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CONFIDENTIAL

REMINGTON ARMS COMPANY, INC.

NEW PRODUCTS RESEARCH

MONTHLY PROGRESS REPORT - JULY, 1985

FIREARMS RESEARCH

SHOTGUN DEVELOPMENT

M/1100 Functional Improvements (1987 Introduction)

Development testing of all improvement items except the gas system (stainless steel magazine tube, wider extractor, new firing pin retractor spring, Special Field-type magazine detent system) is complete.

The previous problem with the barrel support tearing off the stainless steel magazine tube has been corrected by brazing the barrel support in place rather than welding.

Both the wider extractor and new firing pin retractor spring exceeded program goals for endurance.

The new gas system successfully handled all field and magnum ammunition loads. The bolt velocity spread between 1 1/8 oz. "Shurshot" and 2 oz. Federal 3" magnums averaged 160 in/sec. Six guns were shot 4,000 rounds each, with no cleaning of the gas system, and no deterioration in gas system performance. Additional work is continuing on the gas system to determine what alterations would be required to successfully shoot the 1 oz. target load as well as "Shurshot" and magnum.

Design verification testing by the Research Test Lab is scheduled to start on July 29.

M/870 Functional Improvements (1987 Introduction)

A six gun development test has just been completed. Preliminary indications are that the Delrin® ejector bases held up well, and that the malfunction rate was considerably better than the control guns. A full report will be issued shortly.

Design verification testing by the Research Test Lab is scheduled to start the week of August 25, immediately following design verification of the Model 1100 Functional Improvement Program.

A preliminary drawings package has been given to PE&C to begin the manufacturing estimate.

Research Department

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July, 1985

M/870 Restyle - 12 Gauge (1986 Introduction)

Research has completed their evaluation of Production's trial and pilot sample, and authorized production to the warehouse.

M/870 and M/1100 Special Purpose Deer Gun (1986 Introduction)

Research has completed the parts list and drawings package. Transmittal can take place once economics are approved by the Business Team.

Parker Shotgun

Kolar Arms has been selected as the vendor to engineer, design and prototype the 3200 Fire Control in a Parker. Selection was based on ability and low bid (\$35,000 vs. \$70,000 next bid). Work is scheduled to be complete by 1986.

New Concept Shotgun

Short term goals for PDS are to design and build a small quantity of fire controls with a balanced sear and interposer mechanism. These will be installed in M/1100 Shotguns for drop, environmental and endurance testing.

Direct firing systems will be considered longer range projects. These have all now been demonstrated to be capable of firing standard percussion primers. A unique locking system will have to be developed in order to utilize these concepts.

Six hydraulic dampers with various dumping characteristics have been received from Gas Spring Company for mounting inside a M/1100 stock to control terminal bolt velocities. A design for attaching the damper to the receiver is being worked on.

Polymer Products is developing tooling concepts for injection molding M/870 stocks and fore-ends from Rynite ®. The stock will also include a synthetic foamed core which will add stiffness and will be recessed to hold two choke tubes.

RIFLE DEVELOPMENT

New Bolt Action Rifle (1988 Introduction)

Prototype components for ten guns are progressing through the Model Shop and outside vendors. The two critical path items are the receiver and magazine box. The stamping vendor has estimated a delivery date for magazine boxes of early October.

Research Department

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July, 1985

Sportsman 78-.223 Caliber (1986 Introduction)

A test has been requested to determine the effect of firing 5.56mm ammunition in this rifle. The results of this test will determine what rollmarks to include on the barrel.

AMMUNITION RESEARCH

SHOTSHELL DEVELOPMENT"Premier", Steel, and Buck (Sourced Product)

Six of the nine loads have been approved for shipment:

<u>Product</u>	<u>Approved</u>
12 Ga. -3" - 1 7/8 "Premier"	
12 Ga. -3" - 1 5/8 "Premier"	
12 Ga. -2 3/4" - 1 1/2 "Premier"	Yes
20 Ga. -3" - 1 1/4 "Premier"	
20 Ga. -2 3/4" - 1 1/8 "Premier"	Yes
12 Ga. -3" - 1 1/4 Steel	Yes
12 Ga. -2 3/4" - 1 1/8 Steel	Yes
12 Ga. -3" Buck	Yes
12 Ga. -2 3/4" Buck	Yes

Ballistic variations noted on the 12 Ga. "Premier" loads are believed to be attributed to thin SP body walls, primer pellet weight variations, and small diameter obturating skirts on our wads. New bodies and primers are being assembled. Tooling for new wads is being built. In addition, Hercules has offered three new 30% NG powders which appear to offer more stability at the temperature extremes in both 12 and 20 Ga. loads. Samples have been sent to Lonoke for evaluation.

