

xc: C. E. Ritchie

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington**PETERS**

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

January 16, 1986

TO: J.W. Bower
FROM: D.S. Findlay

*file*Monthly Report - January - 1986CV Users GroupFMS Modeling

? Modeling of the FMS 870 receiver model is complete except for detailing revisions requested by Process Engineering on the ejector cuts for the 1987 improvement version. This will be completed by 1/20/86 and a new tape sent to EDL at that time. The delay in remodeling this part has come from faulty information being supplied to us concerning the top radius position and latch cut requirements. The top radius has been remodeled three times on this part since December 23, when the model was originally complete.

A "functional" drawing has been started by Bill Pickett but information from Dick Stafford is required in order to complete it. We are shooting to have this drawing completed by February 7.

Remodeling of the M/1100 receiver will be started 1/20/86 provided Dick Stafford supplies us with information on the process changes before that date. This part is scheduled to be completed (modeled/detailed/checked) by 2/14/86. This work will be done by T. Plunkett and D. Findlay.

All other FMS modeling work has been halted in order to do these assignments.

NBAR Modeling

NBAR drawing work is 85% complete with some of the remaining work being to:

1. model and detail stock
2. detail stock assembly
3. fore end tip
4. barrel assembly complete
5. miscellaneous drawing revisions
6. other part revisions as the designers require them (i.e. magazine box design)

At the present time Steve Miller is working on the stock design for the NBAR.

NCS Modeling

Work is 85% complete on a M/1100 stock on the CV system. The comb cut is the only outstanding area that needs definition. D. Findlay has been working on this but will be shifting to the FMS 1100 receiver model due to its priority. This stock model is for developing a plastic mold for this stock or for manufacturing press form dies.

Restyle/Misc. Drawing Work

At the present time the remaining work involved on the 870/1100 restyle small gauges is:

- o the parts list for the M/1100
- o check over both drawing packages.

Ron Webster is currently working on this as well as some near term drawing revisions including the drawing changes required for the 870 (and eventually the 1100) restyle rollmark changes for 1986 and 1987.

DSF:sps

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



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January 16, 1986

TO: J.W. Bower *file*
FROM: D.S. Findlay

Monthly Report - January - 1986

CV Users Group

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JW BOWER
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January 16, 1986

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INTER-DEPARTMENTAL CORRESPONDENCE

**"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"**

January 17, 1986

TO: J.W. Bower**FROM:** R.S. Murphy *RSY***Timely Monthly Report - January****NBAR - R.S. Murphy - F.E. Martin - F.H. Smith**

Five 30-06 rifles will be in test on Monday, January 20 and the remaining five are expected by Wednesday. Bolt stops, bolt stop releases, bolt locks and poor bolt handle brazes are hindering completion of these guns. The inspection sheets are complete and a copy is attached.

The magazine box development is continuing. Fabrication of a Delrin magazine follower is nearing completion. A trigger guard is also in the Model Shop for alteration. A Model 700 test vehicle will be used for function testing.

Modeling of the stock is progressing in spite of firearms Process Research indecision. Steve has had to re-do work for FPR as a result, and has not been able to devote all of his time to stock modeling.

Research costing of the NBAR is continuing. Standard costs are being developed as input to an I.E. computer program to determine factory costs.

Synthetic Long Stocks**R.S. Murphy - F.H. Smith**

A preliminary contract has been written and sent to Choate via Bob Blackhall. It has taken the form of a "Request For Quote" and mountain rifle stock prints were attached. (copy attached) On Remington's next trip to Arkansas this quote can be altered so that the final purchase order will be accepted as written.

John Shimel and Bill Marks will be here Thursday, January 23 to discuss this program and a meeting with Choate can conceivably take place on the following Monday.

RSM:sps

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.**PETERS**

Xc: C.E. Ritchie
J.R. Snedeker
T.C. Douglas
R.S. Murphy
K.C. Rowlands

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

CONFIDENTIAL

TO: W.H. COLEMAN, II

FROM: J.W. BOWER

*JWB***MONTHLY REPORT - NEW PRODUCTS RESEARCH****SHOTGUN DEVELOPMENT****Model 1100 Improvements**

The Test Lab has completed design verification testing of modifications to the PC gas system with positive results. Modifications consist of the standard inertia sleeve, simplification of the boring of the gas cylinder, and changes to the orifice and port diameters to better accommodate bolt velocity differences between barrel lengths. Production has been notified of the changes. A formal transmittal should take place by March 1. Further analysis of the test data will determine what ammunition loads the PC gas system can be advertised to handle.

Model 870 Improvements

Research work on this item is complete pending Production's trial and pilot.

Production has changed their anticipated warehouse date from 4Q86 to 1Q87. Their initial cut at project costs came in at \$800M. Project costs were significantly higher than anticipated due to the unavailability of the FMS for initial production. Process Engineering has subsequently reduced project costs by approximately \$300M by alternate methods of processing the ejector slot cut. This change will raise the piece price.

Choke Tubes - 20 Ga.

Research testing of choke tube constrictions is complete. Choke tube and fore-end drawings are ready to transmit, pending the Firearms Business Team's decision on retrofit barrels. A test run in Arms Service showed that 75% of current fore-ends would not fit heavy-wall barrels. Research has proposed a reverse-tapered barrel which will retrofit, but which is more difficult to manufacture. A decision is expected on February 25.

NCS

PDS has completed two M/1100 guns with indirect firing systems. Cost estimates of the parts and labor to assemble them, as well as the lack of space in the stock for the power supply, indicate that this concept is not feasible for a production gun. The same conclusion has been drawn for the direct firing system.

PDS has been requested to investigate a simplified design that would retain the M/1100 trigger/sear/hammer arrangement, but include an electrically actuated hammer block (interposer). The power source and electronics for this concept could easily be housed in the stock.

Drawings of a M/870 synthetic stock and fore-end have been sent to a number of vendors for quotes.

Gas Spring Co. has supplied a number of hydraulic action dampers with lower damping characteristics than those previously supplied. These new models also have return springs. Unfortunately they are 1.25" longer than those previously supplied, which will require some changes to the action tube fixture before they can be tested.

