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UNITED STATES ARMY INFANTRY BOARD
Fort Benning, Georgia

ATBC 474

13 AUG 1958

SUBJECT: Supplemental Report of Project Nr 2787, Evaluation of Small
Caliber High Velocity Rifles - Armalite (AR-15)

TO: Commanding General
United States Continental Army Command
Fort Monroe, Virginia
ATTN: ATDEV-3

1. Reference is made to:

a. Report of Project Nr 2787, US Army Inf Bd, 27 May 58,
Evaluation of Small Caliber High Velocity Rifles - Armalite (AR-15).

b. Msg, ORD 20364, OCOFORD, DA, 27 Jun 58.

c. FONECON between Col Wilson, USCONARC, and Maj Oestreich,
US Army Inf Bd, 27 Jun 58.

d. FONECON between Col Wilson, USCONARC, and Lt Col Phillips,
US Army Inf Bd, 9 Jul 58.

2. On 27 June 1958, Chief of Ordnance, DA, informed Commanding General, United States Continental Army Command, that two Armalite (AR-15) rifles were damaged while undergoing rain tests at Aberdeen Proving Ground, Maryland (ref 1b). Following this development, Headquarters, United States Continental Army Command, directed that this Board duplicate the rain test described in reference 1b (ref 1c). When informed on 9 July 1958 of the result of this test, Hq USCONARC further directed that this Board, in coordination with the United States Army Infantry School, prepare a supplemental report which would re-evaluate the Armalite (AR-15) rifle in light of the deficiency resulting from the rain test (ref 1d).

3. During the conduct of the Aberdeen Proving Ground final engineering tests, two fully loaded Armalite rifles with muzzles pointing up were exposed to heavy rain. After this exposure, the muzzles were depressed below the horizontal to allow the water to drain from the bores and were then raised and the rifle fired. Upon firing, the cartridge case ruptured, damaging the extractor, cracking the bolt carrier and bolt, and creating two large bulges in the bore approximately 3 inches from the muzzle.

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4. On 30 June 1958, this Board duplicated the rain test and obtained results similar to that experienced by Aberdeen Proving Ground (photographs are attached as incl 1). Results of the test indicated that a combination of surface tension and capillary attraction of the water within the bore prevented complete drainage, resulting in excessive overpressure when the weapon was fired.

5. Additional testing was conducted. Measured amounts of water were placed in the bore of an Armalite rifle, the muzzle depressed, the rifle allowed to drain, and the drainage measured. After several repetitions, it was determined that approximately 1cc of water was retained within the barrel which vigorous shaking would not dislodge. The test was then repeated, except that the bolt was partially opened as the rifle was drained. No water other than very small globules was retained in the barrel, an amount insufficient to cause excessive overpressure. These tests were repeated using caliber .22 rifles of different design. Results were the same as those obtained with the Armalite (AR-15) rifle.

6. Tests outlined in paragraph 5 were repeated using rifles of .253 and .30 (7.62mm) caliber. Water drained freely from these rifles even when fully loaded.

7. Based on these tests, the United States Army Infantry Board concludes that:

a. Surface tension and capillary attraction will retain sufficient quantities of water in the barrel of a fully loaded Armalite (AR-15) rifle to cause excessive overpressure when the weapon is fired.

b. The retention of the water in the barrel of an Armalite (AR-15) rifle is a major deficiency. However, because of its other favorable characteristics, the Armalite AR-15 remains a potential replacement for the M14 and M15 rifles.

✓ c. The effect of the deficiency of the Armalite (AR-15) rifle may be avoided by taking proper precautionary measures such as partially extracting the cartridge from the chamber when draining.

d. Retention of water in the barrel due to surface tension and capillary attraction is not peculiar to the Armalite (AR-15) rifle.

✓ e. Weapons of approximately .25 caliber or larger do not retain water in their barrels due to surface tension or capillary attraction when the rifles are fully loaded.

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8. This Board recommends that:

a. The development of a High Velocity Small Caliber Rifle be continued despite the results of the rain test described herein.

b. At this stage of development in the High Velocity Small Caliber program, the Armalite (AR-15) continue to be considered as a potential replacement for the M14 and M15 rifles.

