a background check for a concealed carry permit or other licensing requirements.	CA, IL, MA, NJ, RI	CO, CT, DE, HI, NY, OR, WA	7
Violent misdemeanor is prohibiting for handgun possession	Handgun possession is prohibited for people who have committed a violent misdemeanor punishable by less than 1 year of imprisonment	Must cover possession of handguns, not just purchase. Must cover assault, not just aggravated assault. Must extend beyond domestic violence-related misdemeanors, restraining orders, and stalking. Must not require that misdemeanor be punishable by imprisonment of more than 1 year. Must not require that misdemeanor involve use of a firearm or result in injury. You must be 21 to possess a handgun. No exemption for parental consent. Exclusions for adult-supervised hunting, sporting, or training activities are OK. Exception for possession on private premises NOT OK unless minor required to be under adult supervision.	CA, HI, NY	CT, MD	2
Age 21 limit for handgun possession	No possession of handguns until age 21	You must be 21 to possess a handgun. No exemption for parental consent. Exclusions for adult-supervised hunting, sporting, or training activities are OK. Exception for possession on private premises NOT OK unless minor required to be under adult supervision.	IA, RI, SC	CT, HI, MD, MA, NJ, NY (SC repealed)	7
Shall issue law	Law provides no discretion to law enforcement authorities in deciding whether to grant a concealed carry permit.	A permit must be issued unless the applicant meets pre-established disqualifying criteria.	FL, GA, ID, IN, IA, ME, MS, MT, NH, ND, OR, PA, SD, WA, WV	AL, AR, CO, IL, KY, LA, MI, MN, MO, NE, NV, NM, NC, OH, OK, SC, TN, TX, UT, VA, WA, WI (WV moved to permitless carry)	23
Permitless carry	No permit is required to carry a concealed handgun.	Age restrictions may apply, and a voluntary permitting system may still be in place.	VT	AK, AZ, ID, KS, ME, MS, WV, WY	8
Trafficking prohibited	No person may purchase a firearm with the intent to re-sell to a person who is prohibited from buying or possessing a firearm	The law prohibits the purchase of a firearm with the intent to re-sell to a prohibited person. We make no distinction between whether the trafficker (original purchaser) must actually know or have reason to believe that the buyer is prohibited. An exemption for sale to relatives is acceptable.	FL, MA, ND, OH, VA	CA, CO, CT, DE, IL, MN, NY, UT, VA	9
Junk gun ban	Ban on junk guns (sometimes called “Saturday night specials”)	The law prohibits the sale of handguns that fail to meet one or more of the following requirements: (1) Passes drop testing and firing testing; (2) Passes a melting point test; (3) Possesses specific handgun safety features; (4) Appears on a list of approved handguns. This may or may not apply to private sellers.	HI, IL, MD, MN, SC	CA, MA (SC repealed)	3
Stand your ground law	A “stand your ground” law is in place	Use of deadly force is allowed to be a first resort if you are threatened in a public place in which you have the right to be present. There is no duty to retreat. Does not count as stand your ground law if it only	None	AL, AK, AZ, FL, GA, IN, KS, KY, LA, MI, MS, MO, MT, NV, NH, NC, OK, PA, SC, SD, TN, TX, UT, WV	24

(continued on next page)

Table 1. (continued)

Law	Brief description	Detailed description	States with law in 1991	Additional states with law in 2016	Law changes from 1991 to 2016
Assault weapons ban	Ban on sale of assault weapons beyond just assault pistols	applies when person is in a vehicle. Law bans the sale of both assault pistols and other assault weapons.	CA, NJ	CT, MD, MA, NY	4
Large capacity ammunition magazine ban	Ban on sale large capacity magazines beyond just ammunition for pistols	Law bans the sale of both assault pistol ammunition and other large-capacity magazines.	NJ	CA, CO, CT, MD, MA, NY	6

from the U.S. Census. We conducted the analysis using Stata version 15 (StataCorp LP, College Station, TX).

Because the outcome variables are log-transformed, the regression coefficients can be interpreted as the percentage change in the firearm homicide or suicide rate associated with the presence of a particular law by exponentiating the coefficient, subtracting 1, and then multiplying by 100 (i.e., a coefficient of 0.10 for a given law would indicate a 10.5% increase in the mortality rate associated with that law).

To test the plausibility of any observed associations between firearm laws and overall homicide or suicide rates, we conducted a falsification test: we analyzed the relationship between these laws and firearm compared to non-firearm mortality rates. These laws would be expected to primarily affect only the firearm-related rates.

In a final sensitivity analysis, we modeled the secular time trend in firearm homicide or suicide rates by including year as a continuous variable in the model rather than as a fixed effect.

RESULTS

Over the 26-year study period, there was a substantial variation in the violent death rates across states. In 2016, overall homicide rates ranged from a low of 1.3 per 100,000 in Maine and New Hampshire to a high of 14.2 per 100,000 in Louisiana (Table 2). In 2016, overall suicide rates ranged from a low of 7.2 per 100,000 in New Jersey to a high of 26.0 per 100,000 in Montana. Across the study period, there were a total of 93 law changes among the 10 laws studied (Table 1).

When examined individually, universal background checks and violent misdemeanor laws were significantly associated with lower overall homicide rates and “shall issue” laws were significantly associated with higher homicide rates (Table 3). After simultaneously controlling for all 10 firearm laws, universal background checks were associated with 14.9% lower overall homicide rates (95% confidence interval [CI], 5.2%–23.6%); violent misdemeanor laws were associated with 18.1% lower homicide rates (95% CI, 8.1–27.1%); and “shall issue” laws were associated with 9.0% higher homicide rates (95% CI, 1.1%–17.4%). None of the other seven laws were significantly associated with overall homicide rates. In a

falsification test, each of these three laws was found to be significantly associated only with the firearm-related homicide rate, not the non-firearm-related homicide rate (Online Supplemental Table S3).

In the fully adjusted model, household gun ownership was not associated with overall rates of homicide (Table 3). Factors that were significant positive predictors of overall homicide rates were the percentage of males, the violent crime rate, and population density. Overall population was negatively associated with homicide rates.

When examined individually, four of the 10 firearm laws were significantly associated with overall suicide rates (Table 4). However, after simultaneously controlling for all 10 firearm laws, only two laws were significantly related to suicide rates: bans on junk guns were associated with 6.4% lower suicide rates (95% CI, 3.5–9.2%) and permitless carry laws were associated with 5.1% higher suicide rates (95% CI, 0.2–10.4%). Both laws failed the falsification test, as both were significantly related to non-firearm as well as firearm homicide rates (Online Supplemental Table S4). None of the other laws were significantly associated with overall suicide rates.

In the fully adjusted model, household gun ownership was not associated with overall rates of suicide (Table 4). Factors that were significant positive predictors of suicide rates were the violent crime rate, unemployment rate, poverty rate, and per capita alcohol consumption. Overall population was negatively related to suicide rates.

Entering year as a continuous variable instead of as a fixed effect had no appreciable impact on the results (Online Supplemental Table S5).

DISCUSSION

To the best of our knowledge, this is the first study using data from within the past decade to simultaneously model the effect of multiple state firearm laws on homicide and suicide rates at the state level using a multi-year panel design. Using a difference-in-differences analysis, we found that laws requiring universal background checks and those prohibiting firearm possession by people with a conviction for a violent

Table 2 Status of State Firearm Laws and Violent Death Rates, 2016

State	UBC	VM	21	SI	PC	TP	JG	SYG	AW	LCM	Age-adjusted overall homicide rate (per 100,000)	Age-adjusted overall suicide rate (per 100,000)
Louisiana				✓				✓			14.2	14.1
Mississippi					✓			✓			12.0	12.7
Alabama				✓				✓			11.8	15.6
Maryland		✓	✓				✓		✓	✓	10.0	9.3
Missouri				✓							9.9	18.3
New Mexico				✓							9.5	22.5
Illinois	✓			✓		✓	✓				9.2	10.7
South Carolina				✓				✓			9.0	15.7
Tennessee				✓				✓			8.7	16.3
Arkansas				✓							8.7	18.2
Oklahoma				✓				✓			8.6	20.9
Georgia				✓				✓			7.9	13.3
Alaska					✓			✓			7.5	25.4
Indiana				✓				✓			7.5	15.4
North Carolina				✓				✓			7.4	13.0
Nevada				✓				✓			7.4	21.4
Kentucky				✓				✓			7.1	16.8
Delaware	✓					✓					7.0	11.5
Florida				✓		✓		✓			6.8	13.9
Michigan				✓				✓			6.6	13.3
Ohio				✓		✓					6.5	14.1
West Virginia					✓			✓			6.3	19.5
Arizona					✓			✓			6.3	17.6
Pennsylvania				✓				✓			6.0	14.7
Texas				✓				✓			6.0	12.6
Virginia				✓		✓					5.5	13.2
Kansas					✓			✓			5.3	17.9
California	✓	✓				✓	✓		✓	✓	5.2	10.5
Wisconsin				✓							4.8	14.6
South Dakota				✓				✓			4.7	20.5
New Jersey	✓		✓						✓	✓	4.6	7.2
Montana				✓				✓			4.3	26.0
Colorado	✓			✓		✓				✓	4.2	20.5
New York	✓	✓	✓			✓			✓	✓	3.5	8.1
Nebraska				✓							3.3	13.0
Oregon	✓			✓							3.2	17.8
Wyoming					✓						3.0	25.2
Washington	✓			✓							2.9	14.8
Iowa			✓	✓							2.8	14.5
Hawaii	✓	✓	✓				✓				2.8	12.0
Connecticut	✓	✓	✓			✓			✓	✓	2.6	10.0
Utah				✓		✓		✓			2.5	21.8
Minnesota				✓		✓	✓				2.4	13.2
Rhode Island	✓		✓			✓					2.3	11.1
North Dakota				✓		✓					2.2	19.0
Massachusetts	✓		✓			✓	✓		✓	✓	2.0	8.7
Idaho					✓						2.0	21.3
Vermont					✓						1.9	17.3
New Hampshire				✓				✓			1.3	17.3
Maine					✓						1.3	15.7

Includes the following 10 laws: UBC, universal background checks; VM, violent misdemeanor prohibitor; 21, age 21 limit for handgun purchase; SI, shall issue; PC, permitless carry; TP, trafficking prohibited; JG, junk gun ban; SYG, stand your ground law; AW, assault weapons ban; LCM, large capacity magazine ban

misdemeanor were associated with significant reductions in the overall homicide rate, while “shall issue” laws were associated with a significant increase in the homicide rate. There was no significant association between homicide and the other laws studied, and we did not find consistent relationships between any of the laws and overall suicide rates.

This study has several strengths. First, it is one of the first studies to clearly define each law with attention to the detailed provisions of the law, including its scope, exceptions, and exemptions. One reason for some of the conflicting results of previous studies (Online Supplemental Tables S1, S2) may be the inconsistent definition of state statutes.

Second, using a difference-in-differences approach helps to address the major threat to validity in this type of research: states with lower homicide rates to begin with may be more likely to enact stronger gun laws. By including state and year fixed effects, we are using a “within-estimator” that assesses differences within states over time.^{5, 6} Studies that do not include state fixed effects are also assessing differences across states at a given time (“between effects”), which may reflect different propensities of states with lower or higher homicide rates to enact laws, rather than law effects. Thus, the difference-in-differences approach is less subject to the possibility of “reverse causation” (i.e., it is the level of the homicide

Table 3 Linear Regression Model Results: Factors Affecting Homicide Rates, 1991–2016

	Regression coefficient for state firearm laws entered one at a time (95% CI)	Regression coefficient, fully adjusted model [all laws entered together] (95% CI)
Percent black		0.043 (−0.004, 0.089)
Percent male among population ages 15–29		<i>0.100*</i> (0.021, 0.179)
Per capita law enforcement officers		−0.023 (−0.079, 0.033)
Violent crime rate		<i>0.054*</i> (0.026, 0.081)
Divorce rate		−0.030 (−0.066, 0.005)
Unemployment rate		0.002 (−0.015, 0.019)
Poverty rate		0.002 (−0.005, 0.010)
Per capita alcohol consumption		0.138 (−0.021, 0.298)
Incarceration rate (per 1000 population)		−0.025 (−0.058, 0.008)
Population density (per 0.1 mile ²)		<i>0.032*</i> (0.010, 0.054)
Log of population		−0.629* (−1.081, −0.177)
Proxy for household gun ownership percentage		0.001 (−0.004, 0.007)
Firearm laws		
Universal background checks	−0.173* (−0.299, −0.048)	−0.161* (−0.269, −0.053)
Violent misdemeanor is prohibiting for handgun possession	−0.155* (−0.276, −0.033)	−0.200* (−0.316, −0.084)
Age 21 limit for handgun possession	−0.117 (−0.245, 0.010)	−0.068 (−0.200, 0.064)
Shall issue law	<i>0.082*</i> (0.018, 0.146)	<i>0.086*</i> (0.011, 0.160)
Permitless carry law	−0.063 (−0.152, 0.027)	0.015 (−0.101, 0.131)
Trafficking prohibited	−0.045 (−0.133, 0.044)	0.005 (−0.050, 0.061)
Junk gun ban	−0.028 (−0.177, 0.121)	−0.010 (−0.136, 0.116)
Stand Your Ground law	0.020 (−0.042, 0.083)	0.009 (−0.050, 0.067)
Ban on assault weapons	−0.143 (−0.300, 0.013)	−0.092 (−0.222, 0.039)
Ban on large capacity ammunition magazines	−0.089 (−0.205, 0.027)	0.038 (−0.036, 0.112)
R ²		0.94

Outcome variable is the log of the age-adjusted total homicide rate. All models include year and state fixed effects. Standard errors are robust and adjusted for state-level clustering

CI, confidence interval

*Coefficient is statistically significant from zero ($p < 0.05$). Also shown in italic

rates that are affecting the law enactment, not the other way around). The inclusion of state fixed effects has the added advantage of controlling for any differences between states in time-invariant factors.

Third, including a large panel of time-varying state factors as independent variables helps address the problem of omitted variable bias. Nevertheless, it is still possible that states which were experiencing large declines in homicide were more likely to enact a particular law; even the within-estimator may not be sufficient to rule out the possibility of reverse causation.

Our finding of a negative association between universal background checks (including permit requirements) and homicide rates is consistent with several other studies.^{3, 16–20} Our finding of a negative association between violent misdemeanor laws and homicide rates is consistent with one other recent study, which reported a 24% reduction in intimate partner homicide in states with these laws.²¹ However, caution should be exercised when interpreting this finding because only two states implemented violent misdemeanor laws during the study period. While historically the literature on the impact of concealed carry-permitting laws has been inconsistent and several studies have found an association between “shall issue” laws and reduced murder rates,^{7, 22–29} the three most recent studies to examine these laws found a positive association with homicide rates.^{3, 30, 31}

Our finding that there was no association between stand your ground laws and homicide rates conflicts with the findings of two previous studies on these laws.^{32, 33} However, both of these studies examined only the decade of 2000–2010.

When we restrict our analysis to that decade, we obtain similar results.

A second important finding of this study is that changes in household gun ownership were not found to be significantly associated with homicide or suicide rates, a result that differs from several previous studies.^{34, 35} The discrepancy in these results could possibly be due to our inclusion of state fixed effects. It is possible that although there is a strong cross-sectional relationship between the prevalence of firearm ownership and homicide and suicide rates, small changes in firearm ownership that are observed over time are not sufficient enough to result in measurable differences in overall population homicide or suicide rates. Even if we had survey-based measures of household gun ownership, the margin of error is probably greater than the actual change in gun ownership levels from year to year. There is too much noise in our measure of gun ownership and too little variability in true levels of household gun ownership to determine if changes in gun ownership are related to differences in homicide or suicide rates. Few of the previous studies included state fixed effects. Because of the conflict with the existing literature, further study is required before any definitive conclusion is drawn.

It is important to note that the absence of an observed association of a law and overall homicide or suicide rates does not necessarily mean that these laws are ineffective. It may also be that the laws are not broad enough to affect overall population death rates or that the laws are not being adequately enforced.

Table 4 Linear Regression Model Results: Factors Affecting Suicide Rates, 1991–2016

	Regression Coefficient for State Firearm Laws Entered One at a Time (95% CI)	Regression Coefficient, Fully Adjusted Model [All Laws Entered Together] (95% CI)
Percent black		−0.015 (−0.033, 0.003)
Percent male among population ages 15–29		0.018 (−0.014, 0.049)
Per capita law enforcement officers		0.006 (−0.015, 0.027)
Violent crime rate		0.018* (0.007, 0.029)
Divorce rate		−0.008 (−0.028, 0.012)
Unemployment rate		0.008* (0.001, 0.016)
Poverty rate		0.004* (0.000, 0.007)
Per capita alcohol consumption		0.075* (0.012, 0.138)
Incarceration rate (per 1000 population)		0.007 (−0.011, 0.025)
Population density (per 0.1 mile ²)		−0.001 (−0.010, 0.007)
Log of population		−0.349* (−0.601, −0.097)
Proxy for household gun ownership percentage		0.001 (−0.001, 0.003)
Firearm laws		
Universal background checks	0.008 (−0.034, 0.050)	−0.010 (−0.033, 0.053)
Violent misdemeanor is prohibiting for handgun possession	−0.024 (−0.064, 0.016)	−0.043 (−0.090, 0.004)
Age 21 limit for handgun possession	−0.040* (−0.078, −0.001)	−0.030 (−0.070, 0.010)
Shall issue law	0.000 (−0.025, 0.024)	0.004 (−0.022, 0.029)
Permitless carry law	0.063* (0.006, 0.120)	0.050* (0.002, 0.099)
Trafficking prohibited	−0.013 (−0.047, 0.021)	−0.002 (−0.043, 0.038)
Junk gun ban	−0.074* (−0.101, −0.047)	−0.066* (−0.097, −0.036)
Stand Your Ground law	−0.014 (−0.033, 0.006)	−0.018 (−0.037, 0.001)
Ban on assault weapons	−0.037 (−0.081, 0.006)	0.001 (−0.063, 0.066)
Ban on large-capacity ammunition magazines	−0.052* (−0.099, −0.005)	−0.004 (−0.053, 0.046)
R ²		0.94

Outcome variable is the log of the age-adjusted total suicide rate. All models include year and state fixed effects. Standard errors are robust and adjusted for state-level clustering

CI confidence interval

*Coefficient is statistically significant from zero ($p < 0.05$). Also shown in *italic*

Several other limitations deserve mention. First, the firearm ownership proxy has been validated with cross-sectional data, but not with longitudinal data.³⁶ It is not clear whether this proxy is able to accurately measure changes in household gun ownership over time.

Second, while we controlled for a range of state-level factors associated with homicide death rates, there may be unidentified omitted variables. For example, in the early 1990s, firearm homicide rates were very high in many cities, seemingly related to the crack cocaine epidemic.^{37, 38} Nevertheless, when we restrict the analysis to the period 2000–2016, our results remain essentially unchanged, although the precision of the estimates decreases.

Third, we accounted only for the presence or absence of firearm law provisions, not for the implementation and enforcement of these laws. Fourth, trying to incorporate the most important explanatory variables in a large regression almost invariably leads to some multicollinearity. For example, when we use all the other independent variables to explain variations in the gun ownership proxy, the adjusted R^2 is 0.69.

Finally, we do not disaggregate homicide rates by the age or other characteristics of either the offender or victim, which could mask the effect of laws intended to affect a particular subpopulation. For example, age restrictions on gun possession would only be expected to affect youth suicide rates, not adult rates.

In conclusion, this study provides evidence that universal background checks and laws prohibiting gun ownership by people with a history of a violent misdemeanor are associated with lower overall homicide rates, while laws that provide no

discretion to law enforcement officials in approving concealed carry permits are associated with higher homicide rates. Further research on the impact of state firearm laws is necessary to assess causality and should rely upon detailed definitions of each law.

Corresponding Author: Michael Siegel, Department of Community Health Sciences, Boston University School of Public Health, 801 Massachusetts Avenue, 4th Floor, Boston, MA 02118, USA (e-mail: mbsiegel@bu.edu).

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Compliance with Ethical Standards:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

Disclaimer: The views expressed here do not necessarily reflect the views of the Robert Wood Johnson Foundation.

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C. D. Michel – SBN 144258
cmichel@michellawyers.com
Sean A. Brady – SBN 262007
sbrady@michellawyers.com
Matthew D. Cubeiro – SBN 291519
mcubeiro@michellawyers.com
MICHEL & ASSOCIATES, P.C.
180 East Ocean Boulevard, Suite 200
Long Beach, CA 90802
Telephone: 562-216-4444
Facsimile: 562-216-4445

Attorneys for Plaintiffs

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

STEVEN RUPP, et al.,

Plaintiffs,

vs.

XAVIER BECERRA, in his official
capacity as Attorney General of the
State of California,

Defendant.

Case No.: 8:17-cv-00746-JLS-JDE

**DECLARATION OF SEAN A.
BRADY IN SUPPORT OF
PLAINTIFFS' OPPOSITION TO
DEFENDANT'S MOTION FOR
SUMMARY JUDGMENT**

Hearing Date: May 31, 2019
Hearing Time: 10:30 a.m.
Courtroom: 10A
Judge: Josephine L. Staton

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Mr. Colwell is attached hereto as **Exhibit 55**.

8. On December 19, 2018, I deposed Defendant's expert witness Blake Graham. A true and correct copy of the deposition transcript of Mr. Graham is attached hereto as **Exhibit 56**.

9. On December 4, 2018, I deposed Defendant's expert witness Michael Mersereau. A true and correct copy of the deposition transcript of Mr. Mersereau is attached hereto as **Exhibit 57**.

10. A true and correct copy of *What Should America Do About Gun Violence?* Full Comm. Hr'g Before U.S. Sen. Jud. Comm., 113th Cong. at 11 (2013), available at <https://www.judiciary.senate.gov/imo/media/doc/1-30-13KopelTestimony.pdf> (last visited May 2, 2019) is attached as **Exhibit 49**.

11. A true and correct copy of Jane Glenn Cannon, Nolan Clay, *Oklahoma Beheading: Murder Defendant Confessed, Attempted Second Beheading, The Oklahoman*, <https://newsok.com/article/5347003/oklahoma-beheading-murder-defendant-confessed-attempted-second-beheading> (Sept. 30, 2014), is attached as **Exhibit 58**.

12. A true and correct copy of Stephanie Haney, *Texas Homeowner, 20, Shoots and Kills Three Men and Injure Two More While 'Defending Himself' During an Early Morning Home Invasion*, Daily Mail, <https://www.dailymail.co.uk/news/article-6617991/Texas-homeowner-20-shoots-kills-three-men-injures-two-home-invasion.html> (Jan. 22, 2019), is attached as **Exhibit 59**.

13. A true and correct copy of Jessica Colarossi, *Who Has Guns—Not Which Guns—Linked to Murder Rates*, BU Today, <https://www.bu.edu/today/2019/state-gun-laws-that-reduce-gun-deaths/> (March 29, 2019), is attached as **Exhibit 60**.