A number of action system concepts have been proposed by EDL and Ilion Research personnel. Teams have been set up to determine which of the concepts should be developed into prototypes.

Discretionary Research

Du Pont's Composites Group has submitted a quotation asking for \$20,000 for three fiber wound centerfire barrels. While this is within our budget estimate for experimentation, their high-spot estimate of piece price for production quantities is in excess of what the market will pay. No further work will be done pending a review of the piece price by the Composites Group.

RIFLE DEVELOPMENT

NBAR

Five development rifles are at the 100 round level. Problems with the stocks and bolt locks were encountered and corrective measures have been taken. The assembly of the remaining five prototypes is complete.

The magazine box development is progressing. The new follower design appears to work well and a large sample of parts has been molded. A synthetic magazine well (stock insert) is in the Model Shop. A Model 700 test vehicle will be used for function testing.

Modeling of the stock is complete without a cheekpiece. To check the model and verify the design the next step is to N/C machine a one to one stock in wood.

Synthetic Long Stocks

The request for quote/preliminary contract with Choate has been updated and is being returned to Choate (and the Business Team) for approval. Mold and stock design has begun and Skip Smith and John Shimel will meet with Choate on March 3 to review their progress. American Plastics (Choate's molder) is planning to shoot Rynite stocks during this visit.

Foamed Rynite® was discussed during John Shimel's last visit and we are drafting a follow-up report. The foamed Rynite® specialist/engineer will be here on February 28 to further discuss this alternative.

Other plastics molders contacted concerning long stocks will be investigated for a future second source.

Model 7400 Improvements

Reformed riveted (rivetless) extractors have been ordered by the plant and are due in late March. Research will evaluate.

Preliminary destructive testing of rifles with the NBAR-type extractor has started.

Production testing indicated that 30-06 cartridges feed better through short action magazine boxes. They have ordered short action boxes stamped "30-06". Research is investigating the use of a single-lip box.

JWB:js

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
OUTPORT*PETERS*
OUTPORT

Xc: C.E. Ritchie
J.R. Snedeker
T.C. Douglas
R.S. Murphy
K.C. Rowlands

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CONFIDENTIAL*February*

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JWB:js

Xc: F.E. Martin
R.S. Murphy
J.W. Bower *gwb*
File: New Bolt Action Rifle

**NBAR MEETING
MARCH 10, 1986**

- Development testing is in progress at about 500 rounds. Development testing of 10 rifles through 2500 rounds each should be complete by April 1.
- Magazine Boxes:
 - current development testing is being done with BDL boxes.
 - boxes to the new design should be out of the Model Shop by March 24. These boxes will be tested either in the development rifles or in other actions.
- Bolt Lock:
 - the spring and/or plunger need to be redesigned.
- Trigger Block Safety:
 - two rifles are not working as intended.
 - cause of the malfunction will be investigated when all rifles are at 500 rounds.
- Lock Time:
 - faster than M/700.
 - should we push this feature in advertising?
- Extractor:
 - no malfunctions or part breakage.
 - looking at a common extractor with M/7400.
 - during the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.

- Magazine Follower:
 - special coated follower in development rifles.
What will we use in design verification testing?
- Stock Configuration:
 - need a consensus with Marketing prior to design verification testing.
 - current stocks have cracked. Believed to be a fabrication, not a design, problem.
- Accuracy testing has not started yet.
- Drop testing will be done at the end of the development test.
- Design verification testing:
 - needs to be done by June 15.
 - 30 rifles built and turned over to the Test Lab by May 1.
 - 6 rifles each of 5 different calibers - 270, 280, 30-06, 7mm Rem. Mag., 300 Win Mag.

JWBower:js

Xc: F.E. Martin

R.S. Murphy

J.W. Bower

File: New Bolt Action Rifle

Meeting 3-17-86

NBAR MEETING
MARCH 10, 1986

*Accuracy Is In Question
for B&S Rifle*

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- Bolt Lock:
 - *Qualification of Bolt Act*
 - the spring and/or plunger need to be redesigned.
- Trigger Block Safety:
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- Lock Time:
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new spring to be installed 3-17-86

to start operation 3-17-86

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Xc: File

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.*PETERS*

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Ilion, New York
March 14, 1986

TO: J.W. BOWER

FROM: R.S. MURPHY

QUARTERLY REPORT - MARCH, 1986**NBAR**

A new bolt action rifle is being developed as a replacement for the Model 700 BDL. Introduction is scheduled for 1988. Technical improvements include a safety to block both the sear and trigger, a detachable magazine box, a revised extractor, a lightweight firing pin, an enclosed bolt plug, an independent bolt lock, and integral scope mounts.

The ten engineering development test rifles are all at the 500 round level and are currently being inspected. Accuracy will be shot Monday. The endurance and accuracy testing will continue to the 2500 round level after which the destructive drop testing and strength testing will be done. Magazine Box development components are in the Model Shop and are expected by March 24.

A Computervision stock model is complete except for a cheek-piece and will be given to the N/C Shop for prototyping. Marketing is selecting the cheekpiece configuration to be used.

NBAR - Contd.

Transmittal of this design to production is scheduled for July 1. To meet this date developmental testing must be complete by March 31, 30 prototypes must be made by May 1, and design acceptance testing must be complete by June 15. A preliminary print package has been forwarded to the Model Shop to avoid any delays.

SYNTHETIC LONG STOCKS

An injection molded Rynite® synthetic long stock is being developed as a high value, low cost supplement to our Model 700 BDL for 1987. Our primary goal is to ensure reliable rifle accuracy in all temperature and humidity conditions in production volumes at a fraction of the cost of our current long stock. Stable accuracy in all environments currently is only available through the use of expensive handmade fiberglass stocks or time consuming glass bedding.

Choate Machine and Tool Company has been selected to be our vendor for 1987 and development of processing procedures and tooling is underway. Fifty prototypes are scheduled for delivery to Remington on or before August 1. Successful design acceptance testing will allow production to the warehouse in 4Q86 for a 1987 catalog introduction.