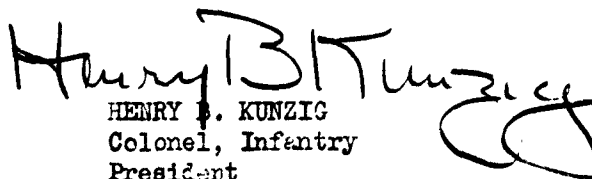
c. The deficiency resulting from the rain tests reported herein, and those previously reported in Report of Project Nr 2787, Evaluation of Small Caliber High Velocity Rifles - Armalite (AR-15), be corrected, and Armalite rifles in the quantities indicated in DF, ATBC 474, USA Inf Bd, 24 Jun 58, subject: "Estimated Requirements for Service Test of Armalite Rifle," be furnished this Board for service test.

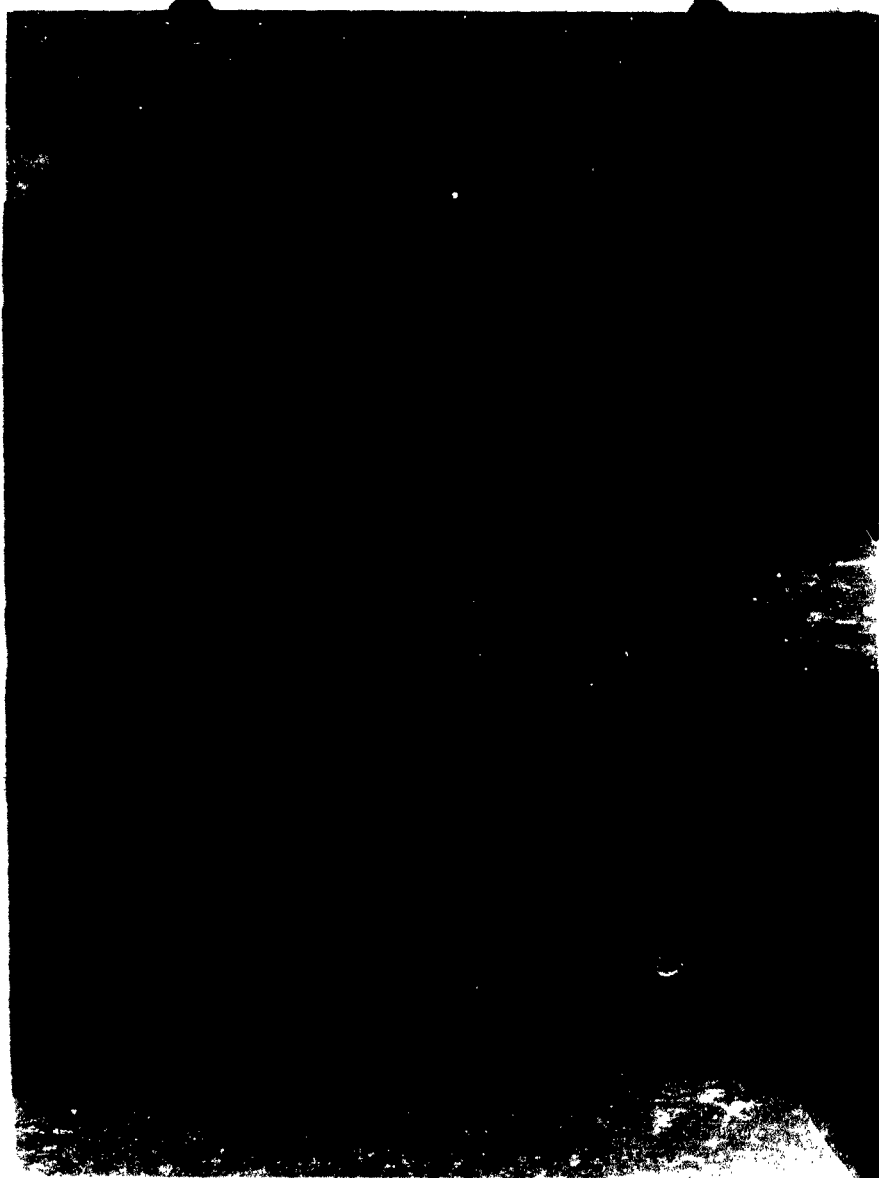
d. In the event the deficiency reported herein cannot be corrected mechanically, consideration be given to:

(1) Examining the feasibility of instituting training procedures which would obviate the hazards connected with the retention of water in the barrel, and/or

(2) Conducting an expedited investigation to determine the smallest caliber rifle which would not have such a deficiency.

