

## LIMITED DISTRIBUTION

### RESEARCH DEPARTMENT

### HIGHLIGHTS REPORT

OCTOBER 1981

### DISTRIBUTION

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NOTE: Please destroy this report when it has served your needs.

FIREARMSNEW PRODUCT DEVELOPMENTXSG/XPG Shotgun Design

Three new carrier latch contingency designs are in progress to correct a feeding related malfunction. Two 3" Magnum XSG's have achieved the 10,000 round endurance goal with no major problems other than excessive set on the carrier tabs. One of the two guns has been test fired to 11,280 rounds and that test will be continued until failure of a major component occurs. Components for four XPG pump guns are scheduled for completion by mid-November.

Model 7400/7600 Center Fire Rifles

The new magazine box, plastic follower, and spring design have been assembled and tested. Results of preliminary tests using one box with two separate guns produce two magazine box related malfunctions in 390 rounds.

Production of the .243 caliber rifles is in progress and gallery reject rates have been running at a less than 5% rate. The 6mm caliber rifles are scheduled next.

New samples of the current magazine boxes fabricated to gage have been received from the vendor.

Model 4 Limited Edition

Two sample guns have been assembled with receivers etched and plated by Fountain. Art work is being revised and samples will be ready in two weeks. All model drawings for cost estimating have been turned over to Process Engineering.

Model 7400/7600 Carbines

Twelve samples with various combinations of styling have been reviewed by Marketing. New samples are being made per Marketing's request to illustrate alternative wood and metal finishes.

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Model 7 Bolt Action

The second Model 7 prototype with long action is scheduled for completion in November.

Bolt Action Carbine

Eleven field test models will be ready the week of October 19. Five models with improved metal finish will be ready the week of October 26.

An order has been placed for samples of a stamped no-bind follower. Those samples are scheduled for delivery by the end of November.

A wood master stock is scheduled for completion at DuPont-EDL by November 1.

Model 979 Seismic Gun

A letter was prepared for distribution by Marketing alerting seismic gun users to inspect for the presence of the pressure plate every time the breech block is assembled to the gun.

An alternate design has been completed which more positively holds the pressure plate in place. The balance of MAPCO's 1981 order is being revised to reflect this design modification.

CURRENT PRODUCT DEVELOPMENT

Model 870 Competition Trap Shotgun

Research is working with Process Engineering to investigate three possible short term corrective measures which may be used to implement a production start-up:

- Bolt kept at maximum height.
- Thickening the receiver wall on the ejection port side by adjusting the present process.
- Keeping the rail cuts - top of receiver dimensions toward the minimum side of the tolerances.

The long term solution being investigated is redesigned to include a long barrel extension. Prototypes of the new design will be ready for testing the week of October 26.

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Model 700 Upgrade

Five prototypes each of the upgraded ADL and BDL models will be completed by the end of October for review by Marketing. They will reflect the latest model requirements as per agreement with Marketing personnel.

Model 870 Limited Edition

Sample etched plates of the latest artwork will be available the week of October 26.

Model 870 Ducks Unlimited 1981

The 32 inch barrels for the Trade gun will be ready by the end of October for point of impact testing.

Model 552-572 BDL Rifles with Model 870 pressed Stock

This cost improvement has been accepted by the Operations Committee and drawings are being transmitted.

Model 552 Long Rifle Only

Drive screws have been ordered for attaching the deflector. Testing should be completed in November.

Gallery blown cases have been eliminated from good barrels with improved extractor-ejector cut gauging.

PROCESS DEVELOPMENT

Four-Slide Machine

A successful runoff of the four-slide machine was made, at the tooling vendor's plant, the week of October 5. Minor electrical modifications were required. Shipment of the machine to Ilion is expected during the first week of November.

ASEA Manipulator

Trial and Pilot of the ASEA was interrupted during the first week of a three week test due to robot malfunctions which were traced to an input-output board. (This is a recurrence of a problem which developed during testing in April.) The input-output

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ASEA Manipulator - Cont'd

board was by-passed and Trial and Pilot continued until a problem developed with degradation in polishing quality, which was related to pronounced machining marks. Acceptable quality could not be achieved and the test was terminated prematurely. Though these cutter marks are worse than previously experienced in this development program, they may not be considered excessive for current manual processing. No further Trial and Pilot testing is planned with the ASEA.

Injection Molding of Metal Powders

A draft of the proposed project has been distributed for review. Circulation of the formal project will begin on October 26, with authorization expected by November 10.