MODEL 700 KIT GUN

Remington as a company is increasingly becoming niche-oriented as we are willing to pursue smaller market segments. To satisfy the needs of the cost conscious hunter who desires to affordably customize a rifle, the 700 Kit Gun is scheduled for introduction in 1987. Our objective is to offer a completely tested Model 700 ADL barreled action in 270, 30-06, and 7mm Rem. Mag. assembled in a machined, unfinished stock. The customer has the option of customizing the stock configuration, stock finish, checkering pattern, etc. to his personal specifications.

Discussions with Marketing and Process indicate that this product can be introduced with little risk and no capital investment. Formal economics are being prepared and a transmittal is planned by April 30.

RSM:js

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March 15, 1986

TO: C.E. Ritchie**FROM: D.S. Findlay****Monthly Report - March - 1986****CV Users Group****FMS Modeling**

Modeling and detailing (model drawing and functional drawing) of the FMS 1100 receiver model is not complete. Dick Stafford has detailing changes to both drawings after his visit to EDL to discuss gauging. A new tape will be sent to EDL containing all of this information, after it has been checked and corrected to this new information the week of 3/15.

FMS Tool Drawings

FMS tool drawings for the M/1100 and 870 receivers are complete, but require checking.

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CE RITCHIE
Page 2
March 15, 1986

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DSF:sps

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.**PETERS****"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____**Ilion, New York
March 17, 1986**TO: FILE****FROM: J.W. BOWER****DEVELOPMENT OF NBAR AND 870 "B" LOAD**

At a meeting in my office on March 12 with Dick Collins, Evan Ritchie, Bob Sanzo, Jim Snedeker, and myself, the following potential FMS Development Schedule was agreed upon:

NBAR - Jim Rodersheimer will complete work on the Model 1100 during the first week of April. To assist him in completing by that date, Remington will supply Ray Jones.

As soon as work is complete on the Model 1100, Rodesheimer will begin work on the NBAR receiver. This will allow T&P in April, 1987 and production in August - September, 1987. These dates are consistent with the Development Schedule. April 1987 trial and pilot should also provide Production the opportunity to start the FMS on Models 870 and 1100 and satisfy project requirements.

Funding for the EDL development is already included in Evan Richie's 1986 budget.

MODEL 870 "B" LOADS - Dick Collins felt EDL could complete development of the "B" load fixture and program in time to run a T&P on the #11 FMS machine in October, 1986. Production would have to agree to running production units in February, 1987, to meet the Development Schedule.

There is still a question whether it is more economical to run the "B" loads on the FMS or on other equipment. Industrial Engineering has not yet responded to my request for comparative economics. This issue will come to a head on March 21, when, as a followup to last week's FMS meeting in Utica, the leadership team discusses possible changes to the Phase I and Phase II project.

Again, Evan Ritchie will fund EDL for development costs.

JWB:js

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
J.R. Snedeker
J.W. Bower (2)
File: NBAR

NBAR MEETING

MARCH 17, 1986

- o All ten development guns have been shot through 500 rounds. Development testing through 2500 rounds each should be complete by April 1. Jerry Selan will assist Fred Martin inspecting the rifles.
- o Magazine Boxes:
 - current development testing is being done with BDL boxes.
 - boxes to the new design should be out of the Model Shop by March 24. Some print dimensions need to be resolved. These boxes will be tested either in the development rifles or in parallel actions.
- o Bolt Lock:
 - new springs are built, ready for test.
 - the drawing needs to be changed to specify qualification of the bolt and bolt plug.
- o Trigger Block Safety:
 - two rifles are not working as intended.
 - cause of the malfunction will be investigated on 3/19, after accuracy testing is complete.
- o Extractor:
 - no malfunctions or part breakage.
 - looking at a common extractor with M/7400.
 - during the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.

- Trigger Pull Adjustment Screw:
 - screw backs out
 - test nylon screw or nylon insert
- Magazine Follower:
 - special coated follower is in development rifles.
What is cost comparison with chrome plate?
- Stock Configuration:
 - Configuration determined except cheekpiece, fore-end and grip caps, and checkering patterns, which Marketing will supply.
 - basic configuration has been modelled on CV.
Give to Sanzo for prototyping.
- Drop testing will be done at the end of the development test. *Also Blow-ups*
- Drawings have been supplied to the Model Shop for design verification testing rifles.
- Design verification testing is scheduled to start on ~~May 1~~ ³ and be complete by June 15. ² _{April 15}
 - 30 rifles total; 6 each of 270, 280, 30-06, 7mm Rem. Mag., 300 Win. Mag. calibers. ¹

JWBower:js

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JWBower:js

REMINGTON ARMS COMPANY, INC.

REMINGTON RESEARCH

FIRST QUARTER PROGRESS REPORT - 1986

MARCH 17, 1986

Note - not distributed
Distribution

J.W. Bower
W.H. Coleman, II
R.A. Darby
T.C. Douglas
W.L. Ericson
D.S. Findlay
E.O. Fini

J.C. Hutton
R.S. Murphy
C.E. Ritchie
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HIGHLIGHTS

NEW PRODUCTS RESEARCH

Shotgun Development

Page

- o Changes to the original M/1100 Improvement transmittal have been made to simplify plant processing and enhance product differentiation. 1
- o The Model 870 Production project has been delayed. This gun will not be in the 1987 catalogue. 1
- o Research transmitted the 20 gauge choke tube design on March 17. 2
- o Research reviewed the New Concept Shotgun with Marketing. The electronic fire control has been redesigned. A box magazine is being fitted to a M/1100 for prototype testing. Quotes for a Rynite® stock and fore-end have been received. 2
- o A prototype Parker fire control has been received. 3

Rifle Development

- o New Bolt Action Rifles are in development testing. 3
- o Production improvements to the Model 7400 have been received. 4
- o Remington and PPD personnel are working with the vendor on a Rynite long stock. 5
- o Transmittal of a Model 700 Kit Gun is expected by April 30. 5

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Rifle Development - Contd.