14. A true and correct copy of Amy Swearer, *8 Times Law-Abiding Citizens Saved Lives With an AR-15*, The Daily Signal,

1 [https://www.dailysignal.com/2018/03/14/8-times-law-abiding-citizens-saved-lives-](https://www.dailysignal.com/2018/03/14/8-times-law-abiding-citizens-saved-lives-ar-15/)
 2 [ar-15/](https://www.dailysignal.com/2018/03/14/8-times-law-abiding-citizens-saved-lives-ar-15/) (March 14, 2018), is attached as **Exhibit 61**.

3 15. A true and correct copy of Gregory Smith, *New Springfield Armory*
 4 *Saint 5.56*, Selling the Second Amendment,
 5 <http://sellingthesecondamendment.com/new-springfield-armory-saint-5-56/> (Dec.
 6 12, 2016), is attached as **Exhibit 62**.

7 16. A true and correct copy of E. Gregory Wallace, “*Assault Weapon*”
 8 *Myths*, Southern Illinois University Law Journal,
 9 [https://law.siu.edu/_common/documents/law-journal/articles-2018/fall-2018/12%20-](https://law.siu.edu/_common/documents/law-journal/articles-2018/fall-2018/12%20-%20Wallace%20-%20jr%2012%208.pdf)
 10 [%20Wallace%20-%20jr%2012%208.pdf](https://law.siu.edu/_common/documents/law-journal/articles-2018/fall-2018/12%20-%20Wallace%20-%20jr%2012%208.pdf) (2018), is attached as **Exhibit 63**.

11 17. A true and correct copy of Daniel Watters, *A 5.56 X 45mm “Timeline”*,
 12 The Gun Zone (Jan. 3, 2004), available at
 13 [https://web.archive.org/web/20040209030852/http://www.thegunzone.com/556dw.h](https://web.archive.org/web/20040209030852/http://www.thegunzone.com/556dw.html)
 14 [tml](https://web.archive.org/web/20040209030852/http://www.thegunzone.com/556dw.html), is attached as **Exhibit 64**.

15 18. A true and correct copy of *Giovanni Beretta Folding Stock Miquelet*
 16 *Fowler*, NRA Museums, [http://www.nramuseum.org/guns/the-galleries/ancient-](http://www.nramuseum.org/guns/the-galleries/ancient-firearms-1350-to-1700/case-2-old-world-art-and-craftsmanship/giovanni-beretta-folding-stock-miquelet-fowler.aspx)
 17 [firearms-1350-to-1700/case-2-old-world-art-and-craftsmanship/giovanni-beretta-](http://www.nramuseum.org/guns/the-galleries/ancient-firearms-1350-to-1700/case-2-old-world-art-and-craftsmanship/giovanni-beretta-folding-stock-miquelet-fowler.aspx)
 18 [folding-stock-miquelet-fowler.aspx](http://www.nramuseum.org/guns/the-galleries/ancient-firearms-1350-to-1700/case-2-old-world-art-and-craftsmanship/giovanni-beretta-folding-stock-miquelet-fowler.aspx), is attached as **Exhibit 65**.

19 19. A true and correct copy of *Lot 513: Lesoinne Et Pirlot Fils, Liege A*
 20 *Rare .69 Percussion Rifled Single-Shot Carbine, Model ‘Delvigne Patent’, No*
 21 *Visible Serial Number*, Invaluable, [https://www.invaluable.com/auction-lot/lesoinne-](https://www.invaluable.com/auction-lot/lesoinne-et-pirlot-fils,-liege-a-rare-.6...-513-c-07c4191726#.U4zK9PldXXp)
 22 [et-pirlot-fils,-liege-a-rare-.6...-513-c-07c4191726#.U4zK9PldXXp](https://www.invaluable.com/auction-lot/lesoinne-et-pirlot-fils,-liege-a-rare-.6...-513-c-07c4191726#.U4zK9PldXXp), is attached as
 23 **Exhibit 66**.

24 20. A true and correct copy of *The Warning Signs that Could Have*
 25 *Prevented the Virginia Tech Shootings*,
 26 [https://web.archive.org/web/20131014013923/http://www.nssc1.org/virginia-tech-](https://web.archive.org/web/20131014013923/http://www.nssc1.org/virginia-tech-shootings.html)
 27 [shootings.html](https://web.archive.org/web/20131014013923/http://www.nssc1.org/virginia-tech-shootings.html), is attached as **Exhibit 67**.

28 21. A true and correct copy of excerpts of Frank C. Barnes, *Cartridges of*

1 *the World 13th Edition*, F+W Media, Inc. (2012), is attached as **Exhibit 68**.

2 22. A true and correct copy of Michael Siegel, *The Impact of State Firearm*
3 *Laws on Homicide and Suicide Deaths in the USA, 1991-2016: A Panel Study*,
4 Society of General Internal Medicine (March 28, 2019), is attached as **Exhibit 69**.

5 I declare under penalty of perjury that the foregoing is true and correct.
6 Executed within the United States on May 2, 2019.

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9 s/ Sean A. Brady

10 Sean A. Brady

11 Declarant
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CERTIFICATE OF SERVICE
IN THE UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

Case Name: *Rupp, et al. v. Becerra*
Case No.: 8:17-cv-00746-JLS-JDE

IT IS HEREBY CERTIFIED THAT:

I, the undersigned, am a citizen of the United States and am at least eighteen years of age. My business address is 180 East Ocean Boulevard, Suite 200, Long Beach, California 90802.

I am not a party to the above-entitled action. I have caused service of:

**DECLARATION OF SEAN A. BRADY IN SUPPORT OF
PLAINTIFFS' OPPOSITION TO DEFENDANT'S
MOTION FOR SUMMARY JUDGMENT**

on the following party by electronically filing the foregoing with the Clerk of the District Court using its ECF System, which electronically notifies them.

Xavier Becerra
Attorney General of California
Peter H. Chang
Deputy Attorney General
E-mail: peter.chang@doj.ca.gov
John D. Echeverria
Deputy Attorney General
E-mail: john.echeverria@doj.ca.gov
455 Golden Gate Ave., Suite 11000
San Francisco, CA 94102

I declare under penalty of perjury that the foregoing is true and correct.

Executed May 2, 2019.

s/ Laura Palmerin
Laura Palmerin

C. D. Michel – SBN 144258
cmichel@michellawyers.com
Sean A. Brady – SBN 262007
sbrady@michellawyers.com
Matthew D. Cubeiro – SBN 291519
mcubeiro@michellawyers.com
MICHEL & ASSOCIATES, P.C.
180 East Ocean Boulevard, Suite 200
Long Beach, CA 90802
Telephone: 562-216-4444
Facsimile: 562-216-4445

Attorneys for Plaintiffs

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

STEVEN RUPP, et al.,

Plaintiffs,

v.

XAVIER BECERRA, in his official
capacity as Attorney General of the
State of California,

Defendant.

Case No.: 8:17-cv-00746-JLS-JDE

**REQUEST FOR JUDICIAL
NOTICE IN SUPPORT OF
PLAINTIFFS' OPPOSITION TO
DEFENDANT'S MOTION FOR
SUMMARY JUDGMENT;
EXHIBITS 1-2**

Hearing Date: May 31, 2019
Hearing Time: 10:30 a.m.
Courtroom: 10A
Judge: Josephine L. Staton

REQUEST FOR JUDICIAL NOTICE

Under Federal Rule of Evidence 201, Plaintiffs Steven Rupp, Steven Dember, Cheryl Johnson, Michael Jones, Christopher Seifert, Alfonso Valencia, Troy Willis, Dennis Martin, and the California Rifle & Pistol Association, Incorporated, respectfully request that the Court take judicial notice of the following documents in support of Plaintiffs' opposition to Defendant's motion for summary judgment:

1. 2017 Crime in the United States: Expanded Homicide Data Table 8, Federal Bureau of Investigation, <https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-inthe-u.s.-2017/topic-pages/tables/expanded-homicide-data-table-8.xls> (last visited May 2, 2019). A true and correct copy of this document is attached as **Exhibit 1**.

2. Senate Budget Subcommittee #5 May 4th, 2017, Hearing @ 21:45, available at <https://www.senate.ca.gov/media/senate-budget-subcommittee-2-20170504/video>. A true and correct copy of this document is attached as **Exhibit 2**.

Judicial notice is proper because the documents for which this request is made are "capable of accurate and ready determination by resort to sources who accuracy cannot reasonably be questioned." Fed. R. Evid. 201(b)(2). "A trial court may presume that public records are authentic and trustworthy." *Gilbrook v. City of Westminster*, 177 F.3d 839, 858 (9th Cir. 1999) (taking judicial notice of agency report). A court shall take judicial notice of such a fact if requested by a party and supplied with the necessary information. Fed. R. Evid. 201(d).

"Legislative history is properly a subject of judicial notice." *Anderson v. Holder*, 673 F.3d 1089, 1094 n.1 (9th Cir. 2012); *Chaker v. Crogan*, 428 F.3d 1215, 1223 n.8 (9th Cir. 2005) (discussing legislative history of California statute). Further, "a federal court must take judicial notice of state statutes 'without plea or proof.'" *Getty Petroleum Mktg., Inc. v. Capital Terminal Co.*, 391 F.3d 312, 323 (1st Cir. 2004) (citing *Lamar v. Micou*, 114 U.S. 218, 223 (1885)).

Here, the accuracy of all the public records subject to Plaintiffs' Request for

Judicial Notice, consisting of enacted legislation and legislative history, cannot reasonably be questioned. Judicial notice of these records is therefore appropriate.

Dated: May 2, 2019

MICHEL & ASSOCIATES, P.C.

s/ Sean A. Brady

Sean A. Brady
Attorneys for Plaintiffs

EXHIBIT 1

Home (<https://ucr.fbi.gov>) • Crime in the U.S. (<https://ucr.fbi.gov/crime-in-the-u.s>) • 2017 (<https://ucr.fbi.gov/crime-in-the-u.s/2017>) • Crime in the U.S. 2017 (<https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017>) • Tables (<https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/tables>) • Expanded Homicide Data Table 8



Criminal Justice Information Services Division (<https://www.fbi.gov/services/cjis>)

Feedback (<https://forms.fbi.gov/cius-feedback-2017>) | Contact Us (<https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/contact-us>) | Data Quality Guidelines (<https://ucr.fbi.gov/data-quality-guidelines-new>) | UCR Home (<https://ucr.fbi.gov/>)

[Home \(https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/home\)](https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/home)

[Offenses Known to Law Enforcement \(https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/offenses-known-to-law-enforcement\)](https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/offenses-known-to-law-enforcement)

[Violent Crime \(https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/violent-crime\)](https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/violent-crime) **Expanded Homicide Data Table 8**

[Property Crime \(https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/property-crime\)](https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/property-crime) **Murder Victims**
by Weapon, 2013–2017

[Clearances \(https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/clearances\)](https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/clearances)

[Persons Arrested \(https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/persons-arrested\)](https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/persons-arrested)

[Police Employee Data \(https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/police-employee-data\)](https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/police-employee-data)

Download Excel (<https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/tables/expanded-homicide-data-table-8.xls/output.xls>)

Weapons	2013	2014	2015	2016	2017
Total	12,253	12,270	13,750	15,296	15,129
Total firearms:	8,454	8,312	9,778	11,138	10,982
Handguns	5,782	5,673	6,569	7,204	7,032
Rifles	285	258	258	378	403
Shotguns	308	264	272	261	264
Other guns	123	93	177	187	187
Firearms, type not stated	1,956	2,024	2,502	3,108	3,096
Knives or cutting instruments	1,490	1,595	1,589	1,632	1,591
Blunt objects (clubs, hammers, etc.)	428	446	450	479	467
Personal weapons (hands, fists, feet, etc.) ¹	687	682	659	669	696
Poison	11	10	8	13	13
Explosives	2	7	1	1	0
Fire	94	71	84	114	103
Narcotics	53	70	75	122	97
Drowning	4	14	14	9	8
Strangulation	85	89	99	99	88
Asphyxiation	95	102	120	93	105

1490

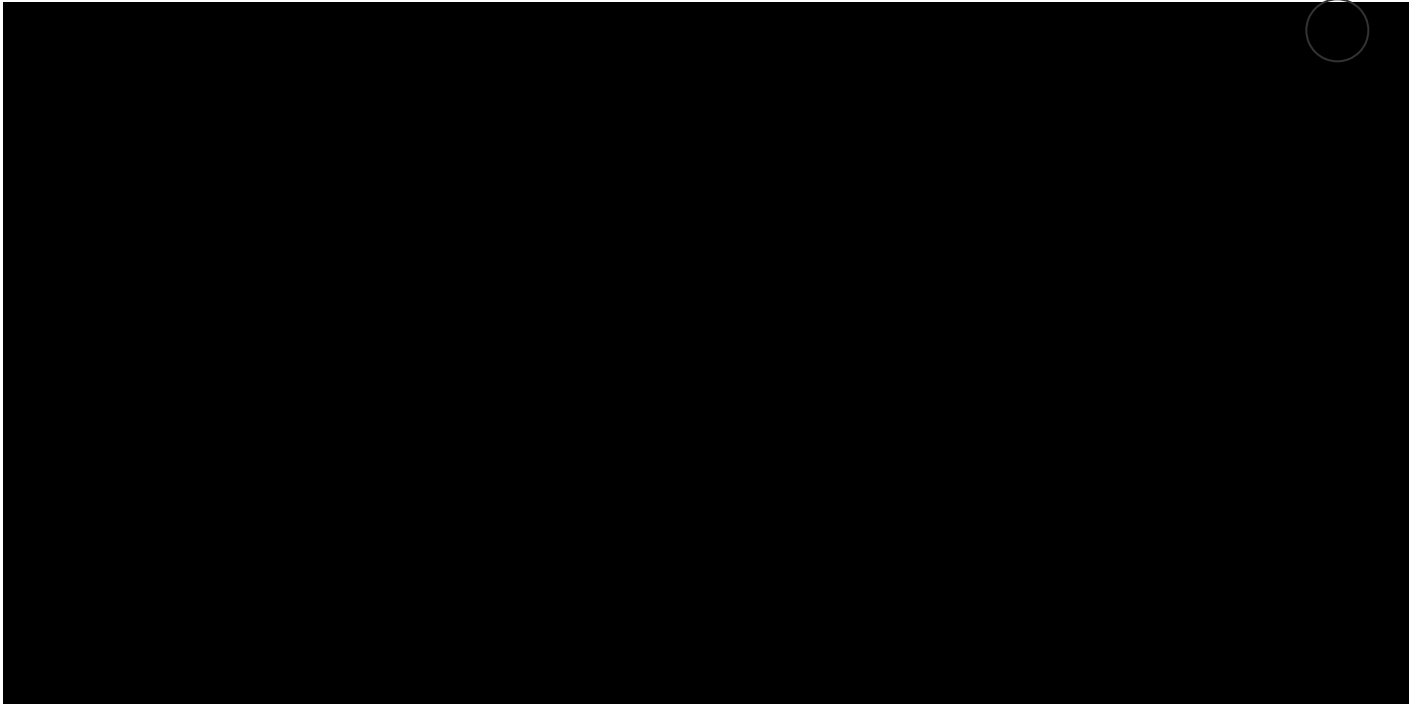
Weapons	2013	2014	2015	2016	2017
Other weapons or weapons not stated	850	872	873	927	979

■ ¹ Pushed is included in personal weapons.

EXHIBIT 2

Media on Demand

Senate Budget Subcommittee #5 , Thursday, May 4th, 2017



 [Download Video \(http://vod.senate.ca.gov/videos/2017/20170504_BudgetSub5_high.mp4\)](http://vod.senate.ca.gov/videos/2017/20170504_BudgetSub5_high.mp4)

 [Download Audio \(http://vod.senate.ca.gov/videos/2017/20170504_BudgetSub5_audio.m4a\)](http://vod.senate.ca.gov/videos/2017/20170504_BudgetSub5_audio.m4a)

The 'Download Video' link will download a video file and a closed caption file. To enable captions, please refer to the documentation of your video player.

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CERTIFICATE OF SERVICE
IN THE UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

Case Name: *Rupp, et al. v. Becerra*
Case No.: 8:17-cv-00746-JLS-JDE

IT IS HEREBY CERTIFIED THAT:

I, the undersigned, am a citizen of the United States and am at least eighteen years of age. My business address is 180 East Ocean Boulevard, Suite 200, Long Beach, California 90802.

I am not a party to the above-entitled action. I have caused service of:

**REQUEST FOR JUDICIAL NOTICE IN SUPPORT OF
PLAINTIFFS' OPPOSITION TO DEFENDANT'S
MOTION FOR SUMMARY JUDGMENT; EXHIBITS 1-2**

on the following party by electronically filing the foregoing with the Clerk of the District Court using its ECF System, which electronically notifies them.

Xavier Becerra
Attorney General of California
Peter H. Chang
Deputy Attorney General
E-mail: peter.chang@doj.ca.gov
John D. Echeverria
Deputy Attorney General
E-mail: john.echeverria@doj.ca.gov
455 Golden Gate Ave., Suite 11000
San Francisco, CA 94102

I declare under penalty of perjury that the foregoing is true and correct.

Executed May 2, 2019.

s/ Laura Palmerin

Laura Palmerin

C. D. Michel – SBN 144258
cmichel@michellawyers.com
Sean A. Brady – SBN 262007
sbrady@michellawyers.com
Matthew D. Cubeiro – SBN 291519
mcubeiro@michellawyers.com
MICHEL & ASSOCIATES, P.C.
180 East Ocean Boulevard, Suite 200
Long Beach, CA 90802
Telephone: 562-216-4444
Facsimile: 562-216-4445

Attorneys for Plaintiffs

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

STEVEN RUPP, et al.,

Plaintiffs,

vs.

XAVIER BECERRA, in his official
capacity as Attorney General of the
State of California,

Defendant.

Case No.: 8:17-cv-00746-JLS-JDE

**PLAINTIFFS' OBJECTIONS TO
EVIDENCE FILED IN SUPPORT OF
DEFENDANT'S MOTION FOR
SUMMARY JUDGMENT**

Hearing Date: May 31, 2019
Hearing Time: 10:30 a.m.
Courtroom: 10A
Judge: Josephine L. Staton

Plaintiffs Steven Rupp, Steven Dember, Cheryl Johnson, Michael Jones, Christopher Seifert, Alfonso Valencia, Troy Willis, Dennis Martin, and the California Rifle & Pistol Association, Incorporated, submit the following objections to evidence filed in support of Defendant's motion for summary judgment.

No.	Defendant's Evidence	Objections
1	Expert Report and Declaration of John Donohue (Donohue Rpt.).	Improper expert methodology. Fed. R. Evid. 702, 703; <i>Gen. Elec. Co. v. Joiner</i> , 522 U.S. 136, 146-47 (1997) (holding courts have discretion to decide that materials relied upon by experts are insufficient to support an expert's conclusions).
2	¶¶27-28: "a poll conducted for the <i>New York Times</i> from June 17-20, 2016 among a national sample of 1975 registered voters found that 67 percent of Americans favored such a ban. Importantly, the <i>New York Times</i> also polled '32 current or retired academics in criminology, public health and law, who have published extensively in peer-reviewed academic journals on gun policy; to ask them what measures would be most effective in dealing with America's mass shooting problem, and an assault weapons ban was deemed overall by this panel to be the single most effective measure."	Hearsay. Fed. R. Evid. 403. The contents of this declaration rely on hearsay statements and statistics. Donohue relies on a poll conducted for the <i>New York Times</i> from 2016 (¶27) as well as surveys conducted by Pew Research Center (¶28).
3		Lay Testimony. Declarant improperly offers lay testimony that is actually expert testimony (based on scientific, technical, or specialized knowledge). Fed. R. Evid. 701(c); <i>United States v. Figueroa-Lopez</i> , 125 F.3d 1241, 1246 (9th Cir. 1997). Declarant impermissibly offers expert testimony under the guise of lay opinion, in contravention of FRE 701 and 702.
4		Authentication. The document referred to has not been properly

1		authenticated. Fed. R. Evid. 901, 902.
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3	2	Expert Report and Declaration of John Donohue (Donohue Rpt.).
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5		¶56: “Moreover, the dramatic jump in gun massacres in the 10 years following the end of the assault weapons ban is in contrast to the downward drift in overall crime over this period, which further buttresses the link between the proliferation of assault weapons following the lapse in the federal assault weapon ban and the increased number of gun massacres.”
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27	3	Expert Report and Declaration of John Donohue (Donohue Rpt.).
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¶¶104-105: “The suggestion is also made that law-abiding citizens should have access to the same type of weaponry available to “trained police officers.” This analogy fails because police have very different needs than private individuals. To defend themselves, private individuals only need to scare off criminals.”

Evid. 702; *Aguilar v. Int’l Longshoremen’s Union Local No. 10*, 966 F.2d 443, 447 (9th Cir. 1992) (“[E]xpert testimony consisting of legal conclusions [is] not admissible.” (citing *Marx v. Diners Club, Inc.*, 550 F.2d 505, 509 (2d Cir. 1977))). The expert is opining on what is proper to consider under the relevant constitutional analysis. Without an extensive educational background regarding police procedures, declarant makes an assertion exceeding the bound of his expertise.

Improper expert methodology.

Fed. R. Evid. 702, 703; *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146-47 (1997) (holding courts have discretion to decide that materials relied upon by experts are insufficient to support an expert’s conclusions).

Lacks personal knowledge.