A thermal extraction system has been ordered from Witec, California, on an advanced authorization approved on September 30. Design of building renovations and specification of the solvent extraction equipment are progressing.

Aluminum Impacting

Quotes have been received from the Cliff Impact Division of Parker Hannifin for supplying an impacted blank for both the XSG and M/7600 receivers. Requirements for processing the blanks into finished parts are being determined to provide input on cost estimates for a finished part.

Laser Welding

The latest EDL laser welded XSG action bar assemblies have endured 1,000 rounds without separating. Tests are continuing.

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AMMUNITION

Shotshell

New Unibody Shotshell Process

12 Gauge

The Technical Data Package has been issued to the Bridgeport Plant.

20 Gauge

An additional 35,000 20 gauge bodies were made using Bridgeport Plant made slugs (D-extruder). Slug dimensional quality was excellent and there were no jams attributable to out-of-spec slugs. Research work on 20 gauge is essentially complete. A Technical Data Package is scheduled for release in November. Production tooling is due November 30, 1981.

28 Gauge

First try tooling has been run in the body former and it is anticipated that bodies will be available for preliminary shooting tests in about four weeks.

Polymer Process and Body Cut-off Study

Members of Du Pont ETL observed the Research extruder in operation and conducted some experiments to gain firsthand information on the details of our operation. They also began laying plans for a fully instrumented extrusion run during which all operating parameters would be recorded and computer analyzed.

Improved 20 Gauge Rifled Slug

Three experimental 3/4 oz. hollow point slug samples designed with differing centers of gravity were fabricated, handloaded and tested for ballistics and accuracy. All samples met ballistics, and one design shot below the 5" @ 50' accuracy specifications, giving a 3.7" average for 5-5 shot groups. An experimental production loading run is planned with this slug.

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### Primer Basics

Elements of the primer basics program are underway as follows:

- Optimization studies of primer ballistic performance are in progress and Hercules NC (double base powder fines) is on hand for analysis.
- The mode of failure analysis for piercing of Remington 117X and Federal #209 primers is in progress.
- The anvil/cup material factorial test is in preparation.
- A Technical Data Package for duplicating mechanical components of the Federal #209 primer has been prepared.
- Anvil brass in two thicknesses (.044" and .052") purchased to the ASTM B-36 specification has been received.
- Anvil steel in the above two thicknesses, purchased to the ASTM A109-72 specification has been ordered.

### CENTER FIRE

#### Extended Range Center Fire Ammunition

An experimental loading run was conducted for 223 Rem 55 Gr. PSPBT cartridges using the new HRP 38 powder from Hercules and Sierra Spitzer boattail bullets. Two hundred yard accuracy was 1.0 inches extreme spread; exceptional for a Duplex loaded cartridge. Samples will be shipped to Technical Services and Hercules for additional testing.

#### 7mm Bench Rest Case

The first production run is in progress. Approximately 100,000 shells are ready for cutoff and head stamp.

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357 Rem Max 158 Gr. SJHP

Redesign of the cartridge to achieve a safe load with desired ballistics is complete. Overall cartridge length is 0.4 inches longer than 357 Magnum product: the case was extended 0.3 inches and the bullet cannelure was moved 0.1 inches towards the heel. Manufacture of the new cases is in progress-- ready for cutoff and head stamp.

Ruger's new revolver has been received and inspected. Test barrels will be modified to accept the new cartridge configuration.

7mm 140 Gr. PSPCL Bullet

The experimental run has been completed through loading and 7mm 08 cartridges with this bullet have been shipped to Technical Services for product acceptance testing. Mushroom and accuracy testing at Lonoke indicate this bullet is superior to the commercial bullet currently used.

RIM FIRE

"Viper" Rim Fire Cartridge

A 25,000 round experimental production run of the "Viper" rim fire cartridge has been completed and the product met all ballistics and accuracy criteria. The ammunition is now undergoing product acceptance testing. A trial and Pilot run must be completed in early November to permit product announcement at the Outdoor Writers Conference, November 17th.

JPGlas:jl

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RESEARCH PERSONNELRemington Roll

	<u>9-30-81</u>	<u>10-31-81</u>	<u>12-31-81</u>
Exempt	59	60	63
Nonexempt	22	21	22
Wage	22	23	22
	<u>      </u>	<u>      </u>	<u>      </u>
Total	103	104	107

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