4 Incl
Photographs


HENRY B. KUNZIG
Colonel, Infantry
President



UNITED STATES ARMY INFANTRY BOARD
FORT BENNING, GEORGIA

PROJECT NR
2787

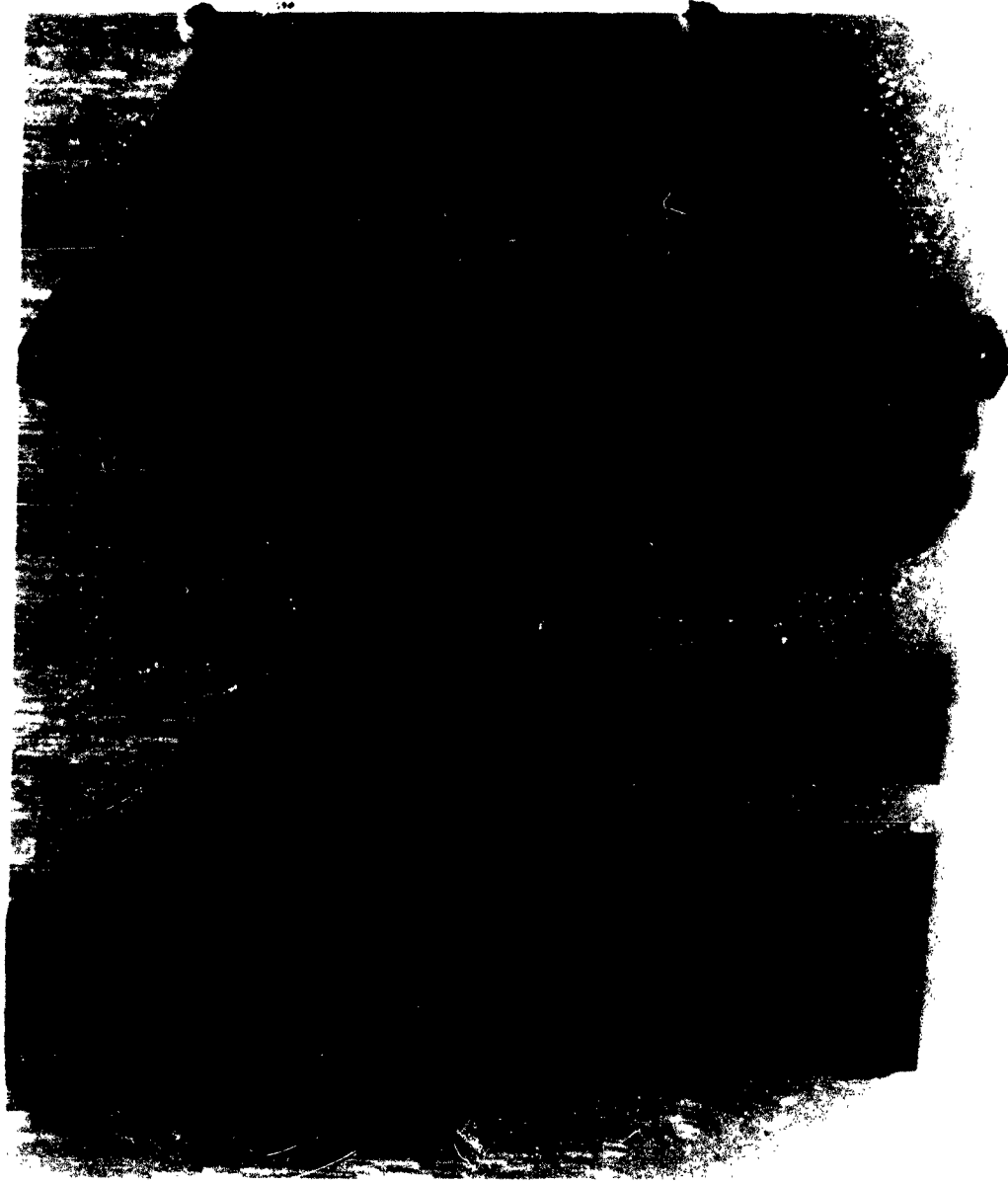
DATE
2 July 1958

NEGATIVE NR
09-166-803/AJ-58

Supplementary Report
Evaluation of High Velocity Small Caliber Rifles - Armalite (AR-15)

Top: Broken bolt carrier (bottom view).
Bottom: Broken bolt release.

Incl 1



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Top: Damaged upper receiver.

Bottom: Damaged upper receiver.

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Top: Ruptured cartridge (blown primer).

Bottom: Ruptured cartridge (side view).

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Damaged magazine assembly.

Incl 4

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END

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