

CONFIDENTIAL

REMINGTON ARMS COMPANY, INC.

NEW PRODUCTS RESEARCH

FIRST QUARTER PROGRESS REPORT - 1985

MARCH 21, 1985

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HIGHLIGHTS

FIREARMS RESEARCH

Shotgun Development

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- o Design modifications to the proposed new gas system for the Model 1100 have resulted in the narrowest bolt velocity spread yet seen in development testing. 4
- o All Model 1100-12 ga. Restyle drawings are complete to the latest revisions agreed to by Production, Marketing, and Research. 4
- o Remington's choke tube design for the Model 870 Restyle was transmitted to Production following resolution of material creep and choke tube loosening. 5
- o The "Parker Reproduction by Winchester" was removed from test at 600 rounds for safety considerations. 5
- o A laboratory model of the New Concept Shotgun fire control should be complete 3Q85. 6

Rifle Development

- o Developmental jar-off testing of the New Bolt Action Rifle fire control is progressing with results expected by the end of March. 6

HIGHLIGHTS

AMMUNITION RESEARCH

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"Premier" Shotshell

- o Experimental machine loads for 12 gauge 3" 1-7/8 oz. SPLV have passed all ballistics and function and casualty testing. 20 gauge 3" 1-1/4 oz. hand loads have been confirmed through designed experiments at the process limits. 7

Remington Target Load

- o 1 set of factory wad tooling for the figure 8 wad has been fabricated to run on an existing "RXP" mold frame which will give Remington in house capability to manufacture these new wads at a lower investment cost and reduced project lead time. 9

"Premier" Centerfire

- o Ten bullets have been designed using the new secant ogive profile. Tooling for .30 and 7mm caliber bullets and jackets are being fabricated. A project is being prepared to modify a bullet assembly machine for the R&D semi-works. 11

FIREARMS RESEARCH

SHOTGUN DEVELOPMENT

Model 1100 Functional Improvements

This program, along with the Model 1100 Restyle Program, is aimed at maintaining the Model 1100's position in the marketplace until its replacement by the New Concept Shotgun. Research efforts are focused on a new gas system which will allow the customer to shoot all field and magnum loads in one gun, a new carrier for improved feeding, a stainless steel magazine tube for improved corrosion resistance, and a thicker extractor and two-piece firing pin spring for improved endurance. Product introduction is scheduled for 1987.

The circumferential spring that has been in test for the gas system has been redesigned for more positive sealing and ease of assembly. Initial testing produced terminal bolt velocities of 130 in/sec with 1 oz. target loads and 319 in/sec with Federal 3" magnum loads. This is the narrowest bolt velocity spread that has been achieved when Federal ammunition was included in the test.

A twenty gun sample of other improvement items is in test at 9,100 total rounds. Malfunction rates are significantly better than on the control guns, which are at 8,000 rounds in the same test.

Model 1100 Restyle Program

This cosmetic program is a complement to the Model 1100 Functional Improvement Program. Specifications include cut checkering, 30-gloss wood finish, two-piece butt plate, screw machine magazine cap, and choke tubes. Introduction of the 12 gauge is scheduled for 1986, with the small gauges to follow one year later.

All 12 gauge drawings and parts lists are complete to the latest revisions agreed to by Production, Marketing, and Research. The transmittal will be issued pending the Business Team's review of program economics, now expected in April.

The drawings package for the 20, 28, and 410 gauges is 75% complete.

Model 870 Restyle

This cosmetic program will improve the perceived price/value relationship of the Model 870. Specifications include 30-gloss wood finish, cut checkering, new recoil pad, and choke tubes. Introduction of the 12 gauge is scheduled for 1986, with the small gauges to follow in 1987.

Model 870 Restyle - cont'd.

Remington's choke tube design was transmitted to Production on February 28, following resolution of the material creep and choke tube loosening problems. A change in material specification to a minimum yield strength of 148,000 psi has eliminated unacceptable choke tube creep. Tightening of thread tolerances between the choke tube and barrel has reduced the amount of loosening to the point that this design is equal to or better than competition.

Production's trial and pilot has started. Machining of choke tubes and barrels is expected to start on March 25 at Trulock Tool Co., one of two vendors selected by Production to satisfy first year requirements.

Model 870, 1100 Special Purpose Magnum

These guns have been developed to fill a special niche in the shotgun market. Specifications include Parkerized metal finishes, oil finished birch stock and fore-end, 26" and 30" chrome plated barrels, and a camouflaged sling strap. The 30" barrelled version is specifically aimed at waterfowl hunters, and the 26" version at turkey shooters.