- o Trial and Pilot of 223 Caliber XP-100's is in progress. 5
- o Manufacturing of a composite rifle barrel is being considered. Production costs are being reviewed with Marketing. 6

FIREARMS PROCESS RESEARCH

Receiver Flexible Manufacturing System

- o Process development on the M/1100 & M/870 shotgun receivers continues at EDL. The T-10 has continued to run flawlessly since December 1985. 60 M/870 receivers from the EDL development program will be assembled into guns and made available for gallery testing by 6/23/86. 6&7

Small Parts Flexible Manufacturing System

- o Development work on the M/1100 Breech Bolt has slowed while the model is reverified. 7

Common Length Shotgun Barrel

- o Testing of this new process is on-going. 7

Shotgun Barrel Automation

- o Evaluations of new barrel process continues. 7&8

Automate Receiver Broach

- o Alternate methods for receiver rollmarking are being evaluated. 8

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Firearms Process Research - Contd.

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- o Common trigger assembly testing continues. Development work continues on the second robot assembly cell at EDL.

8&9

Cut Checkering

- o Process Engineering and Control Section at Ilion continues to become more involved with this program.

9

Form Rolling

- o Vendor warm rolled firing pins have been received. Additional vendors are being sought for alternative processes.

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GFM Automation

- o The installation of the second GFM Robot is in progress. Most of the equipment has been installed.

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Computervision Modeling

FMS Drawings

- o Tool drawings for the M/1100 & 870 receivers are complete.

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NBAR Modeling

- o NBAR drawing work is 85% complete.

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NCS Modeling

- o Work is 85% complete on the M/1100 stock.

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SHOTGUN DEVELOPMENT

Model 1100 Improvements

This program is designed to maintain the Model 1100's position in the marketplace until its replacement by the New Concept Shotgun. Significant changes include a pressure compensating gas system, a stainless steel magazine tube, a new magazine cap and detent system, and improvements to the extractor, firing pin retract spring, piston and piston seal. Introduction is scheduled for the writer's seminar this November.

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Research's work is complete pending Production's trial and pilot.

The Production project has not yet been written for this program. The anticipated warehouse date has been changed from 4Q86 to 1Q87, which means it will not be in the 1987 catalogue.

Research Department

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March, 1986

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SHOTGUN DEVELOPMENT - Contd.

Shotgun Choke Tubes - 20 Gauge

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Design work has begun to modify a Model 1100 to accept a box magazine. This prototype will determine if the perceived advantages of a box magazine are correct.

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SHOTGUN DEVELOPMENT - Contd.

New Concept Shotgun - Contd.

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Kolar and Remington engineers met on March 6 to review the prototype built by Kolar. It was concluded that the design specifications had been met. Kolar will now fit the stock and fore-end and have the gun back in Ilion for testing around the first of April.

A request for quote is being prepared for Kolar to complete the remainder of the drawings (for items other than the fire control), build six prototypes for design verification testing, and manufacture the first year's metal components.

RIFLE DEVELOPMENT

New Bolt Action Rifle

A new bolt action rifle is being developed as a replacement for the Model 700 BDL. Introduction is scheduled for 1988. Technical improvements include a safety to block both the sear and trigger, a detachable magazine box, a revised extractor, a light weight firing pin assembly, an enclosed bolt plug, an independent bolt lock and integral Injectalloy® scope mounts.

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March, 1986

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RIFLE DEVELOPMENT - Contd.

New Bolt Action Rifle - Contd.

Ten engineering development test rifles are all at the 500 round level. Function, endurance, and accuracy testing will continue to the 2500 round level after which destructive drop testing and strength testing will be done. New magazine box components will be out of the Model Shop by March 24. Development testing is scheduled to be complete in early April.

A Computervision stock model is complete except for the cheek-piece. Marketing is selecting the cheekpiece configuration.

Lock time measurements indicate it is significantly better than the Model 700.

Model 7400 Improvements

The Model 7400 was introduced in 1981. Several components are difficult to manufacture to design specifications - in particular the extractor and magazine box. As a result, the model has been plagued with high gallery rejects and customer complaints. Two programs are underway to correct the deficiencies. The first is being managed by Production and makes minor alterations to the extractor and magazine box in an effort to improve functioning well enough to resume production. The second program, being run by Research, is aimed at long-term corrections.

Vendor supplied reformed riveted (rivetless) extractor have been received by the plant and should be in test by March 21. The test will also include an extractor of the current design, but .005" thicker. Also included in this test is a modification to the breech bolt to ease assembly of the extractor, along with a 30° chamfer angle on the breech bolt to eliminate burrs in the extractor shroud cut.

Vendor supplied short action magazine boxes stamped "30-06" have also been received by Production. They are being measured and will be shot along with the Production extractors mentioned above.

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March, 1986

FIREARMS RESEARCH - Contd.

RIFLE DEVELOPMENT - Contd.

SYNTHETIC LONG STOCK

An injection molded Rynite® synthetic stock is being developed as a high value supplement to our Model 700 BDL for 1987. The primary goal is to insure reliable rifle accuracy in all temperature and humidity conditions in production volumes, at a cost less than a wood stock and a fraction of the cost of a hand layed-up fiberglass stock that it will directly compete with.

Choate Machine and Tool Company has been selected as the vendor for 1987/88. Choate has begun manufacturing of the mold. Remington and PPD is working with Choate on Rynite® molding parameters, and equipment for secondary stock operations. Fifty prototypes are scheduled for delivery to Remington by August 1. Successful design acceptance testing will allow production to the warehouse in 4Q86 for a 1987 catalogue introduction.

Model 700 Kit Gun

Remington is becoming increasingly niche-oriented and willing to pursue smaller market segments. To satisfy the needs of the cost conscious shooter who desire to affordably customize a rifle, the Model 700 Kit Gun is scheduled for introduction in 1987. The Kit Gun will be a completely tested Model 700 ADL barreled action in 270, 30-06, and 7mm Rem. Mag. assembled in a machined, unfinished stock. The customer has the option of customizing the stock configuration, stock finish, checkering pattern, etc., to his or her own personal taste.

Formal economics are being prepared. Transmittal to Production is planned by April 30.

XP-100 in 223 Caliber

The XP-100 is Remington's target and hunting pistol. The 223 caliber is a new offering scheduled for mid-1986 introduction. Research transmitted the parts list and drawings package to Production on October 31.