Witnesses are prohibited from testifying as to matters that they lack personal knowledge of. Fed. R. Evid. 602. The personal knowledge standard of 602 is also applicable to affidavits and declarations submitted in connection with motions for summary judgment. (*See* FRCP 56(e) which requires, in part, that: “A supporting or opposing affidavit must be made on personal knowledge, set out facts that would be admissible in evidence, and show that the affiant is competent to testify

		<p>on the matters stated.” <i>See also</i>, <i>FDIC v. New Hampshire Ins. Co.</i>, 953 F.2d 478 (9th Cir. 1991) (“Declarations and other evidence of the moving party that would not be admissible are subject to a timely objection and may be stricken.”).</p> <p>Lay Testimony. Declarant improperly offers lay testimony that is actually expert testimony (based on scientific, technical, or specialized knowledge). Fed. R. Evid. 701(c); <i>United States v. Figueroa-Lopez</i>, 125 F.3d 1241, 1246 (9th Cir. 1997). Declarant impermissibly offers expert testimony under the guise of lay opinion, in contravention of FRE 701 and 702.</p>
4	<p>Expert Report and Declaration of John Donohue (Donohue Rpt.).</p> <p>¶106, 114: “[e]ncouraging the even greater danger of using an assault weapon for self-defense is a recipe for generating similar unwelcome outcomes that will put family members and neighbors at considerable risk.” (¶106).</p> <p>Additionally, Declarant states “Any argument that because a large number of individuals throughout the United States have assault weapons today, they are in ‘common use’ and therefore cannot be banned in California is misguided. The current</p>	<p>Prejudicial Fed. R. Evid. 403</p> <p>Improper expert methodology. Fed. R. Evid. 702, 703; <i>Gen. Elec. Co. v. Joiner</i>, 522 U.S. 136, 146-47 (1997) (holding courts have discretion to decide that materials relied upon by experts are insufficient to support an expert’s conclusions).</p> <p>Lacks personal knowledge. Witnesses are prohibited from testifying as to matters that they lack personal knowledge of. Fed. R. Evid. 602. The personal knowledge standard of 602 is also applicable to affidavits and declarations submitted</p>

1	level of ownership cannot be taken as	in connection with motions for
2	an expression of American approval	summary judgment. (<i>See</i> FRCP
3	of this dangerous weaponry.” (§114).	56(e) which requires, in part, that:
4		“A supporting or opposing affidavit
5		must be made on personal
6		knowledge, set out facts that would
7		be admissible in evidence, and show
8		that the affiant is competent to testify
9		on the matters stated.” <i>See also</i> ,
10		<i>FDIC v. New</i>
11		<i>Hampshire Ins. Co.</i> , 953 F.2d 478
12		(9th Cir. 1991) (“Declarations and
13		other evidence of the moving party
14		that would not be admissible are
15		subject to a timely objection and
16		may
17		be stricken.”).
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13	5 Expert Report and Declaration of	Improper testimony to a legal
14	John Donohue (Donohue Rpt.).	question. Fed.R. Evid. 702; <i>Aguilar</i>
15	¶116: “Indeed, the industry is	<i>v. Int’l Longshoremen’s Union Local</i>
16	constantly striving to find new ways	<i>No. 10</i> , 966 F.2d 443, 447 (9th Cir.
17	to increase the lethality of their	1992) (“[E]xpert testimony
18	merchandise, so the notion that some	consisting of legal conclusions [is]
19	threshold of ‘common use’ erects a	not admissible.” (citing <i>Marx v.</i>
20	constitutional impediment that can	<i>Diners Club, Inc.</i> , 550
21	obstruct governmental initiatives to	F.2d 505, 509 (2d Cir. 1977)). The
22	promote citizen safety is wholly	expert is opining on what is proper to
23	misguided. The ability and right of	consider under the relevant
24	citizens to enact safety promoting	constitutional analysis.
25	measures designed to deal with the	
26	serious growing problem of public	Declarant improperly offers lay
27	mass shootings should not be affected	testimony that is actually expert
28	by the marketing ability of the gun	testimony (based on scientific,
	industry to hawk their wares.”	technical, or specialized knowledge).
		Fed. R. Evid. 701(c); <i>United States</i>
		<i>v. Figueroa-Lopez</i> , 125 F.3d 1241,
		1246 (9th Cir. 1997). Declarant
		impermissibly offers expert
		testimony

1		under the guise of lay opinion, in
2		contravention of FRE 701 and 702.
3	6	Expert Report and Declaration of
4		Blake Graham (Graham Rpt.)
5		¶ 1: “I am a Special Agent Supervisor
6		for the California department of
7		Justice, Bureau of Firearms.”
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19	7	Expert Report and Declaration of
20		Blake Graham (Graham Rpt.)
21		¶¶24: “Overall, in my experience, the
22		challenged features described in
23		Penal Code section 30515 on assault
24		rifles may aid the shooters in being
25		potentially more effective and
26		efficient while shooting people.
27		Semiautomatic assault rifles are
28		generally modelled after successful
		military machine guns and
		submachine guns.”
		Speculative expert testimony. Fed.
		R. Evid. 702; <i>U.S. v. Hermanek</i> , 289
		F.3d 1076, 1094 (9th Cir. 2002)
		(“The trial judge in all cases of
		proffered expert testimony must find
		that it is properly grounded, well
		reasoned, and not speculative before
		it can be admitted. The ... expert
		must explain how the conclusion is
		so grounded.” (quoting Fed. R. Evid.
		702, comm. note)). The Declarant is
		testifying to matters unrelated to his
		professional occupation. Declarant
		has proffered improper opinion
		testimony of a lay person.
		Declarant’s academic credentials
		only include a Bachelor of Science
		degree in Criminal Justice from
		California State University
		Sacramento. Despite Declarant’s
		extensive employment history, there
		is no foundation for which he can lay
		out his opinion on this matter
		Hearsay. Fed. R. Evid. 403:
		Declarant is relying on out of court
		statements offered to prove the truth
		of the matter they assert.
		Lay Testimony. Declarant
		improperly offers lay testimony that
		is actually expert testimony (based
		on scientific, technical, or
		specialized knowledge). Fed. R.
		Evid. 701(c); <i>United States v.</i>
		<i>Figuerroa-Lopez</i> , 125 F.3d 1241,
		1246 (9th Cir. 1997). Declarant

1		impermissibly offers expert testimony
2		under the guise of lay opinion, in
3		contravention of FRE 701 and 702.
4		Speculative expert testimony. Fed.
5		R. Evid. 702; <i>U.S. v. Hermanek</i> , 289
6		F.3d 1076, 1094 (9th Cir. 2002)
7		(“The trial judge in all cases of
8		proffered expert testimony must find
9		that it is properly grounded, well
10		reasoned, and not speculative before
11		it can be admitted. The ... expert
12		must explain how the conclusion is
13		so grounded.” (quoting Fed. R. Evid.
14		702, comm. note)). The Declarant is
15		testifying to matters unrelated to his
16		professional occupation. Declarant
17		has proffered improper opinion
18		testimony of a lay person.
19		Declarant’s academic credentials
20		only include a Bachelor of Science
21		degree in Criminal Justice from
22		California State University
23		Sacramento. Despite Declarant’s
24		extensive employment history, there
25		is no foundation for which he can lay
26		out his opinion on this matter.
27	8	Lay Testimony. Declarant
28	Expert Report and Declaration of Blake Graham (Graham Rpt.)	improperly offers lay testimony that
	¶¶36-38: “Often assault weapons are	is expert testimony (based on
	paired with LCMs during these	scientific, technical, or specialized
	crimes by the suspects. LCMs are	knowledge). Fed. R. Evid. 701(c);
	ammunition feeding devices that can	<i>United States v. Figueroa-Lopez</i> ,
	hold more than ten rounds, and	125 F.3d 1241, 1246 (9th Cir. 1997).
	sometimes up to 100 rounds, of	(¶¶24, 34)
	ammunition. Semiautomatic assault	
	weapons when loaded with LCMs	
	enable a shooter to potentially fire	

1		more than 10 rounds without the need for the shooter to reload the weapon. Because LCMs enable a shooter to fire repeatedly without needing to reload every 10 rounds, they significantly increase a shooter's ability to kill and injure large numbers of people quickly."	
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7	9	Expert Report and Declaration of Blake Graham (Graham Rpt.)	Improper testimony of an expert witness to a legal question. Fed. R. Evid. 702; <i>Aguilar v. Int'l Longshoremen's Union Local No. 10</i> , 966 F.2d 443, 447 (9th Cir. 1992) ("[E]xpert testimony consisting of legal conclusions [is] not admissible." (citing <i>Marx v. Diners Club, Inc.</i> , 550 F.2d 505, 509 (2d Cir. 1977))). The expert is opining on what is proper to consider under the relevant constitutional analysis.
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9		¶45: "It is my opinion that the provisions of California Assault Weapons Control Act challenged by plaintiffs in this case enhances public safety by limiting prohibited weapons that are unreasonably dangerous for unrestricted civilian use and are often used by those who intend on committing crimes such as mass shootings."	
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16	10	Expert Report and Declaration of Michael Mersereau (Mersereau Rpt.)	Speculative expert testimony. Fed. R. Evid. 702; <i>U.S. v. Hermanek</i> , 289 F.3d 1076, 1094 (9th Cir. 2002) ("The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well reasoned, and not speculative before it can be admitted. The ... expert must explain how the conclusion is so grounded." (quoting Fed. R. Evid. 702, comm. note)). The Declarant is testifying to matters unrelated to his professional occupation.
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18		¶1: "I am a Detective employed by the Los Angeles Police Department (the "LAPD") as a sworn officer for approximately 22 years."	
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27	11	Expert Report and Declaration of Michael Mersereau (Mersereau Rpt.)	Lay Testimony. Declarant improperly offers lay testimony that is actually expert testimony (based
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1	¶8: “It is my opinion, based on my training and experience, that assault rifles (as defined by California Penal Code sections 30510 and 30515) pose a greater danger to both police officers and the public than other unrestricted semi-automatic, centerfire rifles...”	on scientific, technical, or specialized knowledge). Fed. R. Evid. 701(c); <i>United States v. Figueroa-Lopez</i> , 125 F.3d 1241, 1246 (9th Cir. 1997). Lay opinion is only admissible if it is based on the declarant’s own percipience of the events and is not based on scientific, technical, or other specialized knowledge within the scope of FRE 702.
12	Expert Report and Declaration of Michael Mersereau (Mersereau Rpt.) ¶13: “Adding any of the features described above further increases the ability of the shooter to accurately and rapidly deliver rounds to the target, increasing the potential lethality of the firearm beyond that presented by a featureless rifle.”	Lacks Foundation. This statement is based solely on lay opinion and is therefore inadmissible. Fed. R. Evid. 602, 701, 702. Prejudicial. Fed. R. Evid. 403.
13	Expert Report and Declaration of Michael Mersereau (Mersereau Rpt.) ¶19: “It is my opinion, based on my training and experience, that the above described attacks would have been less deadly had the shooters not been armed with assault rifles or assault rifles converted to machine guns.”	Lacks Foundation. This statement is based solely on lay opinion and is therefore inadmissible. Fed. R. Evid. 602, 701, 702. Prejudicial. Fed. R. Evid. 403. Lay opinion is only admissible if it is based on the declarant’s own percipience of the events and is not based on scientific, technical, or other specialized knowledge within the scope of FRE 702.
14	Expert Report and Declaration of Michael Mersereau (Mersereau Rpt.)	Lay opinion is only admissible if it is based on the declarant’s own percipience of the events and is not based on scientific, technical, or

	<p>¶23: “There is no evidence that assault rifles are ‘commonly’ used for self-defense. While any firearm including an assault rifle could be used effectively in a self-defense scenario, handguns and shotguns are the more common and preferred choice.”</p>	<p>other specialized knowledge within the scope of FRE 702</p> <p>Lacks Foundation. This statement is based solely on lay opinion and is therefore inadmissible. Fed. R. Evid. 602, 701, 702.</p> <p>Prejudicial. Fed. R. Evid. 403.</p>
15	<p>Expert Report and Declaration of Christopher Colwell (Colwell Rpt.).</p> <p>Page 5: “It is my opinion that while all weapons pose risk, assault rifles, especially when equipped with large capacity magazines, pose a far greater risk to the public from a medical standpoint than non-assault firearms.”</p>	<p>Declarant improperly offers lay testimony that is actually expert testimony (based on scientific, technical, or specialized knowledge). Fed. R. Evid. 701(c); <i>United States v. Figueroa-Lopez</i>, 125 F.3d 1241, 1246 (9th Cir. 1997).</p> <p>Declarant is an expert in the field of medicine, not firearms, thus he is offering a lay opinion which should not be admitted. Lay opinion is admissible if it is based on the declarant’s own percipience of the events and is not based on scientific, technical, or other specialized knowledge within the scope of FRE 702. Here, declarant’s opinion is based on specialized knowledge and is thus inadmissible.</p> <p>Speculative expert testimony. Fed. R. Evid. 702; <i>U.S. v. Hermanek</i>, 289 F.3d 1076, 1094 (9th Cir. 2002) (“The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well reasoned, and not speculative before it can be admitted. The ... expert must explain</p>

1		how the conclusion is so grounded.” (quoting Fed. R. Evid. 702, comm. note)). The Declarant is testifying to matters unrelated to his professional occupation.
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5	16 Expert Report and Declaration of Lucy Allen (Allen Rpt.)	Speculative expert testimony. Fed. R. Evid. 702; <i>U.S. v. Hermanek</i> , 289 F.3d 1076, 1094 (9th Cir. 2002) (“The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well reasoned, and not speculative before it can be admitted. The ... expert must explain how the conclusion is so grounded.” (quoting Fed. R. Evid. 702, comm. note)). The Declarant is testifying to matters unrelated to his professional occupation.
6	¶6: “In preparing this report, I considered the following materials...”	
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15		No personal knowledge. Witnesses are prohibited from testifying as to matters that they lack personal knowledge of. Fed. R. Evid. 602. The personal knowledge standard of 602 is also applicable to affidavits and declarations submitted in connection with motions for summary judgment. (<i>See</i> FRCP 56(e) which requires, in part, that: “A supporting or opposing affidavit must be made on personal knowledge, set out facts that would be admissible in evidence, and show that the affiant is competent to testify on the matters stated.” <i>See also</i> , <i>FDIC v. New Hampshire Ins. Co.</i> , 953 F.2d 478 (9th Cir. 1991)(“Declarations and other evidence of the moving party that
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1		would not be admissible are subject to a timely objection and may be stricken.”).
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4		Hearsay. Fed. R. Evid. 403. The declarant relies on out of court documents to prove the truth of the matters asserted therein. Declarant relies on these sources for the statistics produced by the various authors without demonstrating the validity of the data produced in the various sources (¶6). Despite the fact that the declarant claims to have personally assessed the data presented in her declaration, the data that she used was acquired through third party sources and not by declarant or her employer, NERA Economic Consulting. Thus any conclusion made is based on hearsay and is inadmissible and should not be relied upon.
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17		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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20	17	Expert Report and Declaration of Lucy Allen (Allen Rpt.)
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22		¶9: “The Mother Jones data that we analyzed covers 104 mass shootings from 1982 to September 2008.”
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24		Same objections as 16 above.
25		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
26	18	Updated Table and Appendix B to Expert Report of Lucy Allen (Exhibit 80 to Lucy Allen Deposition)
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28		Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.

<p>19</p> <p>Rebuttal Expert Report and Declaration of John Donohue.</p> <p>¶18: “Even assuming that each of the approximately 166,000 assault rifles is owned by a separate adult individual in California, it would mean that 0.5% of Californians possess an assault rifle (166,000/30.84 million)—an ownership rate that is far from what may be considered as ‘common use.’ That ownership rate is likely even lower because, as my initial report noted, gun ownership is growing increasingly concentrated. This implies that whatever the number of assault rifles is, it is a far smaller number of households in California and in the United State that have such weapons. English confuses the number of guns with the number of <i>owner</i> of guns, with the latter considerably smaller than the former.”</p>		<p>Declarant improperly offers lay testimony that is expert testimony (based on scientific, technical, or specialized knowledge). Fed. R. Evid. 701(c); <i>United States v. Figueroa-Lopez</i>, 125 F.3d 1241, 1246(9th Cir. 1997).</p> <p>Hearsay. Fed. R. Evid. 403. Declarant relies on data collected from an outside source which constitutes an out of court statement and is being offered for the truth of the matter.</p> <p>Relevance. Declarant presents data that is irrelevant to the matter. Fed. R. Evid. 401, 402.</p>
<p>20</p> <p>Rebuttal Expert Report and Declaration of John Donohue.</p> <p>¶20: “In other words, the very features that made this weapon attractive to the military (absent the ability to switch to automatic fire, which is not the standard military mode) now makes it the weapon of choice for many mass shooters across the country.”</p>		<p>Hearsay. Declarant is asserting as fact, the mental impressions and though processes of persons other than himself. Declarant asserts that mass shooters are selecting to use the AR-15 for the specific reasons outlined in ¶20. However, this is improper due to the fact, that Declarant in no way can know why someone make a specific decision. Doing so is prejudicial and is extremely misleading and not based on sworn affidavits from the individuals referred to. Prejudicial. Fed. R. Evid. 403.</p>

21 Rebuttal Expert Report and
Declaration of Blake Graham.

¶ 1: “I am a Special Agent Supervisor
for the California department of
Justice, Bureau of Firearms.”

Lacks personal knowledge.

Witnesses are prohibited from
testifying as to matters that they lack
personal knowledge of. Fed. R. Evid.
602. The personal knowledge
standard of 602 is also applicable to
affidavits and declarations submitted
in connection with motions for
summary judgment. (*See* FRCP
56(e) which requires, in part, that:
“A supporting or opposing affidavit
must be made on personal
knowledge, set out facts that would
be admissible in evidence, and show
that the affiant is competent to testify
on the matters stated.” *See also*,
*FDIC v. New
Hampshire Ins. Co.*, 953 F.2d 478
(9th Cir. 1991) (“Declarations and
other evidence of the moving party
that would not be admissible are
subject to a timely objection and may
be stricken.”).

Speculative expert testimony.

Fed. R. Evid. 702; *U.S. v. Hermanek*,
289 F.3d 1076, 1094 (9th Cir. 2002)
 (“The trial judge in all cases of
proffered expert testimony must find
that it is properly grounded, well
reasoned,
and not speculative before it can be
admitted. The ... expert must explain
how the conclusion is so grounded.”
(quoting Fed. R. Evid. 702, comm.
note)). The Declarant’s academic
credentials only include a Bachelor
of Science degree in Criminal Justice
from California State University

1		Sacramento. Despite Declarant's extensive employment history, there is no foundation for which he can lay out his opinion on this matter.
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4	22	Hearsay. Fed. R. Evid. 403.
5	Rebuttal Expert Report and Declaration of Blake Graham.	Declarant relies on hearsay in support of his rebuttal. Fed. R. Evid. 403. This is a quote attributed to www.scribid.com as noted on page three of the rebuttal.
6	¶ 9: "A 2014 FBI report indicates that 9mm Luger projectiles outperform .40 S&W and .45 auto projectiles tested by the FBI..."	Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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13	Rebuttal Expert Report and Declaration of Blake Graham.	Declarant improperly offers lay testimony that is actually expert testimony (based on scientific, technical, or specialized knowledge). Fed. R. Evid. 701 (c). This statement is uncorroborated by evidence and is solely based on lay opinion, thus making it inadmissible.
14	¶ 12: "While this may be true, those same features are what makes assault weapons attractive to potential mass shooters or criminals..."	
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18	24	Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.
19	Excerpts of Transcript of the Deposition of John Donohue	
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22	25	Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.
23	Excerpts of Transcript of the Deposition of Blake Graham	
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26	26	Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to
27	Excerpts of Transcript of the Deposition of Michael Mersereau	
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1		what it asserts and is therefore inadmissible as hearsay.
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3	27	Excerpts of Transcript of the Deposition of Christopher Colwell
4		Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.
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7	28	Excerpts of Transcript of the Deposition of Lucy Allen (Allen Dep.)
8		Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.
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11	29	Excerpts of Transcript of the Deposition of J. Buford Boone (Boone Dep.)
12		Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.
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15	30	Excerpts of Transcript of the Deposition of Gary Kleck (Kleck Dep.)
16		Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.
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19	31	Excerpts of Transcript of the Deposition of Stephen Helsley (Helsley Dep.)
20		Hearsay. Fed. R. Evid. 403. This exhibit is an out of court statement that is being offered for the truth to what it asserts and is therefore inadmissible as hearsay.
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23	32	Violence Policy Center, Bullet Buttons: The Gun Industry's Attack on California's Assault Weapons Ban (2012)
24		Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the
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document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.

"Declarant improperly offers lay testimony that is actually expert testimony (based on scientific, technical, or specialized knowledge.). Fed. R.Evid. 702, 703. This evidence cites to surveys that they did not personally conduct, and therefore cannot testify to in court. Lacks personal knowledge. Fed.R.Evid. 702. The contents of the article does not identify any data or other acceptable foundation upon which it bases its opinions. The article bases its opinions on an on-line survey conducted in 2010 by the National Shooting Sports Foundation, without detailing the demographics surveyed or any information regarding the accumulation of data.

Additionally, the author of this article has done nothing more than rely on hearsay studies and conformed data accumulated therewith to form biased and unscientific opinions. Studies cited in the article include: (1) The Department of Treasury from April 1998; (2) Modern Sporting Rifle, Comprehensive Consumer Report from 2010; (3) Freedom Group Annual Report from 2011. This article is prejudicial because the contents of the article are misleading in that it is supported by biased

		<p>opinion and irrelevant surveys which do not depict an accurate cross section of the community. Fed.R.Evid. 401, 402, 403.</p> <p>Fed. R. Evid. 403. Prejudicial because article makes several unfounded assumptions and opinions that are misleading and should therefore not be admitted into evidence.</p> <p>Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.</p>
33	Excerpt of United States Army, Rifle Marksmanship M16/M4 - Series Weapons (2008)	<p>Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.</p>
34	Brady Center to Prevent Gun Violence, Assault Weapons “Mass Produced Mayhem” (2008)	<p>Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document’s contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.</p> <p>Fed. R. Evid. 702, 801-802. Because the document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being</p>

1		put forth by an expert who can speak directly to the reliability thereof under Fed. R. Evid. 702, nor is it proper lay opinion under Fed. R. Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed. R. Evid. 801-802. It states as much at p. 1,308: "The question should be asked of the candidates, 'Senator, why should civilians be allowed to wield these weapons of war?' This report provides the factual basis for answering that question, and makes the evidentiary case for an assault weapons ban. The report also outlines how the availability of assault weapons to criminals has altered the balance of power on urban streets between police and criminals, placing police officers in grave risk of harm."
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17		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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20	35	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802
21	Excerpts of Bureau of Alcohol, Tobacco, and Firearms, Department of the Treasury Study on the Sporting Suitability of Modified Semiautomatic Assault Rifles (1998)	
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1		According to this study at footnote 2:
2		“The study was carried out by a
3		working group composed of ATF
4		and Treasury representatives. The
5		working group’s activities and
6		findings were overseen by a steering
7		committee composed of ATF and
8		Treasury officials.” Thus the hearsay
9		data collected and relied upon are
10		prejudicial and misleading.
11		Fed.R.Evid. 801, 802. Fed. R. Evid.
12		403.
13		Authentication. The document
14		referred to has not been properly
15		authenticated. Fed. R. Evid. 901,
16		902.
17	36 Bureau of Alcohol, Tobacco, and	Fed.R.Evid. 702, 801-802. Because
18	Firearms, Report and	this document is comprised entirely
19	Recommendation on the	of out of court statements being
20	Importability of Certain	offered for the truth of their contents,
21	Semiautomatic Rifles (1989) (ATF	and because it is not being put forth
22	Rpt.)	by an expert who can speak directly
23		to the reliability thereof under
24		Fed.R.Evid. 702, 701, nor is it proper
25		lay opinion under Fed.R.Evid. 702,
26		701, the document’s contents are
27		inadmissible hearsay and should not
28		be considered by the court under
		Fed.R.Evid. 801-802 This Report
		was written in 1989, and is therefore
		misleading due to the fact that it is
		based on records from thirty years
		ago. The opinions opined in this
		report are out dated and should not
		be admitted into evidence due to
		their lack of foundation and
		credibility.