Research rejected the trial and pilot sample of the Model 870 Special Purpose Magnum. Two of the ten guns subjected to field function testing had inoperative safeties. The guns have been turned over to Production for further investigation.

Research approved the Model 1100 Special Purpose Magnum trial and pilot sample in January.

Parker Shotgun

The Parker side-by-side is generally considered to be one of the finest shotguns ever produced. Originally made by Parker Brothers, a firm founded in 1868 in Meriden, Connecticut, it was later manufactured by Remington, when Remington purchased Parker Brothers in 1934. Remington ceased production of the Parker in 1947. Consideration is now being given to making a limited number of Parkers available each year. These guns would externally look like the Parker, but would be internally updated to handle today's more demanding ammunition loads. Winchester has recently introduced a "Parker Reproduction by Winchester," which is made in Japan.

The "Parker Reproduction by Winchester" was removed from test at 600 rounds for safety considerations. Several problems developed with the gun, including doubling, jar-off, and firing with the safety on.

Parker Shotgun - cont'd.

Research has been studying two fire controls for the Parker - one developed by Jesse Briley, and the Miller trigger system which is widely retrofitted in Parkers today. Neither fire control completely satisfies our requirements. We are now laying out the proven Remington Model 3200 fire control in the Parker frame.

New Concept Shotgun

The Model 1100 was introduced in 1963 and immediately became the industry standard for autoloading shotguns. However, few significant changes have been made since then, while competition has blunted our technological advantage. This program, which is designed to replace the Model 1100, will re-establish Remington as the innovator and technical leader in autoloading shotguns.

Product Development Services of Fairfield, CT. has been contracted to work on a new fire control. A best concept laboratory model should be available for demonstration in the third quarter. PDS is also investigating non-traditional means of primer detonation.

A concept to store energy from the previous round and use it to reduce gun recoil is being investigated.

A rupture disc design for venting excessively high chamber pressure is under investigation.

RIFLE DEVELOPMENT

New Bolt Action Rifle

A new bolt action rifle is being developed as a potential replacement for the Model 700, which was introduced in 1962. Technical improvements over the Model 700 include enhanced safety, a detachable magazine box, a claw-type extractor, an independent bolt lock, and integral scope mounts. Introduction is scheduled for 1988.

Developmental jar-off testing is progressing to optimize sear engagement angles and fire control component weights. New trigger springs, trigger adjustment screws, and trigger and sear modifications have been made to support this testing. Results are expected by the end of March.

Marketing and Research participated in a series of consumer focus panels in February in Phoenix, Denver, and Houston. A report of panel findings will be published separately.

New Products Research

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March, 1985

Model 700 Classic - .350 Rem. Mag.

For the past several years, Remington has produced a limited quantity of Model 700 Classics chambered for calibers not generally available from Remington. For 1985 the Classic will be produced in 350 Rem. Mag.

A trial and pilot sample of ten rifles selected from the warehouse was rejected at the visual examination. One rifle had a cracked stock, and a second had a loose ejector retaining pin which interfered in the assembly of the bolt.

AMMUNITION RESEARCH

SHOTSHELL DEVELOPMENT

"Premier", Steel & Buck

Competitive shotshell products with buffered and/or hard copper plated shot have gained acceptance among upland game and waterfowl hunters. Marketing has requested a similar line of products to maintain our competitive position.

A decision has been made by the Ammunition Business Team to eliminate sourcing of all "Premier," steel and buck shotshell. A priority effort is being undertaken in Research to develop these loads in accordance with Lonoke's inventory depletion forecast as shown below.

Forecast Inventory Depletion

Product

4/85	Steel 12 ga. 3" 1 1/4 oz.
5/85	"Premier" 12 ga. 3" 1 5/8 oz.
	Buck 12 ga. 2 3/4" OO
6/85	Steel 12 ga. 2 3/4" 1 1/8 oz.
7/85	"Premier" 20 ga. 3" 1 1/4 oz.
	"Premier" 12 ga. 2 3/4" 1 1/2 oz.
8/85	"Premier" 12 ga. 3" 1 7/8 oz.
	Buck 12 ga. 3" OOO
	Buck 12 ga. 3" OO
9/85	Buck 12 Ga. 3" 1
11/85	"Premier" 20 ga. 2 3/4" 1 1/8 oz.
	Buck 12 ga. 3" 4

- 12 Ga. 3" 1 7/8 oz.