Research work is complete pending Production's trial and pilot, which is currently in progress.

Research Department

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March 6, 1986

FIREARMS RESEARCH - Contd.

RIFLE DEVELOPMENT - Contd.

Composiite Materials

Du Pont's Composites Group has submitted a quotation for \$20,000 to fiber-wind three centerfire rifle barrels for test. Per barrel prices are estimated to range from \$575 for a graphite composite to \$150 for Kevlar®. The path forward is being discussed with Marketing.

FIREARMS PROCESS RESEARCH

Receiver Flexible Manufacturing System

The EDL T-10 testing schedule has slipped approximately three weeks because of CV model changes being made to bring the model up to the present process on the manufacturing floor. Both the M/870 and M/1100 receiver models have been corrected and preliminary debugging of the M/870 process and fixture proveout is now in progress. Approximately 60 M/870 receivers produced from the T-10 tests are scheduled to be assembled into guns and be available for gallery testing by 6/23/86.

M/1100 tests using the original sixteen part fixture pallet are continuing at EDL to gain more tool life data and establish operating parameters. Machining of M/1100 receivers on the new prototype fixture using a new NC program is scheduled to begin April 10th.

A project is being written to pre-purchase a #11 production Cincinnati Milacron T-10 machining center to aid in the development work of all the components that will be placed on the FMS. Once development work is complete, this T-10 machining center will be released to production thereby reducing the need for production to purchase T-10's for phase three by one.

A quick update of the Receiver FMS Project economics shows the gross annual savings in 1987 to be \$30M and in 1988 to be \$284M. These estimated savings are based on the latest volume projections. The project economics will be updated in detail in the near future. (Project economics as submitted to the Board of Directors are based on 3 year economics - 1991).

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

Receiver Flexible Manufacturing System - Contd.

An evaluation has been completed comparing the amount of savings generated by the components that will be produced on the FMS. This evaluation will be used to help determine the order with which these components could be placed on the FMS. Additional components will be evaluated as information becomes available to see where they rank as compared to other components. Also, a capacity evaluation has been completed on the Phase I FMS that compares the possible options for running the following components: M/870 12 ga. "A" load Receivers, M/1100 12 Ga. "A" load Receivers, NBAR Receivers, and M/870 "B" load Receivers. These comparisons will be used to help determine if either the NBAR and/or the M/870 B" load Receivers should be run on the Phase I FMS.

Small Parts Flexible Manufacturing System

The development work on the M/1100 breech bolt has slowed down until the model dimensions can be reverified. There are some discrepancies between tool prints, gage dimensions, and how the plant is actually making the parts. If a modeling change is required it may effect the M/870 development work already completed.

We are also rechecking the locking block model dimensions before releasing them to the NC group for program development.

Common Length Shotgun Barrel

Industrial Engineering has not yet completed their economic analysis of producing common length shotgun barrels. PE&C have completed initial tests on cutting off shotgun barrels later in the process to see if concentricity problems occur. PE&C wants to continue testing on a random basis until May 1st to be sure no problems occur.

Shotgun Barrel Automation

Preliminary economic evaluations have been completed on seven proposals to process shotgun barrels from the beginning of the line through the centerless polish operations. These evaluations will be used to help determine which of these processes have the most savings potential and along with other data will be used in determining which process should be developed further.

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

Shotgun Barrel Automation - Contd.

A meeting was held with New Products Research, Process Engineering, Firearms Process Research and G. W. Foggini of EDL to discuss progress to date, and the future direction of the shotgun barrel automation project. The main intent of the meeting was to update people who will be involved with the program and to have both research and process people assigned to work with us on the project. Both of these were accomplished. Several new ideas including machining of a drawn-over-mandrel tubing to finished dimensions, the use of a transfer line to perform extension machining cuts, and the possibility of using an adhesively attached synthetic vent rib were generated.

A proposal, for an extrusion process to form shotgun barrels, was received from Erie Press Systems. The proposal included a ballpark estimate on capital investment and tooling costs for their machine and costs to perform feasibility testing. The proposal needs clarification on several items before a decision to proceed with feasibility testing can be made.

Automate Receiver Broach

Alternative methods for performing the rollmarking operation on receivers are under investigation. These include CNC engraving, electric discharge machining and electrochemical machining. The possibility of using a laser engraver to replace rollmarking is not considered feasible for standard rollmark patterns due to long cycle times and limited depth of cut capability.

Flexible Small Parts Assembly System

Testing of modifications to common trigger assembly components is underway. 15 M/1100 trigger plates are currently being subjected to dry cycle testing. In addition, 6 trigger assemblies are being shot in synthetic trigger plates, and 6 more in standard trigger plates. If these phases of testing are successful, then sample trigger plates for each gun model containing the common trigger will be tested via endurance shooting. If the modified assemblies perform equal to or better than the current common trigger design, transmittal of the changes will take place. At that time a production turnover will be pursued.

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

Flexible Small Parts Assembly System - Contd.

A meeting with Research personnel was held on March 3, 1986, to determine changes required to foolproof the orbital riveter on the M/700 trigger housing work station. We agreed that the use of a locking device on the micrometer adjustment ring, and a check of air pressure would be sufficient to foolproof the riveter. During subsequent discussions, however, it was determined that further test results should be obtained before the riveter is used in production. If the foolproofed riveter and test results are both deemed satisfactory, then production turnover of the work station will take place.

At EDL, development of the second cell and breech bolt work station is ongoing. Gripper design changes have increased the reliability of the system. Software for the system has been completed.

Cut Checkering

J. Hickey of PE&C has been assigned to implement our recommendation on using the rotary wire-brush technique for cleaning checkering.

The fore-end fixtures for the 11-87 were reviewed with J. Hickey and found to be inadequate. PE&C will handle the necessary revisions.

Modified cutters from Accurate Diamond Co. have been received and will be tried as soon as PE&C is ready.

Form Rolling

Samples of Rol-Flo's warm rolled firing pins are being analyzed by our PM Lab. Results should be available by March 19.