1		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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6		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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9	37	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802. Fed.R.Evid. 702, 701.
10	Christopher S. Koper, et al., Criminal Use of Assault Weapons and High-Capacity Semiautomatic Firearms: an Updated Examination of Local and National Sources, 95 Journal of Urban Health 3, 313-321 (2017) (Koper Article)	
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27	38	Lacks foundation. Fed. R. Evid. 602.
28	Colt.com, AR15A4 Advertisement	

1		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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4	39	Colt.com, About Colt Rifles
5		Lacks foundation. Fed. R. Evid. 602.
6		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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10	40	David S. Fallis, Data Indicate Drop in High-Capacity Magazines During Federal Gun Ban, Washington Post (Jan. 10, 2013)
11		Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
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19		Irrelevant. This article is irrelevant due to the fact that the state of Virginia is the focus of this article and not California. Fed.R.Evid. 401, 402.
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23		Hearsay. The author relies on a hearsay survey conducted by the Washington Post in which the author does not denote any demographically data regarding those who took the survey. Fed. R. Evid. 801, 802. The article relies on a report by the National Institute of Justice from
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1		2004. Using data and quotes from works nearly fifteen years old is prejudicial and extremely misleading. Fed.R.Evid. 403. The article is based on the Washington Post's opinions of data gathered. Since the Washington Post is not an expert, this evidence lacks proper foundation and falls prey to the multiple level of hearsay issue (that of the data collected, reports cited to and used by the Post to form their opinions). Fed. R. Evid. 801, 802.
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10		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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14	41 H.R. Rep. No. 103-489, Public Safety and Recreational Firearms Use Protection Act (H.R. Rep. 103-489)	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
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		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).

1		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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4	42	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
5	Mark Follman, et al., More than Half of Mass Shooters Used Assault Weapons and High-Capacity Magazines, Mother Jones (Feb. 27, 2013)	
6		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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8		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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22	43	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are
23	S.B. 880 Report, 2015-2016 Reg. Sess., Assembly Committee on Public Safety (June 14, 2016) (S.B. 880 Rpt.)	
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1		inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
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4		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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8		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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12	44 U.S. Department of Justice, Office of Justice Programs, National Institute of Justice, Selection and Application Guide 0101.06 to Ballistic-Resistant Body Armor (2014)	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
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22		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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27		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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<p>18 46</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p>26</p> <p>27</p> <p>28</p>	<p>Violence Policy Center, The Militarization of the U.S. Civilian Firearms Market (2011)</p>	<p>Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document’s contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.</p> <p>Additionally, its contents are of a technical nature that constitute</p>

1		expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid. 701, Subd. (c).
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4		This article contains images that are
5		biased and misleading. On page 37
6		of this article there is a picture of
7		four children sitting with an AR-50
8		with a caption stating: "The gun
9		industry has saturated the American
10		civilian 'gun culture' with 50 caliber
11		anti-armor sniper rifles, like this AR-
12		50." Thus this evidence should be
13		deemed inadmissible based upon
14		Fed.R.Evid. 403.
15		Prejudicial. Additionally, the article
16		should not be admitted into evidence
17		because of the sever prejudicial
18		nature of its biased statements such
19		as: "It [the gun industry] is a highly
20		militarized and increasingly cynical
21		industry that has cast all restraint
22		aside to generate profit from
23		military-style firearms." Such a
24		statement is not based upon
25		evidence, but on the opinion of the
26		author of this article. Proper
27		foundation for such an opinion has
28		not been made. Fed. R. Evid. 403.
		Authentication. The document
		referred to has not been properly
		authenticated. Fed. R. Evid. 901,
		902.
47	Violence Policy Center, Firearm Justifiable Homicides and Non-Fatal Self-Defense Gun Use: An Analysis of Federal Bureau of Investigation	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents,

1	and National Crime Victimization	and because it is not being put forth
2	Survey Data (2018)	by an expert who can speak directly
3		to the reliability thereof under
4		Fed.R.Evid. 702, nor is it proper lay
5		opinion under Fed.R.Evid. 702, the
6		document's contents are
7		inadmissible hearsay and should not
8		be considered by the court under
9		Fed.R.Evid. 801-802.
10		Additionally, its contents are of a
11		technical nature that constitute
12		expert opinion. Since Defendant did
13		not designate its author as an expert,
14		it cannot be considered. Fed. R.
15		Evid.701, Subd. (c).
16	48 California Senate Bill 23, 1999 Cal.	Authentication. The document
17	Stat. ch. 129 (S.B. 23)	referred to has not been properly
18		authenticated. Fed. R. Evid. 901,
19		902.
20		Fed.R.Evid. 702, 801-802. Because
21		this document is comprised entirely
22		of out of court statements being
23		offered for the truth of their contents,
24		and because it is not being put forth
25		by an expert who can speak directly
26		to the reliability thereof under
27		Fed.R.Evid. 702, nor is it proper lay
28		opinion under Fed.R.Evid. 702, the
		document's contents are
		inadmissible hearsay and should not
		be considered by the court under
		Fed.R.Evid. 801-802.
		Additionally, its contents are of a
		technical nature that constitute
		expert opinion. Since Defendant did
		not designate its author as an expert,

1		it cannot be considered. Fed. R. Evid.701, Subd. (c).
2		
3	49	Guns & Ammo: The New Breed of Assault Rifle, Tomorrow's State-of-the-Art Sporting Rifle (July 1981) (July 1981 Guns & Ammo)
4		Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
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13		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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17		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
18		
19		
20	50	Damien Cave and Charlotte Graham-McLay, New Zealand to Ban Military-Style Semiautomatic Guns, Jacinda Arden Says, New York Times (March 20, 2019)
21		Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not
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1		be considered by the court under Fed.R.Evid. 801-802.
2		
3		Additionally, its contents are of a
4		technical nature that constitute
5		expert opinion. Since Defendant did
6		not designate its author as an expert,
7		it cannot be considered. Fed. R.
8		Evid.701, Subd. (c).
9		Unduly Prejudicial.
10		Fed.R.Evid.403. This article focuses
11		on the country of New Zealand,
12		which in no way can be used to
13		compare or contrast the gun laws in
14		the State of California.
15		
16		Additionally, its contents are of a
17		technical nature that constitute
18		expert opinion. Since Defendant did
19		not designate its author as an expert,
20		it cannot be considered. Fed. R.
21		Evid.701, Subd. (c).
22		Authentication. The document
23		referred to has not been properly
24		authenticated. Fed. R. Evid. 901,
25		902.
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27	51	Fed.R.Evid. 702, 801-802. Because
28	Kaylee Hartung, et al., Stoneman	this document is comprised entirely
	Douglas shooting. Now parents are	of out of court statements being
	urged to be alert, CNN (March 25,	offered for the truth of their contents,
	2019)	and because it is not being put forth
		by an expert who can speak directly
		to the reliability thereof under
		Fed.R.Evid. 702, nor is it proper lay
		opinion under Fed.R.Evid. 702, the
		document's contents are
		inadmissible hearsay and should not

1		be considered by the court under Fed.R.Evid. 801-802.
2		
3		Unduly Prejudicial.
4		Fed.R.Evid.403. This article is
5		extremely prejudicial and biased.
6		Fed.R.Evid. 403. The contents of the
7		article are based on opinion and
8		incidents pertaining to one individual
9		who took her own life. In
10		Defendant's Motion for Summary
11		Judgment, Exhibit 37, is listed
12		following the following sentence:
13		"Social science studies consistently
14		show that mass shootings can lead to
15		increased levels of post traumatic
16		stress symptoms, anxiety, and
17		depression in survivors..." This
18		statement is hearsay and the proper
19		foundation has not been made, thus
20		this evidence should not be admitted.
21		Fed. R. Evid. 801, 802.
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23		Additionally, its contents are of a
24		technical nature that constitute
25		expert opinion. Since Defendant did
26		not designate its author as an expert,
27		it cannot be considered. Fed. R.
28		Evid.701, Subd. (c).
		Authentication. The document
		referred to has not been properly
		authenticated. Fed. R. Evid. 901,
		902.
24	52	Fed.R.Evid. 702, 801-802. Because
25	Panagiotis K. Stefanopoulos, et al.,	this document is comprised entirely
26	Gunshot wounds: A review of	of out of court statements being
27	ballistics related to penetrating	offered for the truth of their contents,
28	trauma, Journal of Acute Disease,	and because it is not being put forth
	178-185 (2014)	by an expert who can speak directly
		to the reliability thereof under

Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.

Unduly Prejudicial.

Fed.R.Evid.403. Defendant's Motion for Summary Judgment at page 20 cites to Exhibit 38 with the following broken and incomplete quote: "The 'effects of rifle bullets can be far more destructive compared to handguns because of their higher energy,' and the 'explosive' effects on gunshot victims." However, the full text reads, "Although the effects of rifle bullets can be far more destructive compared to handguns because of their higher energy, almost all of these so-called 'explosive' effects can be traced to the phenomenon of cavitation, a prominent manifestation of high-energy transfer..."

The article states that "[a]lthough controversy still exists regarding the relative necrosis in muscle tissue..." leading one to believe that the use of this as evidence would cause confusion and ultimately lacks foundation. Thus this evidence should not be considered by this court under Fed. R. Evid. 403.

Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert,

1		it cannot be considered. Fed. R. Evid.701, Subd. (c).
2		
3		Authentication. The document
4		referred to has not been properly
5		authenticated. Fed. R. Evid. 901,
6		902.
7		Incomplete. Fed. R. Evid. 106. The
8		introduction of any remaining
9		portions, ought, in fairness, be
10		considered contemporaneously in
11		Defendant's motion.
12	53	Fed. R. Evid. 702, 801-802.
13	United States Census Bureau, Quick	Because the document is comprised
14	Facts: California (available at	entirely of out of court statements
15	https://www.census.gov/quickfacts/ca	being offered for the truth of their
16)	contents, and because it is not being
17		put forth by an expert who can speak
18		directly to the reliability thereof
19		under Fed. R. Evid. 702, nor is it
20		proper lay opinion under Fed. R.
21		Evid. 702, the document's contents
22		are inadmissible hearsay and should
23		not be considered by this court.
24	54	Additionally, its contents are of a
25	Law Center to Prevent Gun Violence,	technical nature that constitute
26	The California Model: Twenty Years	expert opinion. Since Defendant did
27	of Putting Safety First	not designate its author as an expert,
28		it cannot be considered. Fed. R. Evid.701, Subd. (c).
		Fed.R.Evid. 702, 801-802. Because
		this document is comprised entirely
		of out of court statements being
		offered for the truth of their contents,
		and because it is not being put forth
		by an expert who can speak directly
		to the reliability thereof under

1		Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
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6		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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10		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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14	55	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
15	U.S. DOJ Press Release, California Man Charged with Conspiring to Provide Material Support to Terrorism and Being 'Straw Purchaser' of Assault Rifles Ultimately Used in San Bernardino, California, Attack (Dec. 17, 2015)	
16		
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23		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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1	56	Excerpt of National Shooting Sports Foundation, NSSF Report: Modern Sporting Rifle (MSR) Comprehensive Consumer Report (2013)	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802. Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c). Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
18	57	Excerpt of National Shooting Sports Foundation, NSSF Report 2017 Edition: Firearms Retailer Survey Report, Trend Data 2008-2016 (2017)	Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.

1		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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6		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
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9	58	FBI Training Division: FBI Academy, Quantico, VA, Executive Summary of Justification for Law Enforcement Partners (May 6, 2014)
10		Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.
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19		Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).
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23		Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.
24		
25		
26	59	Violence Policy Center, Key Points About Assault Weapons
27		Fed.R.Evid. 702, 801-802. Because this document is comprised entirely of out of court statements being
28		

offered for the truth of their contents, and because it is not being put forth by an expert who can speak directly to the reliability thereof under Fed.R.Evid. 702, nor is it proper lay opinion under Fed.R.Evid. 702, the document's contents are inadmissible hearsay and should not be considered by the court under Fed.R.Evid. 801-802.

Additionally, its contents are of a technical nature that constitute expert opinion. Since Defendant did not designate its author as an expert, it cannot be considered. Fed. R. Evid.701, Subd. (c).

Authentication. The document referred to has not been properly authenticated. Fed. R. Evid. 901, 902.

Dated: May 2, 2019

MICHEL & ASSOCIATES, P.C.

s/ Sean A. Brady

Sean A. Brady
Attorneys for Plaintiffs

CERTIFICATE OF SERVICE
IN THE UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

Case Name: *Rupp, et al. v. Becerra*
Case No.: 8:17-cv-00746-JLS-JDE

IT IS HEREBY CERTIFIED THAT:

I, the undersigned, am a citizen of the United States and am at least eighteen years of age. My business address is 180 East Ocean Boulevard, Suite 200, Long Beach, California 90802.

I am not a party to the above-entitled action. I have caused service of:

**PLAINTIFFS' OBJECTIONS TO EVIDENCE FILED IN SUPPORT OF
DEFENDANT'S MOTION FOR SUMMARY JUDGMENT**

on the following party by electronically filing the foregoing with the Clerk of the District Court using its ECF System, which electronically notifies them.

Xavier Becerra
Attorney General of California
Peter H. Chang
Deputy Attorney General
E-mail: peter.chang@doj.ca.gov
John D. Echeverria
Deputy Attorney General
E-mail: john.echeverria@doj.ca.gov
455 Golden Gate Ave., Suite 11000
San Francisco, CA 94102

I declare under penalty of perjury that the foregoing is true and correct.

Executed May 2, 2019.

s/ Laura Palmerin
Laura Palmerin

C. D. Michel – SBN 144258
cmichel@michellawyers.com
Sean A. Brady – SBN 262007
sbrady@michellawyers.com
Matthew D. Cubeiro – SBN 291519
mcubeiro@michellawyers.com
MICHEL & ASSOCIATES, P.C.
180 East Ocean Boulevard, Suite 200
Long Beach, CA 90802
Telephone: 562-216-4444
Facsimile: 562-216-4445

Attorneys for Plaintiffs

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

STEVEN RUPP, et al.,

Plaintiffs,

v.

XAVIER BECERRA, in his official
capacity as Attorney General of the
State of California,

Defendant.

Case No.: 8:17-cv-00746-JLS-JDE

**PLAINTIFFS' STATEMENT OF
GENUINE DISPUTES OF
MATERIAL FACT AND
ADDITIONAL
UNCONTROVERTED FACTS**

Hearing Date: May 31, 2019
Hearing Time: 10:30 a.m.
Courtroom: 10A
Judge: Josephine L. Staton

Plaintiffs Steven Rupp, Steven Dember, Cheryl Johnson, Michael Jones, Christopher Seifert, Alfonso Valencia, Troy Willis, Dennis Martin, and the California Rifle & Pistol Association, Incorporated, respectfully submit the following Statement of Genuine Disputes of Material Fact pursuant to Local Rule 56-2.

I. STATEMENT OF GENUINE DISPUTES OF MATERIAL FACT

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
1	<p>In 1957, the U.S. Army requested Armalite, a small arms manufacturer, to produce a lightweight, high-velocity rifle that could operate in both semi-automatic and full-automatic modes, with firepower capable "of penetrating a steel helmet or standard body armor at 500 yards."</p> <p><u>Supporting Evidence</u> Def. Exh. 1 at 29, ¶ 68.</p>	<p>Disputed. Defendant's supporting evidence, consisting of Defendant's expert report, does not cite a source for the quoted statement.</p>
2	<p>According to one of the designers of the AR-15, the rifle was engineered to generate "maximum wound effect."</p> <p><u>Supporting Evidence</u> Def. Exh. 1 at 30, ¶ 73.</p>	<p>Disputed. Defendant's supporting evidence, consisting of Defendant's expert report, does not cite a source for the quoted statement.</p>
3	<p>After field testing in combat operations in Vietnam, the Advanced Research Projects Agency ("ARPA") noted that the "lethality of the AR-15 and its reliability record were particularly impressive."</p> <p><u>Supporting Evidence</u> Def. Exh. 1 at 29, ¶ 68.</p>	<p>Undisputed as to what the report states.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
4	<p>The ARPA found that all casualties inflicted by the AR-15 in combat were fatal, including hits to only extremities.</p> <p><u>Supporting Evidence</u> Def. Exh. 1 at 29-30, ¶¶ 68-69.</p>	<p>Disputed. Defendant's supporting evidence, consisting of Defendant's expert report, does not support that the ARPA report found that "all casualties inflicted by the AR-15 in combat were fatal, including hits to only extremities."</p>
5	<p>In a 1989 report, the Bureau of Alcohol Tobacco & Firearms described features such as folding and telescoping stocks, pistol grips, and flash suppressors as "military features and characteristics . . . carried over to the semiautomatic versions of the original military rifle."</p> <p><u>Supporting Evidence</u> Def. Exh. 22 at 1048-49.</p>	<p>Disputed. Defendants own supporting evidence states that "the vast majority of sporting firearms employ a more traditional pistol grip," suggesting many sporting firearms do in fact employ a pistol grip of some type. Defendants evidence also states that flash suppressors which also serve to dampen muzzle climb have some benefits in sporting uses. Defendants evidence also states that as to sporting uses for folding/telescoping stocks, such items make the firearm easier to carry when hiking or backpacking.</p>
6	<p>In a 1998 study, the Bureau of Alcohol Tobacco & Firearms examined semiautomatic assault rifles with what it described as "distinctive military configuration," which incorporated physical features such as the ability to accept a detachable magazine, holding/telescoping stocks, separate pistol grips, and flash suppressors.</p> <p><u>Supporting Evidence</u> Def. Exh. 21 at 992.</p>	<p>Disputed. Defendants supporting evidence states that ATF does not consider a detachable magazine, in and of itself, a military feature prohibiting the firearm from being imported in the United States.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
7	<p>The AR-15 is the civilian version of the military's M-16.</p> <p><u>Supporting Evidence</u> Def. Exh. 2 at 121-22, ¶ 15; Def. Exh. 16 at 818:3-13.</p>	<p>Disputed to the extent Defendant's statement suggests the firearms are functionally the same.</p>
8	<p>Rifles restricted by the AWCA appear like their military counterparts and possess many of the same features.</p> <p><u>Supporting Evidence</u> Def. Exh. 16 at 787:6-10, 790:10-22.</p>	<p>Disputed as to the rifles restricted by the AWCA possessing "many of the same features." As noted in Defendant's supporting evidence, the selection of what rifles were to be banned under the AWCA was based solely on their "appearance" and not what features the firearms actually possessed.</p>
9	<p>Rifles restricted by the AWCA are capable of firing the same centerfire rifle rounds as U.S. military rifles and "could have the same high capacity for firepower as the military weapons." Civilian assault rifles commonly use ammunition rounds created mainly for military use. The .223 is the civilian version of 5x56 military round. The .308 is the civilian version of the 7.62x51 NATO round.</p> <p><u>Supporting Evidence</u> Def. Exh. 2 at 128, ¶ 34; <i>see</i> Def. Exh. 10 at 320:3-14.</p>	<p>Disputed. The .223 Remington first appeared in 1957 and was designed by Remington Arms. The 5.56 appeared years later in 1964 and was designed by FN Herstal in Belgium, having been based on the .223 Remington. The same is true of the 308 Winchester, having been introduced in 1952 and being the cartridge for which the 7.62x51 NATO (adopted two years later) is based on. The testimony of Blake Graham is therefore factually incorrect and does not support the stated fact.</p> <p><u>Supporting Evidence</u> Ex. 64; Ex. 68.</p>
10	<p>The difference between the M-16 and the AR-15 is that the M-16 is a</p>	<p>While Defendant's supporting evidence does not support this</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
	<p>select-fire rifle that allows the shooter to fire in either automatic or semiautomatic mode, while the AR-15 fires only in semiautomatic mode.</p> <p><u>Supporting Evidence</u> Def. Exh. 45 at 1544; Def. Exh. 16 at 818:3-13.</p>	<p>statement, Plaintiffs do not dispute that AR-15 style semiautomatic rifles are not select-fire.</p>
11	<p>Semiautomatic weapons can be fired at rates of 300 to 500 rounds per minute. According to a Congressional report, this makes them “virtually indistinguishable in practical effect from machineguns.”</p> <p><u>Supporting Evidence</u> Def. Exh. 27 at 1090.</p>	<p>Disputed. Defendant's supporting evidence does not in any way support the claim that semiautomatic weapons can be fired at rates of 300 to 500 rounds per minute. In any event, whether this is or is not a realistic measurement, that rate is not unique to the banned firearms under the AWCA, and equally applies to all semiautomatic firearms.</p>
12	<p>A test by the San Jose police showed that a 30-round magazine empties in slightly less than two seconds on automatic, while the same magazine empties in just five seconds on semiautomatic.</p> <p><u>Supporting Evidence</u> Def. Exh. 20 at 934.</p>	<p>Disputed. The alleged test referred to by Defendants was conducted by then San Jose Police Chief Joseph D. McNamara over 30 years ago. No information concerning the firearms model, the skill of the shooter, type of timing device, or whether the results included reaction time were ever provided regarding this test, and for that reason there is no way to verify the accuracy of the claims made by Chief McNamara regarding the results.</p> <p><u>Supporting Evidence</u> Ex. 63 at 221-222.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
13	<p>A semiautomatic weapon can be converted to automatic fire by installing certain parts, such as bump stocks or multiburst trigger activators.</p> <p><u>Supporting Evidence</u> Def. Exh. 27 at 1090; Def. Exh. 3 at 140, ¶ 20; Def. Exh. 15 at 642:1-10.</p>	<p>Disputed. None of the supporting evidence offered by Defendants states that installing a bump stock or multiburst trigger activator will convert a firearm into a fully automatic machinegun. Even so, the installation of such devices is not limited to only those firearms prohibited by the AWCA, but all semiautomatic firearms.</p>
14	<p>According to a 1989 ATF Report, large-capacity magazines “are indicative of military firearms,” and the fact “[t]hat a firearm is designed and sold with a large capacity magazine, e.g., 20-30 rounds, is a factor to be considered in determining whether a firearm is a semiautomatic assault rifle.”</p> <p><u>Supporting Evidence</u> Def. Exh. 22 at 1048.</p>	<p>Undisputed as to what is stated in the report.</p>
15	<p>AR-platform rifles capable of accepting detachable magazines take 3 to 5 seconds less to reload than the same rifle with a fixed magazine.</p> <p><u>Supporting Evidence</u> Def. Exh. 10 at 331:7-333:7.</p>	<p>Disputed. As stated in Defendant's supporting evidence, there are faster variants of each type of magazine release mechanism that are also dependent on the user's own ability.</p>
16	<p>A protruding pistol grip helps to stabilize the rifle during rapid fire and enables a shooter to maintain accuracy.</p>	<p>Disputed to the extent Defendant's statement suggests that this is the sole or main purpose of a pistol grip.</p> <p>As stated by Plaintiffs' expert, the pistol grip simply places the shooting</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
	<p><u>Supporting Evidence</u> Def. Exh. 3 at 137-38, ¶ 9; Def. Exh. 22 at 1048; Def. Exh. 11 at 349:11-22; Def. Exh. 16 at 844:6-15; Def. Exh. 19 at 913.</p>	<p>hand in the optimal position to operate the trigger, magazine release, and safety mechanism. And an AR-type firearm can still be fired without the pistol grip installed.</p> <p><u>Supporting Evidence</u> Ex. 3 at 7-9.</p>
17	<p>An assault rifle with a pistol grip would allow a shooter to shoot more accurately and reload faster.</p> <p><u>Supporting Evidence</u> Def. Exh. 3 at 137-38, ¶ 9.</p>	<p>Disputed. The citation to Defendant's supporting evidence does not support the claim that a pistol grip allows a user to reload faster.</p>
18	<p>According to a 1989 ATF Report, a pistol grip beneath the action of the rifle can also "be an aid in one-handed firing of the weapon in a combat situation."</p> <p><u>Supporting Evidence</u> Def. Exh. 22 at 1048.</p>	<p>Undisputed as to what is stated in the report. However, disputed to the extent Defendant's statement suggests "combat" is the only situation one can benefit from being able to use the firearm with one hand.</p> <p>As stated by Plaintiffs' expert, the vertical pistol grip design is easier to operate with one hand than less-pronounced grips. This is because it places the hand in a location where the user can manipulate the firearm's primary controls, including the safety. What's more, this can be of benefit when needing to use one hand to hold a flashlight or call 911.</p> <p><u>Supporting Evidence</u> Ex. 1 at 12.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
19	<p>A forward pistol grip on a rifle was a feature of early machineguns; it can help insulate the non-trigger hand from heat during rapid fire.</p> <p><u>Supporting Evidence</u> Def. Exh. 16 at 777:5-11; <i>see id.</i> at 774:7-12.</p>	<p>Disputed to the extent that Defendants are suggesting forward pistols grips are <i>only</i> useful on machineguns to insulate the non-trigger hand from heat during rapid fire. What's more, other features, such as a barrel shroud, serve the same purpose as noted by Defendant's evidence and are not a prohibited feature for rifles banned by the AWCA.</p>
20	<p>According to a 1989 ATF Report, the "predominant advantage" of a folding or telescoping stock "is for military purposes, and it is not normally found on the traditional sporting rifle."</p> <p><u>Supporting Evidence</u> Def. Exh. 22 at 1048.</p>	<p>Disputed. As Defendant's evidence states, while this may be a "predominate use," there are in fact sporting used for such devices. Early examples of folding stocks can be found on guns manufactured as early as the late 1600s, such as the Giovanni Beretta Folding Stock Miquelet Fowler. And a significant use for a telescoping or folding stock not mentioned by Defendants here is to allow the rifle to be stored in a space that it would not normally fit in.</p> <p>As stated by Plaintiffs' expert, a user-adjustable telescoping stock is simply an acknowledgement that people come in different sizes. And the position and/or stance of the user can impact the optimal length of the firearm and thereby affect the firearms accuracy.</p> <p><u>Supporting Evidence</u> Ex. 65; Ex. 3 at 9-10; Ex. 1 at 12.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
21	<p>A folding or telescoping stock renders the rifle more concealable as would a semiautomatic centerfire rifle that is under 30 inches in length. A semiautomatic centerfire rifle under 30 inches in length is more concealable than the same rifle that is 30 inches or longer.</p> <p><u>Supporting Evidence</u> Def. Exh. 2 at 124, ¶ 21 & 126, ¶ 27.</p>	<p>Disputed. A rifle equipped with a folding/telescoping stock is not necessarily one that is less than 30 inches in length. It is possible for a fixed stock firearm to be 30 inches in length and not also be prohibited by the AWCA, yet that same firearm is more concealable than a rifle with a folding or telescoping stock that is more than 30 inches in length in its shortest configuration, which would potentially be prohibited under the AWCA by nature of being equipped with a folding/telescoping stock.</p> <p>Defendant's expert cannot recall any instances where a criminal was able to conceal an AR-style firearm because it was equipped with a telescoping stock.</p> <p>As stated by Plaintiffs' expert, telescoping stocks have a relatively short adjustment range of about three to four inches, meaning there is little—if any—change in the user's ability to conceal an AR-style firearm with a telescoping stock.</p> <p><u>Supporting Evidence</u> Ex. 57 at 48-49; Ex. 3 at 10; Ex. 56 at 90-91.</p>
22	<p>A flash suppressor is a standard feature of the M-16.</p> <p><u>Supporting Evidence</u> Def. Exh. 16 at 773:1-11.</p>	<p>Undisputed.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
23	<p>Flash suppressors can be affixed to the muzzle of a rifle to reduce the flash emitted upon firing, which can aid a shooter in low-light conditions to maintain accurate fire.</p> <p><u>Supporting Evidence</u> Def. Exh. 2 at 125, ¶ 22; Def. Exh. 3 at 138, ¶ 11; Def. Exh. 16 at 855:3-14; Def. Exh. 22 at 1049.</p>	<p>Disputed. As noted in Defendant's supporting evidence, a flash suppressor "may" do so, but it is "not sure how effective flash suppressors are."</p>
24	<p>Flash suppressors can help conceal a shooter's position, especially at night.</p> <p><u>Supporting Evidence</u> Def. Exh. 22 at 1049; Def. Exh. 16 at 836:7-15.</p>	<p>Disputed.</p> <p>As stated by Plaintiffs' expert, a flash suppressor will not hide the flash from those in the direct line of fire or to the side.</p> <p><u>Supporting Evidence</u> 11 C.C.R. § 5471(r) (defining flash suppressor to mean a device that functions to perceptibly reduce or redirect muzzle flash <i>from the shooter's field of vision</i>); Ex. 3 at 10.</p>
25	<p>Manufacturers of assault rifles have marketed the rifles to civilians based on their military features and military design.</p> <p><u>Supporting Evidence</u> Def. Exh. 32 at 1277; <i>see, e.g.</i>, Def. Exhs. 24-25.</p>	<p>Disputed. Defendant's supporting evidence does not support the statement. For example, Defendant's exhibit 25 states that Colt rifles are "based on the same military <i>standards and specifications</i> as the United States issue Colt M16." The documents do not state the firearm has been marketed based off its military "features" or "design."</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
26	<p>As of November 2, 2018, there were up to approximately 184,552 assault weapons registered with the Department of Justice, of which approximately 166,640 are assault rifles.</p> <p><u>Supporting Evidence</u> Def. Exh. 18 at 895.</p>	Undisputed.
27	<p>There have been up to approximately 194,065 assault weapons that have ever been registered with the Department of Justice, of which up to approximately 175,180 were assault rifles (according to best-available approximately as of November 7, 2018). Many one-time registered weapons may no longer be registered for various reasons including death of the registrant or the registrant became prohibited from possessing the weapon. There are approximately 30.5 million adults in California as of 2018.</p> <p><u>Supporting Evidence</u> Def. Exh. 18 at 895; Def. Exh. 39 at 1511.</p>	Undisputed.
28	<i>Number 28 was skipped in Defendant's Statement of Uncontroverted Facts</i>	N/A
29	Gun ownership is becoming more concentrated.	Disputed. Defendant's supporting evidence does not provide any evidence in support of this claim other than generalized statements