Extensive handload development had identified several candidate loads giving satisfactory ballistics under all test conditions using the rotary cam large volume body, however, an

New Products Research

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March, 1985

- 12 Ga. 3" 1 7/8 oz. - cont'd.

experimental loading run at Lonoke was unsuccessful. The limited volume of the rotary cam body coupled with the less compressible 12 SMAG "Power Piston" wad and high shot charging variability, (especially with BB's, + 50 grains) resulted in a large percentage of unsatisfactory crimps. In view of the urgency of the "Premier" shotshell a decision was made to use the SP (two piece) 3" large volume shell with substantially more internal volume which would permit us to use a more forgiving load configuration.

Handload development using the SP body has shown that a blend of Hercules powders (HM80/HM90), the more compressible RP12 wad, and free flowing GULF buffer, give satisfactory ballistics at the test temperature extremes in 16 hr and 120 hr environmental storage. RP12 wads experimentally molded from linear low density polyethylene further reduced -20°F pressure deviations by substantially decreasing wad breakup. A designed experiment evaluation of the load indicated acceptable results under all the loading and temperature conditions.

SPLV bodies and plastic basewads were fabricated and a successful experimental AH & P run was made at Lonoke on simplex equipment using new AH & P tooling. The finished shells were plant loaded using the specified load configuration. Ballistics and function and casualty tests conducted at Ilion and Lonoke confirmed the positive results obtained earlier with handloaded product. Effort is now underway at Lonoke for a more extensive trial and pilot run at AH & P and loading.

- 12 Ga. 3" 1 5/8 oz.

Hand load screening tests have identified two powder candidates (Hercules HM80 and Expro 8188) that appear acceptable for this load when used with the SPLV body, SP 12 "Power Piston" wad and GULF buffer. When SP12 wads molded from linear low density polyethylene are used, -20°F pressure deviations are substantially reduced.

An experimental loading run at Lonoke using this load configuration (HM80 powder) gave satisfactory ballistics results after 16 hr environmental storage. Designed experiments at the process loading limits and long term environmental tests are expected to be complete in April.

Work is also underway to develop an acceptable 1 5/8 oz. load in the RCLV body to assist Lonoke in using a large inventory of bodies shipped from Bridgeport.

- 12 Ga. 3" 1 3/4 oz.

A new 1 3/4 oz. "Premier" load appears to offer the most efficient load in a 3" shotshell. Total shotcharge energy is equivalent to the 1 2/8 oz. load and pellet energy is significantly higher at a muzzle velocity of 1280 fps. Handload screening tests

-12 Ga. 3" 1 3/4 oz. - Contd.

have identified two powder candidates (Hercules HM 85 and Expro 8168) that give satisfactory ballistics when used with the SPLV body, LLDPE RP12 "Power Piston" wad and GULF buffer. A preliminary machine loading at Lonoke using HM 85 confirmed the satisfactory results obtained with handloads. Designed experiments at the process loading limits and long term environmental tests will be conducted in April.

- 20 Ga. 3" 1 1/4 oz.

Two powders have been identified and confirmed through our designed experiments. Long term environmental storage will be complete April 5, 1985. The recommended loads use new Hercules powder (526 or 527), 20 MAG "Power Piston" wad and GULF buffer with the RC body. Plant loading tests are planned for April contingent on meeting the rifled slug schedule being made on the same loader.

- 20 Ga. 2 3/4" 1 1/8 oz.

Handload screening tests using the RC body have identified HM90 powder with GULF buffer and the 20 MAG "Power Piston" wad. Designed experiments at the process loading limits and long term environmental tests are scheduled to be complete in April.

- 12 Ga. 3" 1 1/4 oz. Steel
- 12 Ga. 2 3/4" 1 1/8 oz. Steel
- 12 Ga. 3" 4, 1, 00 & 000BK
- 12 Ga. 2 3/4" OOBK

Components have been ordered from Lonoke to initiate screening tests for these loads in April.

Remington Target Load

Marketing has determined a need to introduce a new line of target loads (RTL) to enhance our competitive position. This new load would consist of the new unibody shotshell, Remington 209 primer, brass cap in all gauges, and a new wad in 12 Ga.

The critical path item is the new figure "8" wad designed to reduce cost, improve cold temperature performance, and provide the flexibility of loading both 1 oz. and 1-1/8 oz. using the same wad.

Remington Target Load - cont'd.

Two configurations of the Figure "8" wad have been developed as follows:

- o component wad has flared shot cup for improved reloading performance,
- o plant loaded wad has a straight ("RXP" style) shot cup for ease of production loading.

Osley & Whitney is designing and fabricating 1 set of tooling for each wad to fit existing "RXP" molds. An "RXP" mold from Lonoke is being shipped to O & W for installation of the tooling, debugging and running of experimental test samples.