Manca Inc. has been asked to give us a price for providing sample firing-pins as swaged on their proposed process. Torrington Machine Co. has been asked for a similar automated swaging system proposal.

A letter of intent to propose a cold heading/form-rolling process for our shotgun firing pin and other parts was just received from Delta Import-Export, of Livonia, Michigan. They represent Essebi Cold Forming Machine Co. from Italy.

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

GFM Automation

All equipment except the cut-off machine has been put into position. Cut-off machine alterations in Machine Shop started March 3. Some design alterations are required to optimize the fixture clamping. This part of the project is becoming a critical path.

Computervision Modeling

FMS Tool Drawings

FMS tool drawings for the M/1100 and 870 receivers are complete, but require checking.

NBAR Modeling

NBAR drawing work is 85% complete with some of the remaining work being to:

1. model and detail stock
2. detail stock assembly
3. fore end tip
4. barrel assembly complete
5. miscellaneous drawing revisions
6. other part revisions as the designers require them (i.e. magazine box design)

Steve Miller is continuing to work on the stock design for the NBAR.

NCS Modeling

Work is 85% complete on a M/1100 stock on the CV system. The comb cut is the only outstanding area that needs definition. This stock model is for developing a plastic mold or for manufacturing press form dies. Bob Sanzo has cut a preliminary model of this part. Minor work to reblend some of the surfaces for mold work will be done by 4/15.

JWBower/CERitchie

Research Department

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March, 1986

File

REMINGTON ARMS COMPANY, INC.

REMINGTON RESEARCH

FIRST QUARTER PROGRESS REPORT - 1986

MARCH 17, 1986

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FIREARMS RESEARCH - Contd.

RIFLE DEVELOPMENT - Contd.

Composiite Materials

Du Pont's Composites Group has submitted a quotation for \$20,000 to fiber-wind three centerfire rifle barrels for test. Per barrel prices are estimated to range from \$575 for a graphite composite to \$150 for Kevlar®. The path forward is being discussed with Marketing.

FIREARMS PROCESS RESEARCH

Receiver Flexible Manufacturing System

The EDL T-10 testing schedule has slipped approximately three weeks because of CV model changes being made to bring the model up to the present process on the manufacturing floor. Both the M/870 and M/1100 receiver models have been corrected and preliminary debugging of the M/870 process and fixture proveout is now in progress. Approximately 60 M/870 receivers produced from the T-10 tests are scheduled to be assembled into guns and be available for gallery testing by 6/23/86.

M/1100 tests using the original sixteen part fixture pallet are continuing at EDL to gain more tool life data and establish operating parameters. Machining of M/1100 receivers on the new prototype fixture using a new NC program is scheduled to begin April 10th.

A project is being written to pre-purchase a #11 production Cincinnati Milacron T-10 machining center to aid in the development work of all the components that will be placed on the FMS. Once development work is complete, this T-10 machining center will be released to production thereby reducing the need for production to purchase T-10's for phase three by one.

A quick update of the Receiver FMS Project economics shows the gross annual savings in 1987 to be \$30M and in 1988 to be \$284M. These estimated savings are based on the latest volume projections. The project economics will be updated in detail in the near future. (Project economics as submitted to the Board of Directors are based on 3 year economics - 1991).

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

Receiver Flexible Manufacturing System - Contd.

An evaluation has been completed comparing the amount of savings generated by the components that will be produced on the FMS. This evaluation will be used to help determine the order with which these components could be placed on the FMS. Additional components will be evaluated as information becomes available to see where they rank as compared to other components. Also, a capacity evaluation has been completed on the Phase I FMS that compares the possible options for running the following components: M/870 12 ga. "A" load Receivers, M/1100 12 Ga. "A" load Receivers, NBAR Receivers, and M/870 "B" load Receivers. These comparisons will be used to help determine if either the NBAR and/or the M/870 B" load Receivers should be run on the Phase I FMS.

Small Parts Flexible Manufacturing System

The development work on the M/1100 breech bolt has slowed down until the model dimensions can be reverified. There are some discrepancies between tool prints, gage dimensions, and how the plant is actually making the parts. If a modeling change is required it may effect the M/870 development work already completed.

We are also rechecking the locking block model dimensions before releasing them to the NC group for program development.

Common Length Shotgun Barrel

Industrial Engineering has not yet completed their economic analysis of producing common length shotgun barrels. PE&C have completed initial tests on cutting off shotgun barrels later in the process to see if concentricity problems occur. PE&C wants to continue testing on a random basis until May 1st to be sure no problems occur.

Shotgun Barrel Automation

Preliminary economic evaluations have been completed on seven proposals to process shotgun barrels from the beginning of the line through the centerless polish operations. These evaluations will be used to help determine which of these processes have the most savings potential and along with other data will be used in determining which process should be developed further.

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

Shotgun Barrel Automation - Contd.

A meeting was held with New Products Research, Process Engineering, Firearms Process Research and G. W. Foggin of EDL to discuss progress to date, and the future direction of the shotgun barrel automation project. The main intent of the meeting was to update people who will be involved with the program and to have both research and process people assigned to work with us on the project. Both of these were accomplished. Several new ideas including machining of a drawn-over-mandrel tubing to finished dimensions, the use of a transfer line to perform extension machining cuts, and the possibility of using an adhesively attached synthetic vent rib were generated.

A proposal, for an extrusion process to form shotgun barrels, was received from Erie Press Systems. The proposal included a ballpark estimate on capital investment and tooling costs for their machine and costs to perform feasibility testing. The proposal needs clarification on several items before a decision to proceed with feasibility testing can be made.

Automate Receiver Broach

Alternative methods for performing the rollmarking operation on receivers are under investigation. These include CNC engraving, electric discharge machining and elected chemical machining. The possibility of using a laser engraver to replace rollmarking is not considered feasible for standard rollmark patterns due to long cycle times and limited depth of cut capability.

Flexible Small Parts Assembly System

Testing of modifications to common trigger assembly components is underway. 15 M/1100 trigger plates are currently being subjected to dry cycle testing. In addition, 6 trigger assemblies are being shot in synthetic trigger plates, and 6 more in standard trigger plates. If these phases of testing are successful, then sample trigger plates for each gun model containing the common trigger will be tested via endurance shooting. If the modified assemblies perform equal to or better than the current common trigger design, transmittal of the changes will take place. At that time a production turnover will be pursued.