Remington Target Load

A purchase requisition has been issued for a 24 cavity mold for the "Figure 8" wad. Delivery is expected in November.

Research Department

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July, 1995

Steel (New Products)

Handloads were successfully demonstrated for 88 shot using existing components. Choke strain tests are in progress. MDV plans to demonstrate at the end of their present steel run. Requests for quote have been issued for 20 Ga. 3" molds and tooling.

Rifled Slugs

Two new products were transmitted to production. The 12 Ga. 2 3/4" - 1 1/4 oz. load is an addition to the existing 12 Ga. 2 3/4" 1 oz. load. The 20 Ga. 2 3/4" - 3/4 oz. load will replace the existing 5/8 oz. load and match the competitive product.

CENTERFIRE DEVELOPMENT

"Premier"

Cost and timing estimates for introduction of eleven new bullets indicate full commercialization could be achieved in three years at a total cost of \$2.2mm. The total program is being reviewed by the Business Team.

High Velocity Limited Range Rifle/Ammunition

An 8" twist barrel is in the Custom Shop for instrumentation. Future work will include testing of a new powder in each of the 8", 9", and 10" twist barrels.

Lightweight 62 gr. 30 caliber bullets loaded in 300 WIN MAG achieved a muzzle velocity of 4200 FPS vs. goal of 5000 FPS. 100 yard accuracy was 3.5" but keyholing occurred at 200 yards indicating instability. 52 gr. bullets were not as accurate but keyholing was not apparent. Additional testing is planned with other barrel twist to determine the relationship between bullet weight, velocity and barrel twist.

Engineering Plastics for Cases

A purchase requisition has been issued to fabricate 38 SPL cases from Rynite® SST.

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Research Department

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July, 1985

RESEARCH PERSONNEL AS OF JULY 31, 1985FIREARMS

<u>Exempt</u> <u>24</u>	<u>Non/Exempt</u> <u>11</u>	<u>Wage Roll</u> <u>19</u>
Bauman, Thomas	Frost, Helen B.	Saggetta, Joseph A.
Bower, James W.	Jones, Raymond A.	Seader, Robert W.
Calkins, Kevin L.	Pickett, Wm., F.	Bedworth, Gary R.
Coleman, Wm., H., II	Saunders, Susan P.	Butler, Richard G.
Curry, Wm., M.	Schuster, Joyce M.	Dickison, Wm.
Douglas, Terry C.	Smithson, Ronald L.	Eastwood, Ralph
Ericson, Wm., L.	Stephens, Charles J.	Eckler, John
Findlay, David S.	Supry, Fred L.	Failing, Marvin
Franz, Scott R.	Urtz, Donald J.	Florentino, Dominick
Hand, Charles J.	Weaver, Harold E.	Harter, James D.
Hennings, James H.	Webster, Ronald A.	Howe, Robert
Hugick, Adam A.		Jennings, Dale E.
Hutton, James C.		Kozakowski, Robert
Lawrence, Jeffrey A.		McManus, Owen
Martin, Fred E.		Paslak, Wm., A.
Martin, James S., Jr.		Starks, Gerry
Murphy, Randall S.		Truax, Irving E.
Plunkett, Thomas J.		Williams, Clifford
Powers, Thomas P.		Williams, Donald
Rankins, Edwin D.		
Rowlands, Kenneth C.		
Sanzo, Robert J.		
Saunders, Eugene L.		
Snedeker, James R.		

Total Firearms Personnel - 54

AMMUNITION

<u>Exempt</u> <u>5</u>	<u>Non/Exempt</u> <u>2</u>	<u>Wage Roll</u> <u>2</u>
Cole, Wm., T.	Conant, Paul	Dunn, Timothy
des Jardins, C.F.	Thomas, Dennis	Selan, Jerry
McDonald, Alexander D.		
Smith, Floyd H.		
Tomek, Warren L.		

Total Ammunition Personnel - 9

* ESD Engineer - James Ronkainen (Firearms)

REMINGTON PERSONNEL

Remington Roll

	<u>Actual</u> <u>7/31/85</u>
<u>Exempt</u>	
Ammunition Research	5
Firearms Research	24
Firearms Modernization	7
Administration	1
	—
Total Exempt	37
 <u>Non/Exempt</u>	
Ammunition Research	2
Firearms Research	11
Firearms Modernization	1
Administration	1
	—
Total Non/Exempt	15
 <u>Wage Roll</u>	
Ammunition Research	2
Firearms Research	19
Firearms Modernization	1
	—
Total Wage Roll	22
 Total Research	74