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
	<p><u>Supporting Evidence</u> Def. Exh. 15 at 658:12-22; <i>see</i> Def. Exh. 1 at 6-10; Def. Exh. 7 at 252, ¶ 18.</p>	<p>from Defendant's expert. For example, Defendant's own expert "presumes" the ownership of so-called "assault weapons" is at least as concentrated as the numbers provided by Defendant's expert which are not supported by evidence.</p> <p>Plaintiffs' expert has testified that there are reasons to believe that gun ownership is underreported in many surveys because those surveys are voluntary and the effect of "social desirability bias." Evidence suggests the proportion of gun owners who possess an "assault rifle" has risen dramatically in recent years, with about one of every two active hunters owning a rifle meeting the definition of an "assault weapon" and, by conservative estimates, about 7 million people likely own at least one such rifle.</p> <p><u>Supporting Evidence</u> Ex. 52 at 3-4.</p>
30	<p>66 percent of AR- or AK-rifles owners own two or more such rifles.</p> <p><u>Supporting Evidence</u> Def. Exh. 42 at 1532</p>	<p>Disputed. Defendants state 66 percent of "AR- or AK-rifles" owners own two or more such rifles. But Defendant's supporting evidence states that this is true as to "MSR" or "Modern Sporting Rifles," which include "other semi-automatic rifles with detachable magazines" that are not AR or AK platform rifles.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
31	<p>Over 30 percent of AR- or AK-platform rifle owners own three or more such rifles, and over one quarter of owners report having four or more such rifles.</p> <p><u>Supporting Evidence</u> Def. Exh. 42 at 1531, 1535.</p>	<p>Disputed. Defendants statement applies to "AR- or AK-rifles" owners. Yet Defendant's supporting evidence states that this is true as to "MSR" or "Modern Sporting Rifles," which include "other semi-automatic rifles with detachable magazines" that are not AR or AK platform rifles. What's more, Defendant's supporting evidence states this number as applied to years 2010 and 2013 only, which may not reflect current ownership trends as the statement suggests.</p>
32	<p>The number of fatalities that occur in a mass shooting is correlated with the use of an assault weapon.</p> <p><u>Supporting Evidence</u> Def. Exh. 15 at 728:20-24; Def. Exh. 6 at 232; Def. Exh. 23 at 1067; Def. Exh. 1 at 45, ¶ 109.</p>	<p>Disputed as to the definition of "assault weapon" and "mass shooting" as those terms are used in Defendant's statement which are not specifically defined in Defendant's supporting evidence.</p> <p>Plaintiff's rebuttal expert disputes Defendant's statement in that no research has reported evidence that rules out the possibility that any association between "mass shootings" and the use of an "assault weapon" is spurious.</p> <p><u>Supporting Evidence</u> Ex. 51 at 11-12.</p>
33	<p>Rifles will penetrate soft body armor designed to stop common handgun rounds.</p> <p><u>Supporting Evidence</u></p>	<p>Disputed as to Defendant's supporting evidence referencing Exhibit 14 without ascertainable page numbers (Defendants cite page 123 and page 124, but Exhibit 14</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
	<p>Def. Exh. 14 at 123:19-124:1; Def. Exh. 11 at 370:5-18.</p>	<p>only contains pages 472-583). Also disputed as to Defendant's exhibit 11, the testimony of LAPD Detective Mersereau, who is not testifying as an expert regarding the ballistic properties of a rifle round on soft body armor.</p> <p>Even so, this fact equally applies to all rifles and not just those banned by the AWCA. And while a rifle's bullet <i>may</i> penetrate soft body armor, it is not known if all rifle bullets necessarily will.</p> <p><u>Supporting Evidence</u> Ex. 51 at 12.</p>
34	<p>Between January 1, 1998 and December 31, 2001, at least 41 of the 211 law enforcement officers slain in the line of duty were killed with assault weapons.</p> <p><u>Supporting Evidence</u> Def. Exh. 31 at 1249.</p>	<p>Disputed. Defendants supporting evidence is a report from the Violence Policy Center, which arrives at this figure using "data obtained from the Federal Bureau of Investigation." But as stated in this report, the FBI data "does not identify the firearm used in some instances," nor does it address when an "assault weapon" is used (FBI data only labels firearms as either rifles, pistols, shotguns, or "other"). What's more, it is entirely unclear what is meant by the term "assault weapon" as used in this report, and whether the firearms are in fact those same types of firearms prohibited by the AWCA.</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
		<u>Supporting Evidence</u> RJN Ex. 1; Ex. 51 at 12.
35	<p>When a bullet enters a victim's body, it would create a permanent cavity or a permanent cavity and a temporary cavity. A permanent cavity "is the tissue that is actually crushed or destroyed by the projectile's interaction with it." A temporary cavity is caused by tissue being stretched away from the permanent cavity. Handguns do not typically cause temporary cavity damage.</p> <p><u>Supporting Evidence</u> Def. Exh. 14 at 508:15-19, 511:16-24; Def. Exh. 38 at 1505, 1507; Def. Exh. 44 at 1541; Def. Exh. 14 at 511:16-24.</p>	<p>Disputed. As stated by Defendant's supporting evidence, with "larger or faster projectiles you can have temporary cavity damage." But many handgun cartridges are in fact larger in both weight and diameter than typical rifle rounds such as those used by AR-15 style semiautomatic firearms. Based on Defendant's supporting evidence, such handgun rounds would in fact cause temporary cavity damage. Even so, Defendant's statement applies equally to all types of rifles and not just those specifically prohibited by the AWCA.</p>
36	<p>After a rifle round enters the body, it would turn over vertically and exit the body base forward. It would create the greatest permanent wound cavity at the point of the maximum vertical rotation.</p> <p><u>Supporting Evidence</u> Def. Exh. 14 at 504:5-505:5.</p>	<p>Disputed as to "rifle round." Defendant's supporting evidence does not differentiate between rifle or handgun rounds (instead only referring to "long skinny projectile which fails to expand"). Even so, Defendant's statement applies equally to all types of rifles and not just those specifically prohibited by the AWCA.</p>
37	<p>The temporary cavity, if one is created, by a handgun wound is typically not as injurious to the tissue as the temporary cavity typically from a rifle wound, and can be more easily treated by a physician.</p>	<p>Disputed. As stated in Defendant's supporting evidence, "you can make this untrue by the selection of certain cartridges." Even so, Defendant's statement applies equally to all types of rifles and not just those</p>

No.	Defendant's Uncontroverted Facts and Supporting Evidence	Plaintiffs' Response and Supporting Evidence
	<u>Supporting Evidence</u> Def. Exh. 14 at 514:4-23; Def. Exh. 44 at 1541.	specifically prohibited by the AWCA.
38	<p>During the period in which the federal assault weapons ban was in effect, the use of banned assault weapons in crimes was reduced.</p> <p><u>Supporting Evidence</u> Def. Exh. 15 at 662:14-663:1.</p>	<p>Disputed. As stated in Defendant's supporting evidence, "you have to understand what in this context the term Aws means." It refers "only to the narrow subset that had been banned under the federal assault weapon ban."</p> <p>Plaintiffs' expert, to which Defendant's rely upon for their statement, also makes clear in his report that while the federal ban was in effect, criminals substituted mechanically identical unbanned semiauto firearms that could be fired just as fast, could also accept easily changed detachable magazines, and were just as lethal as the banned guns.</p> <p><u>Supporting Evidence</u> Ex. 51 at 12-13.</p>
39	<p>The AWCA is broader than the federal assault weapons ban because, unlike the federal ban's two-feature test, the AWCA restricts centerfire rifles capable of accepting a detachable magazine if it has one of the listed features.</p> <p><u>Supporting Evidence</u> Def. Exh. 15 at 610:4-11.</p>	Undisputed.

II. PLAINTIFFS' ADDITIONAL UNDISPUTED MATERIAL FACTS

Plaintiffs' also contend that the following material facts are not in dispute:

No.	Plaintiffs' Uncontroverted Facts	Supporting Evidence
1	California has prohibited what it classifies as "assault weapons" over the past three decades.	Cal. Penal Code §§ 30600-30605 (formerly Cal. Penal Code §§ 12280 (originally adopted in 1989)).
2	California has never directly notified owners of firearms classified by California of "assault weapons" of the need to register them as "assault weapons" in order to continue their lawful possession.	Defendant's Supplemental Response to Plaintiff Troy Willis's First Set of Interrogatories, Response to Interrogatory No. 10; See also AG00018310-AG00018320.
3	Countless individuals have lawfully modified their firearms, removed them from the state of California, or sold or transferred them to avoid the "assault weapon" registration requirements.	Cal. Penal Code § 30920 (requiring persons who lawfully possessed firearms subsequently declared "assault weapons" to dispossess themselves of their firearms or register them with the California Department of Justice).
4	The California Department of Justice, Bureau of Firearms, anticipated between 1 to 1.5 million "assault weapon" registrations during the most recent "assault weapon" registration period alone.	RJN Ex. 2

Dated: May 2, 2019

MICHEL & ASSOCIATES, P.C.

s/ Sean A. Brady

Sean A. Brady
Attorneys for Plaintiffs

CERTIFICATE OF SERVICE
IN THE UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

Case Name: *Rupp, et al. v. Becerra*
Case No.: 8:17-cv-00746-JLS-JDE

IT IS HEREBY CERTIFIED THAT:

I, the undersigned, am a citizen of the United States and am at least eighteen years of age. My business address is 180 East Ocean Boulevard, Suite 200, Long Beach, California 90802.

I am not a party to the above-entitled action. I have caused service of:

**PLAINTIFFS' STATEMENT OF GENUINE DISPUTES OF MATERIAL
FACT AND ADDITIONAL UNCONTROVERTED FACTS**

on the following party by electronically filing the foregoing with the Clerk of the District Court using its ECF System, which electronically notifies them.

Xavier Becerra
Attorney General of California
Peter H. Chang
Deputy Attorney General
E-mail: peter.chang@doj.ca.gov
John D. Echeverria
Deputy Attorney General
E-mail: john.echeverria@doj.ca.gov
455 Golden Gate Ave., Suite 11000
San Francisco, CA 94102

I declare under penalty of perjury that the foregoing is true and correct.

Executed May 2, 2019.

s/ Laura Palmerin
Laura Palmerin

XAVIER BECERRA
Attorney General of California
MARK R. BECKINGTON
Supervising Deputy Attorney General
JOHN D. ECHEVERRIA
Deputy Attorney General
PETER H. CHANG
Deputy Attorney General
State Bar No. 241467
455 Golden Gate Avenue, Suite 11000
San Francisco, CA 94102-7004
Telephone: (415) 510-3776
Fax: (415) 703-1234
E-mail: Peter.Chang@doj.ca.gov
Attorneys for Defendant Xavier Becerra

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

STEVEN RUPP, et al.,

Plaintiffs,

v.

**XAVIER BECERRA, in his official
capacity as Attorney General of the
State of California, et al.,**

Defendants.

8:17-cv-00746-JLS-JDE

**SUPPLEMENTAL
DECLARATION OF PETER H.
CHANG IN SUPPORT OF
DEFENDANT'S OPPOSITION TO
PLAINTIFFS' MOTION FOR
SUMMARY JUDGMENT**

Date: May 31, 2019
Time: 10:30 a.m.
Courtroom: 10A
Judge: Hon. Josephine L. Staton
Trial Date: N/A
Action Filed: April 24, 2017

1 I, Peter H. Chang, hereby declare and state the following:

2 1. I am a Deputy Attorney General at the California Department of Justice
3 and serve as counsel to Attorney General Xavier Becerra in the above-titled matter.

4 2. I made this declaration in support of Defendant's Motion for Summary
5 Judgment. Unless otherwise stated, I have personal knowledge of the facts set forth
6 herein and am competent to testify thereto.

7 3. Exhibits 21-24 ("NSSF Reports") to the Declaration of Sean A. Brady in
8 Support of Plaintiffs' Motion for Summary Judgment comprise of four reports
9 published by the National Shooting Sport Foundation ("NSSF").

10 4. The NSSF Reports were relied upon extensively by Plaintiffs' expert,
11 William English, in preparing his expert report. After receiving the expert report of
12 William English, I searched for the NSSF Reports online. I found that these reports
13 were not freely available to the general public, but only available for members of
14 NNSF or available to non-members for purchase:

15 Plaintiffs' Exhibit 21 ([https://www.nssf.org/research/firearms-retailer-survey-](https://www.nssf.org/research/firearms-retailer-survey-report/)
16 [report/](https://www.nssf.org/research/firearms-retailer-survey-report/));

17 Plaintiffs' Exhibit 22 ([https://www.nssf.org/research/nsga-participation-](https://www.nssf.org/research/nsga-participation-reports/)
18 [reports/](https://www.nssf.org/research/nsga-participation-reports/));

19 Plaintiffs' Exhibit 23
20 (https://nssf.force.com/CPBase_item?id=a13150000079w0KAAQ); and

21 Plaintiffs' Exhibit 24 ([https://www.nssf.org/research/industry-reference-](https://www.nssf.org/research/industry-reference-guide/#item12)
22 [guide/#item12](https://www.nssf.org/research/industry-reference-guide/#item12)).

23 5. Plaintiffs did not produce the NSSF Reports during discovery.

24 6. The expert report of William English was served on Defendant on
25 October 25, 2018. On October 31, 2018, I requested the NSSF Reports from
26 Plaintiffs' counsel. A copy of those reports, however, were not produced to
27 Defendant until December 10, 2018, two days before the deposition of William
28 English. Defendant expert, John Donohue, did not have an opportunity to review

1 the NSSF Reports in preparing his rebuttal report to the expert report of William
2 English. The expert rebuttal reports were due on November 21, 2018. ECF No. 62.

3 7. Attached is true and accurate copy of the following exhibit:

Exhibit Number	Document Description	Page Number
46	Excerpts of Transcript of the Deposition of William English	1545-1557

7 I declare under penalty of perjury under the laws of the United States of
8 America that the foregoing is true and correct.

9 Executed on May 2, 2019, at San Francisco, California.

12 /s/ Peter H. Chang

13 Peter H. Chang
14 Deputy Attorney General

Exhibit 46

1 IN THE UNITED STATES DISTRICT COURT
2 FOR THE CENTRAL DISTRICT OF CALIFORNIA
3 SOUTHERN DIVISION
4 - - -
5 STEVEN RUPP, et al.,)
6 Plaintiffs,)
7 vs.) 8:17-cv-00746-JLS-JDE
8 XAVIER BECERRA, in his)
9 official capacity as)
10 Attorney General of the)
11 State of California; et al.,)
12 Defendants.)
13 -----
14 DEPOSITION OF WILLIAM ENGLISH, Ph.D.
15 WASHINGTON, D.C.
16 DECEMBER 12, 2018
17
18
19 ATKINSON-BAKER, INC.
20 (800) 288-3376 www.depo.com
21 REPORTED BY: JENNIFER M. O'CONNOR
22 FILE NO. AC0BB1A

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

- - -

STEVEN RUPP, et al.,)
Plaintiffs,)
vs.) 8:17-cv-00746-JLS-JDE
XAVIER BECERRA, in his)
official capacity as)
Attorney General of the)
State of California; et al.,)
Defendants.)

Deposition of WILLIAM ENGLISH, Ph.D.,
taken on behalf of Defendants at the Law Offices of
Cooper & Kirk, PLLC, 1523 New Hampshire Avenue,
N.W., Washington, D.C. at 9:01 a.m., Wednesday,
December 12, 2018, before Jennifer M. O'Connor, a
Notary Public in and for the District of Columbia.

Atkinson-Baker, Inc.
www.depo.com

A P P E A R A N C E S:

FOR THE PLAINTIFFS:

COOPER & KIRK, PLLC

BY: PETER A. PATTERSON, ESQ.