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

Flexible Small Parts Assembly System - Contd.

A meeting with Research personnel was held on March 3, 1986, to determine changes required to foolproof the orbital riveter on the M/700 trigger housing work station. We agreed that the use of a locking device on the micrometer adjustment ring, and a check of air pressure would be sufficient to foolproof the riveter. During subsequent discussions, however, it was determined that further test results should be obtained before the riveter is used in production. If the foolproofed riveter and test results are both deemed satisfactory, then production turnover of the work station will take place.

At EDL, development of the second cell and breech bolt work station is ongoing. Gripper design changes have increased the reliability of the system. Software for the system has been completed.

Cut Checkering

J. Hickey of PE&C has been assigned to implement our recommendation on using the rotary wire-brush technique for cleaning checkering.

The fore-end fixtures for the 11-87 were reviewed with J. Hickey and found to be inadequate. PE&C will handle the necessary revisions.

Modified cutters from Accurate Diamond Co. have been received and will be tried as soon as PE&C is ready.

Form Rolling

Samples of Rol-Flo's warm rolled firing pins are being analyzed by our PM Lab. Results should be available by March 19.

Manca Inc. has been asked to give us a price for providing sample firing-pins as swaged on their proposed process. Torrington Machine Co. has been asked for a similar automated swaging system proposal.

A letter of intent to propose a cold heading/form-rolling process for our shotgun firing pin and other parts was just received from Delta Import-Export, of Livonia, Michigan. They represent Essebi Cold Forming Machine Co. from Italy.

Research Department

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March, 1986

FIREARMS PROCESS RESEARCH - Contd.

GFM Automation

All equipment except the cut-off machine has been put into position. Cut-off machine alterations in Machine Shop started March 3. Some design alterations are required to optimize the fixture clamping. This part of the project is becoming a critical path.

Computervision Modeling

FMS Tool Drawings

FMS tool drawings for the M/1100 and 870 receivers are complete, but require checking.

NBAR Modeling

NBAR drawing work is 85% complete with some of the remaining work being to:

1. model and detail stock
2. detail stock assembly
3. fore end tip
4. barrel assembly complete
5. miscellaneous drawing revisions
6. other part revisions as the designers require them (i.e. magazine box design)

Steve Miller is continuing to work on the stock design for the NBAR.

NCS Modeling

Work is 85% complete on a M/1100 stock on the CV system. The comb cut is the only outstanding area that needs definition. This stock model is for developing a plastic mold or for manufacturing press form dies. Bob Sanzo has cut a preliminary model of this part. Minor work to reblend some of the surfaces for mold work will be done by 4/15.

JWBower/CERitchie

Research Department

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March, 1986

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



Murphy
7M
Blumen

Wilmington, Delaware
March 19, 1986

*File -
new bolt
action rifle*

H. K. BOYLE - ILION
J. W. BOWER - ILION
W. H. COLEMAN - ILION
E. O. FINI - B6242

J. E. PREISER - B6232
K. W. SOUCY - ILION
B. W. RAU - B6240
L. E. ZEILLMANN - B6226

NEW BOLT ACTION RIFLE CONSUMER RESEARCH-ADDITIONAL FEATURES

In December 1985, six group sessions were conducted among men between the ages of 25-55 who have hunted at least twice with a bolt action centerfire rifle in the past year. The purpose of these sessions was to evaluate additional candidate features for the new bolt action center fire rifle. (An initial set of groups was conducted in early 1985).

The attached report summarizes the findings of the December group sessions.

JH Chambers
J. H. CHAMBERS

JHC/mfm
Attachment

the Gediman Research Group, Inc.

26 Sixth Street
Stamford, Connecticut 06905
203-348-0009

NEW BOLT ACTION CENTER FIRE RIFLE DESIGN
FEATURE DEVELOPMENT RESEARCH

FOR: REMINGTON ARMS COMPANY, INC.
MARCH, 1986

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APPENDIX

* SEE APPENDIX PAGES FOR GUN MODEL CODE DESIGNATIONS AND DESCRIPTIONS OF ALL TEST ELEMENTS, AS WELL AS TABULAR RESULTS (BY AREA) OF THE SELF-ADMINISTERED BOOKLETS AND COMPILATION OF REASONS FOR CHOICES FROM DISCUSSIONS.

INTRODUCTION

OBJECTIVE

FURTHER EXPLORE MARKET REACTIONS TO THE PROJECTED
NEW LINE OF REMINGTON BOLT ACTION CENTER FIRE RIFLES
TO DETERMINE THE EFFECT OF SPECIFIC DESIGN FEATURES
(MAINLY COSMETIC) SUGGESTED BY PREVIOUS RESEARCH.*

SPECIFICALLY, EXPLORE CONSUMERS' REACTIONS AND PREFERENCES
WITH RESPECT TO THE FOLLOWING FEATURES...

- . STOCK CONFIGURATION
- . METAL FINISH
- . BOLT BODY FINISH
- . STOCK FINISH
- . BARREL CONTOUR
- . FOLLOWER FINISH
- . RECEIVER CONFIGURATION
- . FORE-END TIP
- . GRIP CAP
- . BUTT PAD COLOR
- . SPACERS

...AS WELL AS ALTERNATIVE OPTIONS ON EACH OF TWO DESIGN ISSUES:

- . CHECKERING PATTERNS
- . WOOD GRAIN OPTIONS

* SEE GEDIMAN RESEARCH GROUP, INC.: "NEW BOLT ACTION CENTER
FIRE PRODUCT/FEATURIZATION DEVELOPMENT RESEARCH," APRIL 1985.