We estimate the total design, fabrication, mold refurbishing and tooling will take about 28 weeks.

CENTERFIRE DEVELOPMENT

"Premier" Centerfire

Competitive "Premium" centerfire rifle products with superior down range ballistics, accuracy and appearance have gained acceptance among big game hunters. Marketing has requested a similar line of products to maintain our competitive position.

Ten bullets are planned for this program as shown in order of priority below.

<u>Caliber</u>	<u>Weight</u>	<u>Cartridge</u>
.30	180	308 Win., 30-06, 300 Win Mag.
.30	150	308 Win., 30-06, 300 Win. Mag., 300 Sav
7mm	175	7mm Rem. Mag., (280 Rem., 7mm-08)
7mm	150	7mm Rem. Mag., (280 Rem., 7mm-08)
.270	130	270 Win.
.270	100	270 Win.
.25	120	25-06 Rem.
.25	100	25-06 Rem.
6mm	100	6mm Rem., 243 Win.
.22	55	22/250, 223, 222

CENTERFIRE DEVELOPMENT - Contd.

"Premier" Centerfire - Contd.

All bullets shapes have been designed. EDL has responsibility for all jacket development and the Ilion Model Shop has demonstrated its ability to fabricate bullet forming dies. .30 Caliber forming dies to provide nose cuts for mush performance are being fabricated and jacket draw tooling is available. 7mm bullet jacket tooling is also being fabricated.

Current tooling development has taken place on production's modified bullet assembly machine and has been limited by production priorities. A Research project for \$170M is being prepared for circulation this month to purchase and install a modified bullet assembly machine in the semi-works at Ilion. Research's exclusive use of the machine would cut development time significantly. It would be returned to production after completion of our development. Delivery is expected five months after authorization.

WHColeman:js/sps



NEW PRODUCTS RESEARCH PERSONNEL AS OF MARCH 31, 1985

FIREARMS

Exempt 24

Bauman, Thomas G.
Bower, James W.
Calkins, Kevin L.
Coleman, Wm., H. II
Curry, Wm.
Findlay, David S.
Franz, Scott R.
Hand, Charles J.
Hennings, James H.
Hugick, Adam H.
Hutton, James C.
Lawrence, Jeffrey A.
Martin, Fred E.
Murphy, Randall S.
Nightingale, Richard E.
Plunkett, Thomas J.
Powers, Thomas P.
Rankins, Edwin
Rowlands, Kenneth C.
Sanzo, Robert J.
Sassone, Richard L.
Saunders, Eugene L.
Smith, Floyd H.
Snedeker, James R.

Non/Exempt 12

Eskoff, Sophie S.
Frost, Helen, B.
Jones, Raymond A.
Martin, James S., Jr.
Pickett, Wm., F.
Saunders, Susan P.
Schuster, Joyce M.
Smithson, Ronald L.
Stephens, Charles J.
Supry, Fred L.
Urtz, Donald J.
Weaver, Harold E.

Wage Roll 16

Baggetta, Joseph A.
Beader, Robert W.
Bedworth, Gary R.
Butler, Richard G.
Fiorentino, Dominick
Harter, James D.
Howe, Robert W.
Jennings, Dale E.
Kozakowski, Robert J.
Paslak, Wm., A.
Sohns, Wm., A.
Storne, Ramon
Truax, Irving E., Jr.
Williams, Clifford G.
Williams, Donald M.
Williams, Ronald R.

Total Firearms Personnel - 52

AMMUNITION

Exempt 4

Cole, Wm., T.
desJardins, C.F., Jr.
McDonald, Alexander D.
Tomek, Warren L.

Non/Exempt 2

Conant, Paul
Thomas, Dennis

Wage Roll 2

Dunn, Timothy
Selan, Jerry

Total Ammunition Personnel - 8

REMINGTON PERSONNEL

Remington Roll

Actual
3/31/85

Exempt

Ammunition Research
Firearms Research
Firearms Modernization
Administration

4
24
9
1

Total Exempt

38

Non/Exempt

Ammunition Research
Firearms Research
Firearms Modernization
Administration

2
12
1
1

Total Non/Exempt

16

Wage Roll

Ammunition Research
Firearms Research
Firearms Modernization

2
16
1

Total Wage Roll

19

Total Research

73

☐ FOR ENCLOSURE

DATE _____

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Please Discuss With	For Approval	For Attention	For Information	Note and Forward To File	Note and Return To Sender	Forwarded Per Your Request
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