BY: NICOLE FRAZER REAVES, ESQ.

1523 New Hampshire Avenue, N.W.

Washington, D.C. 20036

(202) 220-9670

ppatterson@cooperkirk.com

FOR THE DEFENDANTS:

DEPARTMENT OF JUSTICE

BY: PETER H. CHANG, ESQ.

Office of the Attorney General

455 Golden Gate Avenue, Suite 11000

San Francisco, California 94102

(415) 510-3776

Peter.Chang@doj.ca.gov

1 A Very good.

2 Q -- 30510 and 30515 that we talked about
3 and that are being challenged here.

4 A Yes.

5 Q Just so we're on the same page on
6 terminology. And when I say -- I'll say -- and you
7 know, I may refer to the prohibited features. When
8 I say that, I will mean these five --

9 A Understood, yes.

10 Q -- features, not including grenade
11 launcher, but the other five features identified in
12 Penal Code Section 30515 (a)(1). Okay? All right,
13 go back. Okay.

14 When we left off -- we're on page 53 of
15 Exhibit 62. So, you know, this particular report
16 doesn't provide the 14 million fire -- number for
17 2015 for NICS -- adjusted NICS number, correct? But
18 you did some independent research and the 14 million
19 number was --

20 A The number's in fact correct, yes.

21 Q Is correct.

22 A And I had to estimate based on this

1 report, but it is indeed independently -- what I saw
2 there was subsequently verified as correct.

3 Q If you look on -- if you look on page 48
4 -- well, let me -- if you could look on page 49.

5 A 49.

6 Q So this is federal NICS long gun
7 background checks in 2015. And this number, just
8 like the other number we looked at, ends in
9 September 2015, correct?

10 A Yes. September's the last month.

11 Q Okay. Do you have -- do you know what the
12 numbers are for the remainder of 2015?

13 A No, that would be contained in the next
14 year's report. It would be easy to find, but I
15 don't know them off the top of my head.

16 Q And where did you get this -- this NSSF
17 report?

18 A Did you say where or when?

19 Q Where.

20 A Oh. So the law firm that had contacted
21 me, Sean Brady was a lawyer I was corresponding
22 with. And the -- as I began doing my research, I

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1 was able to identify reports that I thought would be
2 useful but I'd want to look at, and so I
3 corresponded with Sean Brady and asked the law firm
4 if they could procure these for me.

5 Q When did you make that request?

6 A Oh, I don't know the specific date, but --

7 Q Approximately.

8 A -- sometime in the last few months, yeah.

9 Or I guess it would have been shortly after I was
10 asked to --

11 Q Before you prepared this report, correct?

12 A Right. Yes. Before.

13 Q And say there -- in preparing your report,
14 you listed four separate NSSF reports --

15 A Yes.

16 Q -- as references in the reference section
17 of your opening report, correct?

18 A That's correct.

19 Q And Mr. Brady -- did Mr. Brady give you
20 copies of all these reports?

21 A I believe some of them I actually found
22 online. There were -- you had to do some searching.

1 So I think at least one. I'm not certain though,
2 but he did give me some of them.

3 Q Did you have to pay for any of them?

4 A I did not have to pay.

5 Q Okay. I'm going to hand you, it's Exhibit
6 63.

7 (English Deposition Exhibit No. 63 was
8 marked for identification.)

9 BY MR. CHANG:

10 Q Have you seen this document before,
11 Professor?

12 A Yes. I may have seen this 2017 version.
13 I'm not sure the precise year, but yes, this -- this
14 document, the Bureau of Alcohol, Tobacco and
15 Firearms, post year by year and I've certainly seen
16 versions of it. Yeah, this is the year that I
17 referred to.

18 Q So if you look at the second -- or the
19 page numbered one --

20 A Yes.

21 Q -- it's titled "Firearms Manufactured,"
22 correct?

1 A Yes.

2 Q And if you look at the number for calendar
3 year 2015, it shows that according to this BATFE
4 report, 9,358,661 firearms were manufactured,
5 correct?

6 A Correct.

7 Q That's total in the United States?

8 A Yeah.

9 Q Do you know how many firearms were
10 imported into the United States in 2015?

11 A Not off the top of my head. It should be
12 contained in another bureau report that I cite.

13 Q Do you recall which bureau report?

14 A Yeah, so that -- you see the United States
15 Department of Justice Bureau Alcohol, Tobacco,
16 Firearms, Explosives, multiple years available at
17 that website. That website site right there has the
18 maybe export reports, import reports.

19 Q This --

20 A It may actually be here. Let me just
21 check clear -- rest of this report, that it might be
22 contained here as well.

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1 centerfire rifle or a rimfire rifle.

2 So there is a high degree of modularity
3 and customization. So it's -- I know the NSSF
4 report on MSRs finds that 4 percent of AR platform
5 rifle MSRs are .22 rimfire and so that's a very
6 small number. You know, you can, if you like,
7 discount the 15 million by 4 percent, but the thing
8 to keep in mind though is even if it's -- it's
9 potential -- it's possible for an AR-15 rimfire
10 rifle to be converted to a centerfire rifle and vice
11 versa.

12 Now, there could be further, you know,
13 structural design changes that make those sorts of
14 conversions more or less possible, but there is a
15 certain intra-operability to this rifle. It's a
16 modular platform.

17 Q Sure. I'm just saying, the -- you know,
18 the 15 million AR-15 rifle number you provide in
19 your report, that's just on the, you know, the lower
20 receiver part. They can put a rimfire -- they can
21 make it rimfire, they can make it centerfire, they
22 can add features, they can remove the features. I

171

William English, Ph.D.
December 12, 2018

Def. Exhibit 46
Page 001553

1564

1 mean, the 15 million number that -- estimate that
2 you provide in your report includes all those
3 configurations, correct?

4 A So I should -- it's important to note here
5 that Clossman and Long are only counting rifles.
6 They're not counting lowers and they're explicit
7 about that. And they're also not counting pistols,
8 which in this case can be as simple as taking the
9 same firearm action and removing stock and having a
10 short barrel.

11 So that's important to know as well. So
12 the -- so they're not counting many things that also
13 might qualify here, but if you want to exercise an
14 abundance of caution, then yeah, the 15 million
15 number, based on the NSSF number, you could discount
16 that by 4 percent if you wanted to make sure that
17 you're excluding at least what the AR-15 users
18 account as the percentage of rimfire rifles out
19 there.

20 Q My question is just, you know, the number
21 you provide, if the estimate of 15 million AR-15
22 rifles --

1 A That's right.

2 Q -- in the United States, that number
3 includes AR-15 rifles that are -- have been
4 configured to be rimfire rifles and the AR-15 rifles
5 have been configured to be featureless, correct?

6 A Yes.

7 Q I'd like you to turn to page 34 of the
8 Clossman and Long paper. Well, I guess let me ask a
9 more general question.

10 Based on the Clossman and Long paper, can
11 you tell how many M4/AR-15s were sold in California
12 between 2004 and 2013? Well, let me -- I'll direct
13 your --

14 A Yeah, so you're talking on page 34 here?

15 Q On page 34, right. So let me strike my
16 question. I'll restate it.

17 Page 34, Clossman and Long stated that --
18 they assumed California had purchased over 526,000
19 M4/AR-15s, correct?

20 A Yes.

21 Q Do you know how they reached that
22 estimate?

1 A So reading in the prior pages, it appears
2 that the -- this is based on the NICS checks. So
3 looking at NICS checks and multiplying that by the
4 percentage of AR-15s manufactured each year, that's
5 the kind a market share, I believe, if I've
6 understood this right, that the NICS data is broken
7 down by state. Yeah.

8 Q Okay. So looking at the NICS data,
9 Clossman and Long estimated that 526,000 -- or over
10 526,000 M4/AR-15s were sold in California between
11 2004 and 2013, correct?

12 A Yes, that's their estimate there on page
13 34.

14 Q Okay. And Clossman and Long also
15 estimated that between 2004 and 2016, 4.6 million
16 M4/AR-15s were sold in the United States, correct?

17 A That's correct.

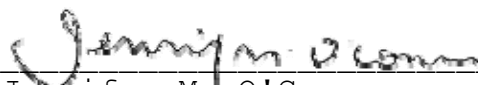
18 Q So based on those numbers, California was
19 about approximately 11 percent of the total U.S.
20 market for M4/AR-15s, correct?

21 A Again, just to clarify the methods here, I
22 take it that they're looking at NICS data from the

Atkinson-Baker, Inc.
www.depo.com

CERTIFICATE OF NOTARY PUBLIC

I, JENNIFER M. O'CONNOR, the officer before
whom the foregoing deposition was taken, do hereby
certify that the foregoing witness whose testimony
appears in the foregoing deposition was duly sworn
by me; that the testimony of said witness was
recorded by me and thereafter reduced to typewriting
by me; that said transcript is a true record of the
testimony given by said witness; that I am neither
Counsel for, related to, nor employed by any of the
parties to the action in which this proceeding was
called; and, furthermore, that I am not a relative
or employee of any attorney or Counsel employed by
the parties hereto, nor financially or otherwise
interested in the outcome of this action



Jennifer M. O'Connor
Notary Public in and for the
District of Columbia
My Commission Expires on February 14, 2020

(Signature not waived.)



XAVIER BECERRA
Attorney General of California
MARK R. BECKINGTON
Supervising Deputy Attorney General
JOHN D. ECHEVERRIA
Deputy Attorney General
PETER H. CHANG
Deputy Attorney General
State Bar No. 241467
455 Golden Gate Avenue, Suite 11000
San Francisco, CA 94102-7004
Telephone: (415) 510-3776
Fax: (415) 703-1234
E-mail: Peter.Chang@doj.ca.gov
Attorneys for Defendant Xavier Becerra

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

STEVEN RUPP, et al.,

Plaintiffs,

v.

**XAVIER BECERRA, in his official
capacity as Attorney General of the
State of California, et al.,**

Defendants.

8:17-cv-00746-JLS-JDE

**DEFENDANT'S STATEMENT OF
GENUINE DISPUTES OF
MATERIAL FACT**

Date: May 31, 2019
Time: 10:30 a.m.
Courtroom: 10A
Judge: Hon. Josephine L. Staton
Trial Date: N/A
Action Filed: April 24, 2017

In accordance with Local Rule 56-2 and this Court's procedures, Defendant Xavier Becerra, Attorney General of the State of California, sued in his official capacity ("Defendant"), submits the following Statement of Genuine Disputes of Material Fact in support of his Opposition to Plaintiffs' Motion for Summary Judgment, filed concurrently herewith.

While Defendant disputes certain material facts herein, resolution of these facts do not require trial. *See* Def. Opp. to Mem. in Supp. of Pls. Mot. Summ. J., filed concurrently herewith, at 13-14. In addition, Defendant notes objections to evidence cited in support of Plaintiffs' Statement of Uncontroverted Facts and Conclusions of Law, which are also discussed in Defendant's Objections to Evidence Filed in Support of Plaintiffs' Motion for Summary Judgment, filed concurrently herewith.

	Plaintiffs' Statement of Uncontroverted Facts and Conclusions of Law	Defendant's Genuine Disputes of Material Fact and Objections
1	All individual plaintiffs are residents of the State of California. (Willis Decl. ¶ 1; Dember Decl. ¶ 1; Martin Decl. ¶ 1; Rupp Decl. ¶ 1; Valencia Decl. ¶ 1; Johnson Decl. ¶ 1; Seifert Decl. ¶ 1; Jones Decl. ¶ 1.)	Undisputed.
2	All individual plaintiffs are law-abiding and are not prohibited from owning firearms under the laws of the United States or the State of California. (Willis Decl. ¶ 2; Dember Decl. ¶ 2; Martin Decl. ¶ 2; Rupp Decl. ¶ 2; Valencia Decl. ¶ 2; Johnson Decl. ¶ 2; Seifert Decl. ¶ 2; Jones Decl. ¶ 2.)	Undisputed.

1	3	All individual plaintiffs have never been found by any law enforcement agency, any court, or any other government agency to be irresponsible, unsafe, or negligent with firearms in any manner. (Willis Decl. ¶ 2; Dember Decl. ¶ 2; Martin Decl. ¶ 2; Rupp Decl. ¶ 2; Valencia Decl. ¶ 2; Johnson Decl. ¶ 2; Seifert Decl. ¶ 2; Jones Decl. ¶ 2.)	Undisputed.
2	4	Plaintiff Troy Willis is a retired reserve officer for the Indio Police Department. (Willis Decl. ¶ 2.)	Undisputed.
3	5	Plaintiffs Willis and Christopher Seifert each lawfully own a semiautomatic, centerfire rifle with a detachable magazine equipped with one or more prohibited features under the AWCA. (Willis Decl. ¶ 3; Seifert Decl. ¶ 3.)	Undisputed.
4	6	Plaintiff Dennis Martin lawfully owns a semiautomatic, centerfire rifle with a non-fixed magazine that he registered with the California Department of Justice as an “assault weapon.” (Martin Decl. ¶ 3.)	Undisputed.
5	7	Plaintiff Martin is prohibited under the AWCA and its related regulations from replacing his firearm’s “bullet button” with a standard magazine release, and but for these restrictions would immediately do so. (Martin Decl. ¶ 4.)	Undisputed.
6	8	Plaintiffs Willis, Martin, and Seifert are each prohibited under the AWCA from engaging in certain activities with their registered “assault weapons” that are otherwise	Undisputed.

1		lawful with any other firearm not	
2		classified as an “assault weapon,”	
3		and but for these restrictions	
4		Plaintiffs Willis, Martin, . . . , and . . .	
5		would engage in such activities.	
6		(Willis Decl. ¶ 5; Martin Decl. ¶ 5;	
7		Seifert Decl. ¶ 4.)	
8	9	Plaintiff Steven Rupp and Michael	Disputed. Plaintiffs may register to
9		Jones each own a semiautomatic,	possess assault rifles without
10		centerfire rifle with a non-fixed	modifying them. (Cal. Penal Code
11		magazine that they were forced to	§ 30900(b)(1) (permitting registration
12		modify to ensure it was no longer	of semiautomatic, centerfire rifles
13		considered an “assault weapon” and	with a non-fixed magazine by July 1,
14		therefore lawful to possess in the	2018).)
15		State of California. (Rupp Decl. ¶ 3;	
16		Jones Decl. ¶ 3.)	
17	10	Plaintiffs Rupp and Seifert each	Undisputed.
18		lawfully own a frame or “lower	
19		receiver” of a firearm that they	
20		wish to assemble into fully	
21		functioning semiautomatic,	
22		centerfire rifles with a detachable	
23		magazine and either a pistol grip,	
24		flash suppressor, or adjustable stock,	
25		or in a configuration that has an	
26		overall length of less than 30 inches	
27		but more than 26 inches. (Seifert	
28		Decl. ¶ 5; Rupp Decl. ¶ 4.)	
	11	Plaintiffs Rupp and Seifert are	Undisputed.
		concerned that if multiple intruders	
		attack them while at home, they will	
		be required to immediately	
		reassemble their firearm into such a	
		configuration to effectively protect	
		themselves and others in their home.	
		(Rupp Decl. ¶ 6; Seifert Decl. ¶ 7.)	
	12	Plaintiffs Rupp and Seifert believe	Undisputed.
		that not being able to immediately	
		assemble their frames or “lower	
		receivers” into such a configuration	

1		will impact their ability to effectively defend themselves and others in their home. (Rupp Decl. ¶ 7; Seifert Decl. ¶ 8.)	
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4	13	Plaintiffs Alfonso Valencia, Steven Dember, and Cheryl Johnson each would like to acquire a semiautomatic, centerfire rifle with a detachable magazine having one or more of the features that is prohibited by the AWCA to keep in their home for self-defense and other lawful purposes, including hunting, training, and recreation. (Valencia Decl. ¶ 3; Johnson Decl. ¶ 3; Dember Decl. ¶ 3.)	Undisputed.
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12	14	All individual Plaintiffs will be continuously and irreparably harmed by the ongoing deprivation of their individual, fundamental right to possess and use commonly possessed firearms for lawful purposes, including in-home self-defense, without risking criminal prosecution. (Willis Decl. ¶ 6; Martin Decl. ¶ 6; Rupp Decl. ¶ 8; Seifert Decl. ¶ 9; Jones Decl. ¶ 5.)	Disputed. (ECF No. 49 at 23 (noting that individuals subject to the AWCA “remain free to choose any weapon that is <i>not</i> restricted by the AWCA or another state law”); <i>e.g.</i> , <i>Kolbe v. Hogan</i> , 849 F.3d 114, 140-41 (4th Cir. 2017) (en banc) (assault-weapon restrictions do not violate the Second Amendment).) Objection: Conclusion of law. Improper legal testimony of a lay witness. (Fed R. Evid. 701(b).)
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22	15	All individual Plaintiffs would like to acquire new semiautomatic, centerfire rifles with a detachable magazine, having one or more of the features that is prohibited by the AWCA, and were it not for the AWCA and fear of prosecution for violating it, would do so. (Willis Decl. ¶ 7; Dember Decl. ¶¶ 3-4;	Undisputed.
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1		Martin Decl. ¶ 7; Rupp Decl. ¶ 9;	
2		Valencia Decl. ¶¶ 3-4; Johnson	
3		Decl. ¶¶ 3-4; Seifert Decl. ¶ 10;	
4		Jones Decl. ¶ 6.)	
5	16	All individual Plaintiffs who	Disputed. Plaintiffs may register to
6		lawfully own “assault weapons” or	possess assault rifles without
7		firearms they were forced to modify	modifying them. (Cal. Penal Code
8		in accordance with the AWCA	§ 30900(b)(1) (permitting registration
9		acquired their firearm for use in	of semiautomatic, centerfire rifles
10		their home for self-defense and	with a non-fixed magazine by July 1,
11		other lawful purposes such as	2018).)
12		hunting, training, and recreation.	
13		(Willis Decl. ¶ 4; Rupp Decl. ¶ 5;	
14		Seifert Decl. ¶ 6; Jones Decl. ¶ 4.)	
15	17	Richard Travis is the Executive	Undisputed.
16		Director for Plaintiff California	
17		Rifle & Pistol Association,	
18		Incorporated (“CRPA”). (Travis	
19		Decl. ¶ 1.)	
20	18	Plaintiff CRPA is a non-profit	Undisputed.
21		membership and donor-supported	
22		organization classified under IRC	
23		section 501(c)(4) and incorporated	
24		under the laws of California with its	
25		headquarters in Fullerton,	
26		California. (Travis Decl. ¶ 1.)	
27	19	Founded in 1875, CRPA seeks to	Undisputed.
28		defend the Second Amendment and	
		advance laws that protect the rights	
		of individual citizens. (Travis Decl.	
		¶ 2.)	
	20	Plaintiff CRPA Works [sic] to	Undisputed.
		preserve the constitutional and	
		statutory rights of gun ownership,	
		including the right to self-defense,	
		the right to hunt, and the right to	
		keep and bear arms. (Travis Decl.	
		¶ 2.)	
	21	Plaintiff CRPA is dedicated to	Undisputed.
		promoting the shooting sports,	

1		providing education, training, and organized competition for adult and junior shooters. (Travis Decl. ¶ 2.)	
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3	22	Plaintiff CRPA's members include law enforcement officers, prosecutors, professionals, firearms experts, and members of the public. (Travis Decl. ¶ 2.)	Undisputed.
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7	23	Plaintiff CRPA works to preserve the constitutional rights of all law-abiding individuals, including the fundamental right to keep and bear commonly owned firearms for the core lawful purpose of self-defense. (Travis Decl. ¶ 3.)	Undisputed.
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12	24	Plaintiff CRPA has members who own semiautomatic, centerfire rifles with non-fixed magazines that were forced to register their firearm as an "assault weapon" with the California Department of Justice before July 1, 2018. (Travis Decl. ¶ 4.)	Disputed. Registration is not required for weapons that do not have a fixed magazine and none of the features listed in Penal Code section 30515. (Cal. Penal Code § 30900(b)(1).) Objection: Hearsay. (Fed. R. Evid. 801.)
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17	25	Plaintiff CRPA has members who are prohibited under the AWCA and its related regulations from replacing their firearm's "bullet button" with a standard magazine release, and but for those restrictions would do so. (Travis Decl. ¶ 4.)	Undisputed.
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22	26	Plaintiff CRPA also has members who lawfully own semiautomatic, centerfire rifles with detachable magazines with one or more prohibited features under the AWCA, or firearms specifically identified by their make and model as "assault weapons" under the AWCA. (Travis Decl. ¶ 5.)	Undisputed.
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1 2 3 4 5 6 7 8	27	Plaintiff CRPA has members who lawfully own firearms classified as “assault weapons” who are prohibited under the AWCA and related regulations from engaging in certain activities that are otherwise lawful with any other firearm not classified as an “assault weapon,” and but for those restrictions would engage in such activities with their firearms. (Travis Decl. ¶ 6.)	Undisputed.
9 10 11 12 13 14 15 16 17	28	Plaintiff CRPA has members who, but for the AWCA and its related regulations, would acquire, transfer, and/or possess firearms classified as “assault weapons,” and are continuously and irreparably harmed by the ongoing deprivation of their individual, fundamental right to possess and use commonly possessed firearms for lawful purposes, including in-home self-defense, without risking criminal prosecution. (Travis Decl. ¶ 7.)	Disputed. (ECF No. 49 at 23 (noting that individuals subject to the AWCA “remain free to choose any weapon that is <i>not</i> restricted by the AWCA or another state law”); <i>e.g.</i> , <i>Kolbe</i> , 849 F.3d at 140-41 (assault-weapon restrictions do not violate the Second Amendment).) Objection: Improper legal testimony of a lay witness. (Fed R. Evid. 701(b).)
18 19 20 21 22 23 24 25 26	29	Millions of rifles that are prohibited by the AWCA are in the hands of the American people. (Brady Decl., Ex. 2 [Expert Report W. English]; Ex. 7 [Depo. Tr. B. Graham] at 21:13-21, 25:9-15, 28:3-6; Exs. 11-25; Ex. 8 [DOJ Resp. to Seifert’s Reqs. for Admission, Set One] at 4; Ex. 10 [DOJ Second Suppl. Resp. to Willis Interrogs., Set One] at 8.)	Disputed. Def. Exh. 18 ¹ at 895 (approximately 166,650 assault rifles were registered in California as of November 2, 2018); Def. Exh. 7 (Donohue Reb. Rpt) at 252-253 (¶¶ 17-18) (ownership rate of assault rifles in California is less than 0.5 percent); <i>see</i> Def. Exh. 1 (Donohue Rept.) at 8, ¶ 22; <i>see also</i> Pls. Exh. 17 ² at 2 (“Scholars who have researched American gun ownership treat the industry’s estimates with

¹ “Def. Exh.” refers to exhibits accompanying the Declaration of Peter H. Chang, ECF No. 76.

² “Pls. Exh.” refers to exhibits accompanying the Declaration of Sean A. Brady, ECF No. 78.

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some skepticism.”); *id.* (“Americans only started buying assault weapons in large numbers after the federal assault weapon ban expired in 2004. That year there were only about 100,000 made by American manufacturers.”); *id.* at 3 (“[C]ivilian ownership of assault weapons is also a recent phenomenon”).)

Evidence cited by Plaintiffs does not support proposed statement of fact. (*See, e.g.*, Pls. Exh. 7 (Graham Dep. Tr.) at 21:18-24 (testifying that the “most common two groups” of firearms at Northern California gun shows are “a semiautomatic handgun or probably an AR platform of some kind,” which Graham clarified “might just be a lower receiver sitting there” that would not be prohibited under the AWCA); *id.* at 25:9-15 (agreeing that prior to the AWCA amendment to include bullet-button rifles, AR-15 platform rifles were “prevalent” at gun stores that Graham frequented); *id.* at 28:3-6 (agreeing that prior to Senate Bill 880 Graham would see AR platform rifles at gun stores “frequently”).)

Plaintiffs’ estimate includes assault rifles acquired by law enforcement. (Pls. Exh. 17 at 2 (“An important note: The NSSF report includes weapons produced for law enforcement.”).)

Objections: (1) Speculative expert testimony of William English (Fed. R. Evid. 702); and (2) failure to timely

1		produce facts and data relied upon by William English (Fed. R. Civ. P. 26(a)(2)(B)(ii); Fed. R. Civ. P. 37(c)(1)).
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4	30	Americans typically choose rifles prohibited by the AWCA for self-defense.
5		(Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 5; Ex. 2 [Expert Report of W. English] at 4; Ex. 3 [Expert Report of S. Helsley] at 11-12; Exs. 28-29; 35-37.)
6		Disputed. Evidence cited by Plaintiffs does not support proposed statement of fact. (Pls. Exh. 21 (2017 NSSF Report) at 10 (noting that 30% of AR-style rifles were sold in 2016 for “personal-protection purposes,” compared to 47.1% for “target/informal shooting” and 59.5% of handguns for “personal-protection purposes”); Pls. Exh. 1 (Boone Rpt.) at 5 (does not state that rifles that qualify as assault weapons under the AWCA are typically chosen by law-abiding citizens for self-defense); Pls. Exh. 2 (English Rpt.) at 4 (acknowledging that “[r]ecreational target shooting was the most prevalent reason cited for owning a [‘modern sporting rifle’]”); Pls. Exh. 3 (Helsley Rpt.) at 11-12 (does not state that rifles that qualify as assault weapons under the AWCA are typically chosen by law-abiding citizens for self-defense).)
7		Objections: Same objections to the English Report noted in response to Item No. 29 <i>supra</i> .
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23	31	Americans typically choose rifles prohibited by the AWCA for hunting.
24		(Brady Decl., Ex. 2 [Expert Report of W. English] at 4, 7; Ex. 3 [Expert Report of S. Helsley] at 11-12; Ex. 30-33.)
25		Disputed. Evidence cited by Plaintiffs does not support proposed statement of fact. (Pls. Exh. 2 (English Rpt.) at 4 (noting that hunting was one of several “[a]dditional reasons” cited by survey participants for owning a “modern sporting rifle”); Pls. Exh. 3 (Helsley Rpt.) at 11 (does not state
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1 that rifles that qualify as assault
2 weapons under the AWCA are
3 typically chosen by law-abiding
4 citizens for hunting but rather states
5 that an owner of an AR-platform rifle
6 *can* configure the weapon “as a 7lb
7 rifle for hunting in steep difficult
8 terrain”); *id.* at 12 (noting merely that
9 “AR-platform rifles serve a variety of
10 functions,” including hunting).)

11 Evidence shows traditional (non-
12 assault) rifles are typically chosen for
13 hunting. (Pls. Exh. 21 (2017 NSSF
14 Report) at 10 (noting that 22.9% of
15 AR-style rifles were sold in 2016 for
16 hunting purposes, compared to 68.3%
17 of “[t]raditional rifles” for hunting
18 purposes); *id.*, Ex. 22 (2016 NSSF
19 Report) at ix (“Handguns and
20 traditional rifles top the list” of
21 firearms used in target or sport
22 shooting and hunting); *id.*, Ex. 30
23 (Brenton USA post) (discussing
24 reasons to hunt with AR-15 rifle, not
25 that rifles that qualify as assault
26 weapons under the AWCA are
27 typically chosen by law-abiding
28 citizens for hunting); Pls. Exh. 31
(Guns.com post) at 1 (“AR-15s . . .
have long been a symbol of the
tactical world, but black rifles are
slowly creeping their way past
military and law enforcement
applications and into the world of
hunting.” (emphasis added)); *id.* at 3
(quoting Army veteran, “Because of
[the AR-15’s] military inception, it
has been seen as an under powered,
military application rifle only. Not
until recently, with the popularity of

1		the newer [ammunition] rounds have
2		people started to consider it as a
3		viable option for hunting
4		applications.”); <i>see also</i> Def. Exh. 21
5		(1998 ATF Rpt. on Sporting
6		Suitability of Modified Semiautomatic
7		Assault Rifles) at 1019 (“[W]hile
8		these rifles are used for hunting
9		medium and larger game, as well as
10		for shooting varmints, the evidence
11		was not persuasive that there was
12		widespread use for hunting. We did
13		not find any evidence that the ability
14		to a large capacity military magazine
15		serves any hunting purpose.
16		Traditional hunting rifles have much
17		smaller magazine capabilities.
18		Furthermore, the mere fact that the
19		LCMM rifles are used for hunting
20		does not mean that they are
21		particularly suitable for hunting or
22		meet the test for importation [based on
23		sporting suitability].”); Def. Exh. 22
24		(1989 ATF Rpt. on Importability of
25		Certain Semiautomatic Rifles) at 1054
26		(concluding that “the semiautomatic
27		assault rifle is not a type of firearm
28		generally recognized as a particularly
		suitable for or readily adaptable to
		sporting purposes”).)
		Objections: Same objections to the
		English Report noted in response to
		Item No. 29 <i>supra</i> .
32	Americans typically choose rifles prohibited by the AWCA for competition. (Brady Decl., Ex. 2 [Expert Report of W. English] at 4; Ex. 3 [Expert	Disputed. Evidence cited by Plaintiffs does not support proposed statement of fact. (Pls. Exh. 2 (English Rpt.) at 4 (noting that “competitive shooting sports” was one of several “[a]dditional reasons” cited by survey

	<p>Report of S. Helsley] at 11-12; Ex. 22.)</p>	<p>participants for owning a “modern sporting rifle”); Pls. Exh. 3 (Helsley Rpt.) at 11 (does not state that rifles that qualify as assault weapons under the AWCA are typically chosen by law-abiding citizens for competition and, rather, speculates that an owner of an AR-platform rifle can configure the weapon “as a 12lb single-shot rifle for 1000-yard target competition”); Pls. Exh. 22 (2016 NSSF Report) (does not distinguish competitive target shooting from recreational target or sport shooting activities); <i>id.</i> at ix (“Handguns and traditional rifles top the list” of firearms used in target or sport shooting and hunting).)</p> <p>Objections: Same objections to the English Report noted in response to Item No. 29 <i>supra</i>.</p>
33	<p>Americans typically choose rifles prohibited by the AWCA for target shooting.</p> <p>(Brady Decl., Ex. 2 [Expert Report of W. English] at 4; Ex. 3 [Expert Report of S. Helsley] at 11-12; Ex. 22.)</p>	<p>Disputed. Evidence cited by Plaintiffs does not support proposed statement of fact. (Pls. Exh. 2 (English Rpt.) at 4 (noting that “competitive shooting sports” was one of several “[a]dditional reasons” cited by survey participants for owning a “modern sporting rifle”); Pls. Exh. 3 (Helsley Rpt.) at 11 (does not state that rifles that qualify as assault weapons under the AWCA are typically chosen by law-abiding citizens for target shooting and, rather, speculates that an owner of an AR-platform rifle can configure the weapon “as a 12lb single-shot rifle for 1000-yard target competition”); Pls. Exh. 22 (2016 NSSF Report) at ix (“Handguns and traditional rifles top the list” of</p>

		<p>firearms used in target or sport shooting and hunting); <i>id.</i> at iii (noting a 14% drop in the number of participants who used a “modern sporting rifle” for target shooting from 2014 to 2016).)</p> <p>Objections: Same objections to the English Report noted in response to Item No. 29 <i>supra</i>.</p>
34	<p>The American public has had access to and has commonly owned semi-automatic, centerfire rifles with detachable magazines for more than a century.</p> <p>(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 3-6; <i>see also</i> John Henwood, <i>The 8 and the 81: A History of Remington’s Pioneer Autoloading Rifles</i> 4-5 (1993); John Henwood, <i>The Forgotten Winchesters: A History of the Models 1905, 1907, and 1910 Self-Loading Rifles</i> 2-6, 22-23, 115-24 (1995).)</p>	<p>Disputed. Evidence cited by Plaintiffs does not support proposed statement of fact. (Pls. Exh. 3 (Helsley Rpt.) at 5 (discussing the availability of M1 carbines in the “early 1960s, [when] they became widely available both on the surplus market and through the [Director of Civilian Marksmanship]”); <i>id.</i> at 6 (discussing “second wave of surplus rifle imports” in the late 1980s, which included a “new important player”: the SKS, a “semiautomatic rifle with a <i>fixed ten round magazine</i>” (emphasis added)).)</p> <p>Proposed statement is contradicted by Plaintiffs’ expert. (Def. Exh. 16 at 825:20-826:12 (testifying that AR platform rifles became commonly possessed by civilians around the early 1980s); <i>id.</i> at 827:3-13 (testifying that semiautomatic rifles with centerfire firing mechanisms became commonly possessed by civilians around 1960).)</p>
35	<p>The AR-15 has been available to the American public since at least 1959.</p>	<p>Undisputed.</p>

1		(Brady Decl., Ex. 2 [Expert Report of W. English] at 3; Ex. 3 [Expert Report of S. Helsley] at 6.)	
2	36	The popularity of AR-15 type rifles has increased since its inception.	Undisputed.
3		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 11-12.)	
4		Pistol Grips	
5	37	Rifles commonly come standard with a pistol grip.	Undisputed.
6		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 7; [Expert Report of W. English] at 3.)	
7	38	Pistol grips for rifles are commonly available aftermarket.	Undisputed.
8		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 11; Ex. 44.)	
9	39	Pistol grips do not affect a rifle's rate of fire.	Disputed. Proposed statement is contradicted by Plaintiffs' expert.
10		(Brady Decl.; Ex. 3 [Expert Report of S. Helsley] at 7-9.)	(Def. Exh. 16 (Helsley Dep. Tr.) at 835:20-836:4 ("Q. Is it possible that for somebody with less experience than you, that the features may have something to do with the rifles rate of fire, particularly the rifle's effective [as opposed to cyclic] rate of fire? A. Is it possible? Everything's possible."); <i>id.</i> at 843:13-844:15 (testifying that, in general, a protruding pistol grip could be more effective in stabilizing a weapon during rapid fire than other types of pistol grips); <i>id.</i> at 848:8-12 (Q. "[I]f there's a monster man grip, could that affect detrimentally the effective rate of fire for that firearm? A. I would say yes."); Pls. Exh. 3 (Helsley Rpt.)

1		at 8 (“An AR type rifle can still be
2		fired without a pistol grip installed,
3		but would leave the user’s hand in a
4		non-optimal and less safe position to
5		operate the rifle. For example, the
6		‘MonsterMan’ style grip . . . is not
7		prohibited by California law.”); <i>see</i>
8		<i>also</i> Def. Exh. 2 (Graham Rpt.) at 126
9		(“Pistol grip that protrudes beneath
10		the action of the weapon, thumbhole
11		stock, and forward pistol grip may
12		provide the shooter increased physical
13		control of the rifle. These features
14		also provide increased ergonomics,
15		which can enhance more accurate
16		rapid shooting.”).)
17	40	<i>[SUF 40 intentionally left blank.]</i>
18	41	Pistol grips do not affect a rifle’s
19		capacity to accept ammunition.
20		(Brady Decl., Ex. 3 [Expert Report
21		of S. Helsley] at 7-9.)
22	42	Pistol grips do not affect the power
23		of the projectile a rifle discharge
24		[sic].
25		(Brady Decl., Ex. 1 [Expert Report
26		of J. B. Boone] at 5-7; Ex. 3 [Expert
27		Report of S. Helsley] at 7-9.)
28	43	Pistol grips are not dangerous per se.
		(Brady Decl., Ex. 3 [Expert Report
		of S. Helsley] at 6-9.)
		Disputed. Proposed statement is
		contradicted by Plaintiffs’ expert.
		(Def. Exh. 16 (Helsley Dep. Tr.) at
		835:20-836:4 (“Q. Is it possible that
		for somebody with less experience
		than you, that the features may have
		something to do with the rifles rate of
		fire, particularly the rifle’s effective
		[as opposed to cyclic] rate of fire? A.
		Is it possible? Everything’s

1		possible.”); <i>id.</i> at 843:13-844:15
2		(testifying that, in general, a
3		protruding pistol grip could be more
4		effective in stabilizing a weapon
5		during rapid fire than other types of
6		pistol grips); <i>id.</i> at 848:8-12 (Q. “[I]f
7		there’s a monster man grip, could that
8		affect detrimentally the effective rate
9		of fire for that firearm? A. I would
10		say yes.”); Pls. Exh. 3 (Helsley Rpt.)
11		at 8 (“An AR type rifle can still be
12		fired without a pistol grip installed,
13		but would leave the user’s hand in a
14		non-optimal and less safe position to
15		operate the rifle. For example, the
16		‘MonsterMan’ style grip . . . is not
17		prohibited by California law.”); <i>see</i>
18		<i>also</i> Def. Exh. 2 (Graham Rpt.) at 126
19		(“Pistol grip that protrudes beneath
20		the action of the weapon, thumbhole
21		stock, and forward pistol grip may
22		provide the shooter increased physical
23		control of the rifle. These features
24		also provide increased ergonomics,
25		which can enhance more accurate
26		rapid shooting.”).)
27	44	The purpose of a pistol grip is to
28		position the “trigger finger” for
		optimum trigger control and help
		absorb recoil.
		(Brady Decl., Ex. 3 [Expert Report
		of S. Helsley] at 7.)
	45	Pistol grips allow a rifle to be used
		with one hand.
		(Brady Decl., Ex. 1 [Expert Report
		of J. B. Boone] at 12.)
		Disputed. Plaintiffs’ evidence shows
		most rifles may be used with one
		hand. (Pls. Exh. 28 (American
		Rifleman Article) at 6 (“Most general-
		purpose rifles will work perfectly
		when fired with only one hand.”).)

1		
2	46	Pistol grips can accommodate a disabled person.
3		
4		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9.)
5		
6		Disputed. Plaintiffs' evidence shows most rifles may be used with one hand. (Pls. Exh. 28 (American Rifleman Article) at 6 ("Most general-purpose rifles will work perfectly when fired with only one hand.").)
7		Objection: Speculative testimony of an expert witness. (Fed. R. Evid. 702.)
8		
9		Adjustable Stocks
10	47	Rifles commonly come standard with an adjustable stock.
11		
12		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; [Expert Report of W. English] at 3 ³ .)
13		
14		Disputed. Proposed statement is contradicted by Plaintiffs' expert. (Pls. Exh. 3 (Helsley Rpt.) at 9 ("Most mass-produced rifles and shotguns are equipped with a stock that will fit the 'average' user—whoever that is. Some firearms come with factory stocks that are designed to allow the user to adjust the [length of pull]."); <i>id.</i> , Pls. Exh. 2 (English Rpt.) at 3 (stating that "Modern Sporting Rifles" "virtually always are equipped with a vertical pistol grip and often have a flash suppressor and/or an adjustable stock").)
15		
16		Objection: Plaintiffs' expert witness, English, is not qualified to testify on assault rifle features. (Fed. R. Evid. 702.)
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23	48	Adjustable stocks for rifles are commonly available aftermarket.
24		
25		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9; Ex. 45.)
26		
27		Disputed. Proposed statement is not supported by cited evidence. (Pls. Exh. 3 (Helsley Rpt.) at 9 (does not state that adjustable rifle stocks are commonly available aftermarket); Pls. Exh. 45 (Brownells.com) at 1

³ The English Report is Plaintiffs' Exhibit 2.

		(indicating that 44 items are available for sale that qualify as adjustable rifle stocks).)
49	<p>A “telescoping stock” allows the user of the rifle to adjust the length of a rifle a couple of inches as conditions dictate and has no material effect on the concealability of the rifle.</p> <p>(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; Ex. 7 [Depo. Tr. B. Graham] at 81:2-19.)</p>	Disputed. Evidence shows a telescoping stock enhances the concealability of a rifle. (Def. Exh. 3 (Mersereau Rpt.) at 138, ¶ 10; Def. Exh. 2 (Graham Rpt.) at 124, ¶ 21; Def. Exh. 22 (ATF Rpt.) at 1048.)
50	<p>The purpose of a telescoping stock is to allow the user of a rifle to make it a comfortable length for that user’s body type or as conditions dictate.</p> <p>(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; [Depo. Tr. B. Graham] at 94:1-4; 95:19-21.)</p>	Disputed. Evidence shows a telescoping stock enhances the concealability of a rifle. (Def. Exh. 3 (Mersereau Rpt.) at 138, ¶ 10; Def. Exh. 2 (Graham Rpt.) at 124, ¶ 21; Def. Exh. 22 (ATF Rpt.) at 1048.)
51	<p>People of different body sizes may need different length stocks to properly hold a rifle.</p> <p>(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9; Ex. 6 [Depo. Tr. M. Mersereau] at 37:2-11; [Depo. Tr. B. Graham] at 95:19-21.)</p>	Undisputed.
52	<p>What clothing a person is wearing may affect what length stock that person needs to properly hold a rifle.</p> <p>(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9; [Depo. Tr. B. Graham] at 94:1-4.)</p>	Undisputed.
	Flash Suppressors	
53	Rifles commonly come standard with a flash suppressor.	Disputed. Proposed statement is not supported by cited evidence. (Pls.

1		Exh. 3 (Helsley Rpt.) at 10-11 (does not state that rifles commonly come standard with a flash suppressor); <i>id.</i> , Pls. Exh. 2 (English Rpt.) at 3 (stating that “Modern Sporting Rifles” “virtually always are equipped with a vertical pistol grip and often have a flash suppressor and/or an adjustable stock”).)
2	(Brady Decl., Ex. 2 [Expert Report of W. English] at 3; Ex. 3 [Expert Report of S. Helsley] at 10-11.)	
3		
4		
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6		
7	54 Flash suppressors for rifles are commonly available aftermarket.	Disputed. Proposed statement is not supported by cited evidence. (Pls. Exh. 3 (Helsley Rpt.) at 11 (does not state that flash suppressors are commonly available aftermarket); Pls. Exh. 46 (Brownells.com) at 1 (indicating that 109 items are available for sale that qualify as “flash hidere”).)
8	(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 11; Ex. 46.)	
9		
10		
11		
12		
13	55 Flash suppressors do not hide the flash from those in the direct line of fire, but rather from the shooter.	Disputed. Evidence shows flash suppressors help conceal the shooter. (Pls. Exh. 25 at 8 (indicating that the flash suppressor “[r]educes the flash from the barrel of the weapon, allowing the shooter to remain concealed when shooting at night”); <i>id.</i> , Ex. 7 (Graham Dep. Tr.) at 104:9-19 (testifying that a flash suppressor “may” make the muzzle flash less visible to “people being shot at” “[d]epending on your angle to the shooter”); <i>see also</i> Def. Exh. 16 at 863:7-15 (“Q. “So a flash suppressor could help a shooter remain concealed from the periphery in low light conditions when operating a firearm with a flash suppressor? A. Yes.”); ⁴ <i>id.</i> , Exh. 22 at 1049 (flash suppressor “disperses the muzzle flash when the
14	(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; Ex. 5 [Expert Report of B. Graham] at 22, 28; Ex. 6 [Depo. Tr. M. Mersereau] at 56:14-18; Ex. 7 [Depo. Tr. B. Graham] at 103:15-20.)	
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⁴ Defendant’s Statement of Uncontroverted Facts incorrectly cited page 836 instead of page 863 of Exhibit 16. *See* Dkt. No. 75 at 5 (Item No. 24).

1		firearm is fired to help conceal the shooter's position, especially at night").)
2		
3	56	Flash suppressors only have an effect in low-light conditions.
4		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; Ex. 6 [Depo. Tr. M. Mersereau] at 56:3-6; [Depo. Tr. B. Graham] at 103:21-24.)
5		Disputed. Evidence shows flash suppressors have an effect beyond low-light conditions. (Pls. Exh. 7 (Graham Dep. Tr.) at 103:21-24 ("Q. So is . . . the effect of a flash suppressor only relevant in low light conditions? A. I would say it's most relevant . . ."); Def. Exh. 22 at 1049 (flash suppressor "disperses the muzzle flash when the firearm is fired to help conceal the shooter's position, <i>especially at night</i> " (emphasis added)).)
6		
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11		
12		Features Generally
13	57	None of the features is inherently dangerous.
14		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 6; Ex. 7 [Depo. Tr. B. Graham] at 108:2-16.)
15		Undisputed.
16		
17	58	None of the features becomes inherently dangerous when used in conjunction with any of the other features.
18		(Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 6; Ex. 7 [Depo. Tr. B. Graham] at 108:2-16.)
19		Undisputed.
20		
21	59	The features increase accuracy of the rifle.
22		(Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 8-12; Ex. 3 [Expert Report of S. Helsley] at 6-11, 12; Ex. 4 [Expert Report of M. Mersereau] at 8-11; Ex. 5 [Expert Report of B. Graham] at 19, 22, 26,
23		Undisputed.
24		
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27		
28		

1		28; [Depo. Tr. B. Graham] at 119-123; 124:1-6.)	
2	60	The features increase user control of the rifle. Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 8-12; Ex. 3 [Expert Report of S. Helsley] at 6-11, 12; Ex. 4 [Expert Report of M. Mersereau] at 8-11; Ex. 5 [Expert Report of B. Graham] at 19, 22, 26, 28; Ex. 6 [Depo. Tr. M. Mersereau] at 36:7-37:11; Ex. 7 [Depo. Tr. B. Graham] at 107:6-14, 108:2-16; [Depo. Tr. B. Graham] at 119-123; 124:1-6.)	Undisputed.
3	61	The State's designated expert witness, Blake Graham, opined that the features increase accuracy and the user's control of the rifle. (Brady Decl., Ex. 3 [Expert Report of B. Graham] at 19, 22, 26, 28; Ex. 7 [Depo. Tr. B. Graham] at 107:6-14, 108:2-16; [Depo. Tr. B. Graham] at 119-123; 124:1-6.)	Undisputed.
4	62	The State's designated expert witness, Michael Mersereau, opined that features increase accuracy and the user's control of the rifle. (Brady Decl., Ex. 4 [Expert Report of M. Mersereau] at 8-11; Ex. 6 [Depo. Tr. M. Mersereau] at 36:7-37:11.)	Undisputed.
5		"Assault Weapon" Laws	
6	63	California's Assault Weapon Control Act was adopted in 1989	Undisputed.

1		and was the first “assault weapon” law in the country.	
2		(Assemb. B. 357, 1989-1990 Reg. Sess. (Cal. 1989); Brady Decl., Ex. 48.)	
3	64	The federal “assault weapon” law took effect in 1994.	Undisputed.
4		(Req. Jud. Ntc., ¶ 8, Ex. 8.)	
5	65	Congress allowed the federal “assault weapon” law to expire in 2004.	Undisputed.
6		(Req. Jud. Ntc., ¶ 8, Ex. 8.)	
7	66	Federal law does not currently restrict “assault weapons.”	Disputed. Federal law imposes generally applicable firearms restrictions that would apply to “assault weapons.” (<i>See, e.g.</i> , 18 U.S.C. § 922.)
8		(Req. Jud. Ntc., ¶ 8, Ex. 8.)	
9	67	Currently, other than California, there are six states in the country with an “assault weapon” law, plus the District of Columbia.	Undisputed.
10		(Req. Jud. Ntc., Exs. 1-7.)	
11	68	Every “assault weapon” law in the country other than California’s was originally adopted in the 1990s or later.	Undisputed.
12		(Req. Jud. Ntc., Exs. 1-7 (Conn. Gen. Stat. §§53-202a – 53-202k (first enacted in 1993); D.C. Code Ann. §§7-2501.01(3A), 7-2502.02 (a)(6) (enacted in 2008); Haw. Rev. Stat. Ann. §§ 134-1, 134-8 (first enacted in 1992); Md. Code Ann., Crim. Law §§ 4-301, 4-303 (first enacted in 2002); N.J. Stat. Ann. §§	

1	2C:39-1w, 2C:39-3 (first enacted in	
2	1999); N.Y. Penal Law §§	
3	265.00(22), 265.02(7) (first enacted	
4	in 1998)).)	
5	69 The United States government,	Undisputed.
6	through the Director of Civilian	
7	Marksmanship, used to operate a	
8	program that would sell	
9	semiautomatic, centerfire rifles with	
10	detachable magazines directly to the	
11	public, including some rifles that	
12	would be considered “assault	
13	weapons” under the AWCA.	
14	(Brady Decl., Ex. 3 [Expert Report	
15	of S. Helsley] at 5; Exs. 16, 42, 43.)	

Dated: May 2, 2019

Respectfully submitted,

XAVIER BECERRA
 Attorney General of California
 MARK R. BECKINGTON
 Supervising Deputy Attorney General
 JOHN D. ECHEVERRIA
 Deputy Attorney General

 /s/ Peter H. Chang

 PETER H. CHANG
 Deputy Attorney General
Attorneys for Defendant Xavier Becerra

C. D. Michel – SBN 144258
cmichel@michellawyers.com
Sean A. Brady – SBN 262007
sbrady@michellawyers.com
Matthew D. Cubeiro – SBN 291519
mcubeiro@michellawyers.com
MICHEL & ASSOCIATES, P.C.
180 East Ocean Boulevard, Suite 200
Long Beach, CA 90802
Telephone: 562-216-4444
Facsimile: 562-216-4445

Attorneys for Plaintiffs

**UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION**

STEVEN RUPP, et al.,

Plaintiffs,

v.

XAVIER BECERRA, in his official
capacity as Attorney General of the
State of California,

Defendant.

Case No.: 8:17-cv-00746-JLS-JDE

**PLAINTIFFS' STATEMENT OF
UNCONTROVERTED FACTS AND
CONCLUSIONS OF LAW IN
SUPPORT OF MOTION FOR
SUMMARY JUDGMENT**

Hearing Date: May 31, 2019
Hearing Time: 10:30 a.m.
Courtroom: 10A
Judge: Josephine L. Staton

[Filed concurrently with Notice of Motion
for Summary Judgment, Memorandum of
Points and Authorities, Request for Judicial
Notice, Declarations of Sean A. Brady,
Steven Rupp, Steven Dember, Cheryl
Johnson, Christopher Seifert, Alfonso
Valencia, Troy Willis, Michael Jones,
Dennis Martin, and Richard Travis]

Plaintiffs Steven Rupp, Steven Dember, Cheryl Johnson, Michael Jones, Christopher Seifert, Alfonso Valencia, Troy Willis, Dennis Martin, and the California Rifle & Pistol Association, Incorporated, (“Plaintiffs”) respectfully submit the following Statement of Uncontroverted Facts and Conclusions of Law pursuant to Local Rule 56-1.

I. STATEMENT OF UNCONTROVERTED FACTS

No.	Uncontroverted Facts	Supporting Evidence
1	All individual plaintiffs are residents of the State of California.	Willis Decl. ¶ 1; Dember Decl. ¶ 1; Martin Decl. ¶ 1; Rupp Decl. ¶ 1; Valencia Decl. ¶ 1; Johnson Decl. ¶ 1; Seifert Decl. ¶ 1; Jones Decl. ¶ 1.
2	All individual plaintiffs are law-abiding and are not prohibited from owning firearms under the laws of the United States or the State of California.	Willis Decl. ¶ 2; Dember Decl. ¶ 2; Martin Decl. ¶ 2; Rupp Decl. ¶ 2; Valencia Decl. ¶ 2; Johnson Decl. ¶ 2; Seifert Decl. ¶ 2; Jones Decl. ¶ 2.
3	All individual plaintiffs have never been found by any law enforcement agency, any court, or any other government agency to be irresponsible, unsafe, or negligent with firearms in any manner.	Willis Decl. ¶ 2; Dember Decl. ¶ 2; Martin Decl. ¶ 2; Rupp Decl. ¶ 2; Valencia Decl. ¶ 2; Johnson Decl. ¶ 2; Seifert Decl. ¶ 2; Jones Decl. ¶ 2.
4	Plaintiff Troy Willis is a retired reserve officer for the Indio Police Department.	Willis Decl. ¶ 2.
5	Plaintiffs Willis and Christopher Seifert each lawfully own a semiautomatic, centerfire rifle with a detachable magazine equipped with one or more prohibited features under the AWCA.	Willis Decl. ¶ 3; Seifert Decl. ¶ 3.

No.	Uncontroverted Facts	Supporting Evidence
6	Plaintiff Dennis Martin lawfully owns a semiautomatic, centerfire rifle with a non-fixed magazine that he registered with the California Department of Justice as an “assault weapon.”	Martin Decl. ¶ 3.
7	Plaintiff Martin is prohibited under the AWCA and its related regulations from replacing his firearm’s “bullet button” with a standard magazine release, and but for these restrictions would immediately do so.	Martin Decl. ¶ 4.
8	Plaintiffs Willis, Martin, and Seifert are each prohibited under the AWCA from engaging in certain activities with their registered “assault weapons” that are otherwise lawful with any other firearm not classified as an “assault weapon,” and but for these restrictions Plaintiffs Willis, Martin, . . . , and . . . would engage in such activities.	Willis Decl. ¶ 5; Martin Decl. ¶ 5; Seifert Decl. ¶ 4.
9	Plaintiff Steven Rupp and Michael Jones each own a semiautomatic, centerfire rifle with a non-fixed magazine that they were forced to modify to ensure it was no longer considered an “assault weapon” and therefore lawful to possess in the State of California.	Rupp Decl. ¶ 3; Jones Decl. ¶ 3.
10	Plaintiffs Rupp and Seifert each lawfully own a frame or “lower receiver” of a firearm that they	Seifert Decl. ¶ 5; Rupp Decl. ¶ 4.

No.	Uncontroverted Facts	Supporting Evidence
	wish to assemble into fully functioning semiautomatic, centerfire rifles with a detachable magazine and either a pistol grip, flash suppressor, or adjustable stock, or in a configuration that has an overall length of less than 30 inches but more than 26 inches.	
11	Plaintiffs Rupp and Seifert are concerned that if multiple intruders attack them while at home, they will be required to immediately reassemble their firearm into such a configuration to effectively protect themselves and others in their home.	Rupp Decl. ¶ 6; Seifert Decl. ¶ 7.
12	Plaintiffs Rupp and Seifert believe that not being able to immediately assemble their frames or “lower receivers” into such a configuration will impact their ability to effectively defend themselves and others in their home.	Rupp Decl. ¶ 7; Seifert Decl. ¶ 8.
13	Plaintiffs Alfonso Valencia, Steven Dember, and Cheryl Johnson each would like to acquire a semiautomatic, centerfire rifle with a detachable magazine having one or more of the features that is prohibited by the AWCA to keep in their home for self-defense and other lawful purposes, including hunting, training, and recreation.	Valencia Decl. ¶ 3; Johnson Decl. ¶ 3; Dember Decl. ¶ 3.

No.	Uncontroverted Facts	Supporting Evidence
14	All individual Plaintiffs will be continuously and irreparably harmed by the ongoing deprivation of their individual, fundamental right to possess and use commonly possessed firearms for lawful purposes, including in-home self-defense, without risking criminal prosecution.	Willis Decl. ¶ 6; Martin Decl. ¶ 6; Rupp Decl. ¶ 8; Seifert Decl. ¶ 9; Jones Decl. ¶ 5.
15	All individual Plaintiffs would like to acquire new semiautomatic, centerfire rifles with a detachable magazine, having one or more of the features that is prohibited by the AWCA, and were it not for the AWCA and fear of prosecution for violating it, would do so.	Willis Decl. ¶ 7; Dember Decl. ¶¶ 3-4; Martin Decl. ¶ 7; Rupp Decl. ¶ 9; Valencia Decl. ¶¶ 3-4; Johnson Decl. ¶¶ 3-4; Seifert Decl. ¶ 10; Jones Decl. ¶ 6.
16	All individual Plaintiffs who lawfully own “assault weapons” or firearms they were forced to modify in accordance with the AWCA acquired their firearm for use in their home for self-defense and other lawful purposes such as hunting, training, and recreation.	Willis Decl. ¶ 4; Rupp Decl. ¶ 5; Seifert Decl. ¶ 6; Jones Decl. ¶ 4.
17	Richard Travis is the Executive Director for Plaintiff California Rifle & Pistol Association, Incorporated (“CRPA”)	Travis Decl. ¶ 1.
18	Plaintiff CRPA is a non-profit membership and donor-supported organization classified under IRC section 501(c)(4) and incorporated under the laws of California with its headquarters in	Travis Decl. ¶ 1.

No.	Uncontroverted Facts	Supporting Evidence
	Fullerton, California.	
19	Founded in 1875, CRPA seeks to defend the Second Amendment and advance laws that protect the rights of individual citizens.	Travis Decl. ¶ 2.
20	Plaintiff CRPA Works to preserve the constitutional and statutory rights of gun ownership, including the right to self-defense, the right to hunt, and the right to keep and bear arms.	Travis Decl. ¶ 2.
21	Plaintiff CRPA is dedicated to promoting the shooting sports, providing education, training, and organized competition for adult and junior shooters.	Travis Decl. ¶ 2.
22	Plaintiff CRPA's members include law enforcement officers, prosecutors, professionals, firearms experts, and members of the public.	Travis Decl. ¶ 2.
23	Plaintiff CRPA works to preserve the constitutional rights of all law-abiding individuals, including the fundamental right to keep and bear commonly owned firearms for the core lawful purpose of self-defense.	Travis Decl. ¶ 3.
24	Plaintiff CRPA has members who own semiautomatic, centerfire rifles with non-fixed magazines that were forced to register their firearm as an "assault weapon" with the California Department of	Travis Decl. ¶ 4.

No.	Uncontroverted Facts	Supporting Evidence
	Justice before July 1, 2018.	
25	Plaintiff CRPA has members who are prohibited under the AWCA and its related regulations from replacing their firearm's "bullet button" with a standard magazine release, and but for those restrictions would do so.	Travis Decl. ¶ 4.
26	Plaintiff CRPA also has members who lawfully own semiautomatic, centerfire rifles with detachable magazines with one or more prohibited features under the AWCA, or firearms specifically identified by their make and model as "assault weapons" under the AWCA.	Travis Decl. ¶ 5.
27	Plaintiff CRPA has members who lawfully own firearms classified as "assault weapons" who are prohibited under the AWCA and related regulations from engaging in certain activities that are otherwise lawful with any other firearm not classified as an "assault weapon," and but for those restrictions would engage in such activities with their firearms.	Travis Decl. ¶ 6.
28	Plaintiff CRPA has members who, but for the AWCA and its related regulations, would acquire, transfer, and/or possess firearms classified as "assault weapons," and are continuously and irreparably harmed by the ongoing deprivation of their	Travis Decl. ¶ 7.

No.	Uncontroverted Facts	Supporting Evidence
	individual, fundamental right to possess and use commonly possessed firearms for lawful purposes, including in-home self-defense, without risking criminal prosecution.	
29	Millions of rifles that are prohibited by the AWCA are in the hands of the American people.	Brady Decl., Ex. 2 [Expert Report W. English]; Ex. 7 [Depo. Tr. B. Graham] at 21:13-21, 25:9-15, 28:3-6; Exs. 11-25; Ex. 8 [DOJ Resp. to Seifert's Reqs. for Admission, Set One] at 4; Ex. 10 [DOJ Second Suppl. Resp. to Willis Interrogs., Set One] at 8.
30	Americans typically choose rifles prohibited by the AWCA for self-defense.	Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 5; Ex. 2 [Expert Report of W. English] at 4; Ex. 3 [Expert Report of S. Helsley] at 11-12; Exs. 28-29; 35-37.
31	Americans typically choose rifles prohibited by the AWCA for hunting.	Brady Decl., Ex. 2 [Expert Report of W. English] at 4, 7; Ex. 3 [Expert Report of S. Helsley] at 11-12; Ex. 30-33.
32	Americans typically choose rifles prohibited by the AWCA for competition.	Brady Decl., Ex. 2 [Expert Report of W. English] at 4; Ex. 3 Expert Report of S. Helsley] at 6; Ex. 22.
33	Americans typically choose rifles prohibited by the AWCA for target shooting.	Brady Decl., Ex. 2 [Expert Report of W. English] at 4; Ex. 3 [Expert Report of S. Helsley] at 11-12; Ex. 22.
34	The American public has had access to and has commonly owned semi-automatic, centerfire rifles with detachable magazines for more than a century.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 3-6.

No.	Uncontroverted Facts	Supporting Evidence
35	The AR-15 has been available to the American public since at least 1959.	Brady Decl., Ex. 2 [Expert Report of W. English] at 3; Ex. 3 [Expert Report of S. Helsley] at 6.
36	The popularity of AR-15 type rifles has increased since its inception.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 11-12.
	Pistol Grips	
37	Rifles commonly come standard with a pistol grip.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 7; [Expert Report of W. English] at 3.
38	Pistol grips for rifles are commonly available aftermarket.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 11; Ex. 44.
39	Pistol grips do not affect a rifle's rate of fire.	Brady Decl.; Ex. 3 [Expert Report of S. Helsley] at 7-9.
40	<i>[SUF 40 intentionally left blank.]</i>	
41	Pistol grips do not affect a rifle's capacity to accept ammunition.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 7-9.
42	Pistol grips do not affect the power of the projectile a rifle discharge.	Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 5-7; Ex. 3 [Expert Report of S. Helsley] at 7-9.
43	Pistol grips are not dangerous per se.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 6-9.
44	The purpose of a pistol grip is to position the "trigger finger" for optimum trigger control and help absorb recoil.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 7.
45	Pistol grips allow a rifle to be used with one hand.	Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 12.
46	Pistol grips can accommodate a disabled person.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9.

No.	Uncontroverted Facts	Supporting Evidence
	Adjustable Stocks	
47	Rifles commonly come standard with an adjustable stock.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; [Expert Report of W. English] at 3.
48	Adjustable stocks for rifles are commonly available aftermarket.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9; Ex. 45.
49	A “telescoping stock” allows the user of the rifle to adjust the length of a rifle a couple of inches as conditions dictate and has no material effect on the concealability of the rifle.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; Ex. 7 [Depo. Tr. B. Graham] at 81:2-19.
50	The purpose of a telescoping stock is to allow the user of a rifle to make it a comfortable length for that user’s body type or as conditions dictate.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; [Depo. Tr. B. Graham] at 94:1-4; 95:19-21.
51	People of different body sizes may need different length stocks to properly hold a rifle.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9; Ex. 6 [Depo. Tr. M. Mersereau] at 37:2-11; [Depo. Tr. B. Graham] at 95:19-21.
52	What clothing a person is wearing may affect what length stock that person needs to properly hold a rifle.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 9; [Depo. Tr. B. Graham] at 94:1-4.
	Flash Suppressors	
53	Rifles commonly come standard with a flash suppressor.	Brady Decl., Ex. 2 [Expert Report of W. English] at 3; Ex. 3 [Expert Report of S. Helsley] at 10-11.
54	Flash suppressors for rifles are commonly available aftermarket.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 11; Ex. 46.

No.	Uncontroverted Facts	Supporting Evidence
55	Flash suppressors do not hide the flash from those in the direct line of fire, but rather from the shooter.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; Ex. 5 [Expert Report of B. Graham] at 22, 28; Ex. 6 [Depo. Tr. M. Mersereau] at 56:14-18; Ex. 7 [Depo. Tr. B. Graham] at 103:15-20.
56	Flash suppressors only have an effect in low-light conditions.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 10; Ex. 6 [Depo. Tr. M. Mersereau] at 56:3-6; [Depo. Tr. B. Graham] at 103:21-24.
	Features Generally	
57	None of the features is inherently dangerous.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 6; Ex. 7 [Depo. Tr. B. Graham] at 108:2-16.
58	None of the features becomes inherently dangerous when used in conjunction with any of the other features.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 6; Ex. 7 [Depo. Tr. B. Graham] at 108:2-16.
59	The features increase accuracy of the rifle.	Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 8-12; Ex. 3 [Expert Report of S. Helsley] at 6-11, 12; Ex. 4 [Expert Report of M. Mersereau] at 8-11; Ex. 5 [Expert Report of B. Graham] at 19, 22, 26, 28; [Depo. Tr. B. Graham] at 119-123; 124:1-6.
60	The features increase user control of the rifle.	Brady Decl., Ex. 1 [Expert Report of J. B. Boone] at 8-12; Ex. 3 [Expert Report of S. Helsley] at 6-11, 12; Ex. 4 [Expert Report of M. Mersereau] at 8-11; Ex. 5 [Expert Report of B. Graham] at 19, 22, 26, 28; Ex. 6 [Depo. Tr. M. Mersereau] at 36:7-37:11; Ex. 7 [Depo. Tr. B. Graham] at 107:6-14, 108:2-16; [Depo. Tr. B. Graham] at 119-123; 124:1-6.

No.	Uncontroverted Facts	Supporting Evidence
61	The State's designated expert witness, Blake Graham, opined that the features increase accuracy and the user's control of the rifle.	Brady Decl., Ex. 3 [Expert Report of B. Graham] at 19, 22, 26, 28; Ex. 7 [Depo. Tr. B. Graham] at 107:6-14, 108:2-16; [Depo. Tr. B. Graham] at 119-123; 124:1-6.
62	The State's designated expert witness, Michael Mersereau, opined that features increase accuracy and the user's control of the rifle.	Brady Decl., Ex. 4 [Expert Report of M. Mersereau] at 8-11; Ex. 6 [Depo. Tr. M. Mersereau] at 36:7-37:11.
	"Assault Weapon" Laws	
63	California's Assault Weapon Control Act was adopted in 1989 and was the first "assault weapon" law in the country.	Assemb. B. 357, 1989-1990 Reg. Sess. (Cal. 1989); Brady Decl., Ex. 48.
64	The federal "assault weapon" law took effect in 1994.	Req. Jud. Ntc., ¶ 8, Ex. 8.
65	Congress allowed the federal "assault weapon" law to expire in 2004.	Req. Jud. Ntc., ¶ 8, Ex. 8.
66	Federal law does not currently restrict "assault weapons."	Req. Jud. Ntc., ¶ 8, Ex. 8.
67	Currently, other than California, there are six states in the country with an "assault weapon" law, plus the District of Columbia.	Req. Jud. Ntc., Exs. 1-7.
68	Every "assault weapon" law in the country other than California's was originally adopted in the 1990s or later.	Req. Jud. Ntc., Exs. 1-7 (Conn. Gen. Stat. §§53-202a – 53-202k (first enacted in 1993); D.C. Code Ann. §§7-2501.01(3A), 7-2502.02 (a)(6) (enacted in 2008); Haw. Rev. Stat. Ann. §§ 134-1, 134-8 (first enacted in 1992); Md. Code Ann., Crim. Law §§ 4-301, 4-303 (first enacted in 2002); N.J. Stat. Ann. §§ 2C:39-1w, 2C:39-3 (first enacted in 1999); N.Y. Penal Law §§ 265.00(22),

No.	Uncontroverted Facts	Supporting Evidence
		265.02(7) (first enacted in 1998)).
69	The United States government, through the Director of Civilian Marksmanship, used to operate a program that would sell semiautomatic, centerfire rifles with detachable magazines directly to the public, including some rifles that would be considered “assault weapons” under the AWCA.	Brady Decl., Ex. 3 [Expert Report of S. Helsley] at 5; Exs. 16, 42, 43.

Dated: April 26, 2019

MICHEL & ASSOCIATES, P.C.

/s/ Sean A. Brady

Sean A. Brady

Attorneys for Plaintiffs

CERTIFICATE OF SERVICE
IN THE UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

Case Name: *Rupp, et al. v. Becerra*
Case No.: 8:17-cv-00746-JLS-JDE

IT IS HEREBY CERTIFIED THAT:

I, the undersigned, am a citizen of the United States and am at least eighteen years of age. My business address is 180 East Ocean Boulevard, Suite 200, Long Beach, California 90802.

I am not a party to the above-entitled action. I have caused service of:

**STATEMENT OF UNCONTROVERTED FACTS AND CONCLUSIONS
OF LAW IN SUPPORT OF PLAINTIFFS' MOTION
FOR SUMMARY JUDGMENT**

on the following party by electronically filing the foregoing with the Clerk of the District Court using its ECF System, which electronically notifies them.

Xavier Becerra
Attorney General of California
Peter H. Chang
Deputy Attorney General
E-mail: peter.chang@doj.ca.gov
John D. Echeverria
Deputy Attorney General
E-mail: john.echeverria@doj.ca.gov
455 Golden Gate Ave., Suite 11000
San Francisco, CA 94102

I declare under penalty of perjury that the foregoing is true and correct.

Executed April 26, 2019.

/s/Christina Castron
Christina Castron