SAMPLE AND METHOD

SAMPLE:

SIX FOCUSED GROUP DISCUSSIONS WITH A TOTAL OF 54 BOLT ACTION CENTER FIRE RIFLE OWNERS:

- BETWEEN THE AGES OF 25-55
- HAVE HUNTED WITH A BOLT ACTION RIFLE ON AT LEAST TWO SEPARATE OCCASIONS IN THE PAST YEAR
- HAVE BEEN HUNTING FOR AT LEAST 7 YEARS

TWO GROUPS EACH IN SEATTLE, KANSAS CITY, AND DALLAS, IN EARLY DECEMBER 1985,

METHOD:

AFTER A BRIEF "WARM UP" PERIOD, RESPONDENTS WERE EXPOSED TO PROTOTYPES INCORPORATING THE VARIOUS TEST FEATURES. IN ORDER TO AVOID POSSIBLE CONTAMINATION OF OPINION, BEFORE ANY DISCUSSION RESPONDENTS WERE ASKED TO RATE, IN SELF-ADMINISTERED QUESTIONNAIRE BOOKLETS PROVIDED, THEIR PREFERENCE ON A SPECIFIC TEST FEATURE. THEN THE FEATURE WAS DISCUSSED BY THE GROUP AS A WHOLE.

FOLLOWING THE DISCUSSION, RESPONDENTS WERE ASKED TO RE-RATE THEIR PREFERENCE ON THAT SAME FEATURE, BASED ON ANY NEW INFORMATION OR OPINION THAT MIGHT HAVE INFLUENCED THEM. IF THEIR PREFERENCE CHANGED, THEY WERE ASKED TO WRITE DOWN THE REASON(S).*

THIS PROCEDURE WAS REPEATED FOR EACH TEST FEATURE UNTIL ALL ISSUES WERE COVERED.

AT THE END OF EACH SESSION, RESPONDENTS WERE SHOWN DIFFERENT PROTOTYPES INCORPORATING THE TWO ADDITIONAL COSMETIC ISSUES (CHECKERING PATTERNS AND WOOD GRAIN OPTIONS), AND THE PROCEDURE DESCRIBED ABOVE WAS REPEATED FOR THESE TWO APPLICATIONS. THE REASON FOR USING DIFFERENT PROTOTYPES WAS TO AVOID THE POSSIBILITY THAT TOO MUCH FOCUS WOULD BE PUT ON THESE COSMETIC FEATURES AND OVERSHADOW THE OTHER DESIGN ISSUES. LASTLY, A BROWNING RIFLE WAS SHOWN FOR MONADIC AND COMPARATIVE REACTIONS.

* COMPARISON OF CONSUMERS' "AFTER" VERSUS "BEFORE" FEATURE RATINGS IS AN EFFECTIVE WAY TO IDENTIFY POTENTIAL OPPORTUNITIES FOR ADVERTISING (AND OTHER MARKETING) COMMUNICATIONS.

METHOD (CONT'D)

THE USUAL CAUTIONS ASSOCIATED WITH FOCUS GROUP QUALITATIVE RESEARCH APPLY HERE -- NOT ONLY BECAUSE OF THE LIMITED NUMBER OF PERSONS INVOLVED, OR THE POSSIBILITY OF IDIOSYNCRATIC REACTIONS OF DOMINANT RESPONDENTS BEING PROMULGATED AS CONSENSUS, BUT ALSO BECAUSE OF THE TEMPTATION OF SOME RESPONDENTS TO EXPERTISE ON TECHNICAL, CREATIVE, AND PSYCHOLOGICAL MATTERS ON WHICH THEY HAVE LITTLE KNOWLEDGE AND NO TRAINING. THIS IS NOT TO DISPARAGE THE USEFULNESS OF THE RESEARCH METHOD; IT SERVES AN IMPORTANT DISCOVERY FUNCTION. TO BE MOST USEFUL, HOWEVER, THESE RESULTS SHOULD BE REGARDED AS DIRECTIONAL, NOT DEFINITIVE, AND TEMPERED WITH PROFESSIONAL MARKETING AND BUSINESS JUDGMENT.

SUMMARY OF RESULTS

SUMMARY OF RESULTS

THE HUNTERS IN THESE GROUPS ARE EXTREMELY INVOLVED WITH THE APPEARANCE OF THEIR GUNS; AND IN THE MAINTENANCE OF THAT APPEARANCE. THEY WANT THEIR GUNS TO HAVE A CERTAIN LOOK, AND THEY WANT TO BE ABLE TO KEEP THEM LOOKING THAT WAY. HOWEVER, IN CHOOSING AMONG THE OPTIONAL DESIGN FEATURES PRESENTED TO THEM IN THE RESEARCH, OTHER ISSUES -- BOTH FUNCTIONAL AND COMFORT RELATED -- OFTEN IMPACT ON THEIR PREFERENCES AS WELL.

THE CHART ON THE NEXT PAGE PRESENTS THE NEW BOLT ACTION CENTER FIRE RIFLE DESIGN FEATURES TESTED IN THIS RESEARCH IN DESCENDING ORDER OF PRIORITY BASED ON THE IMPORTANCE OF THAT FEATURE TO THE HUNTERS WHO PARTICIPATED IN THE SIX FOCUS GROUPS.*

THE PREFERENCE SCORES** FOR THE DESIGN OPTIONS OFFERED FOR EACH FEATURE ARE SHOWN BY THE HORIZONTAL ARROWS.

* ORDER OF IMPORTANCE IS DERIVED FROM GROUP RESPONSES (VIA SHOW OF HANDS) FOLLOWING THE DISCUSSION OF ALL 11 FEATURES AS TO THE RELATIVE IMPORTANCE, TO THEM, OF THE DESIGN OF EACH FEATURE -- DOES THE DESIGN OF THAT FEATURE MATTER "A LOT," "A LITTLE," OR "NOT AT ALL."

** FINAL CHOICES, FOLLOWING DISCUSSION.

SUMMARY OF RESULTS (cont'd)

-7-

| | Mean Score* | Final Preferences | |
|-------------------------|----------------|-----------------------|--------|
| Stock Configuration: | 2.00 | Monte Carlo | 58% |
| | | Straight | 33% |
| | | Cheekpiece | 67% |
| | | None | 30% |
| Metal Finish: | 1.77 | All satin | 59% |
| | | All polish | 32% |
| | | Mixed | 7% |
| Bolt Body Finish: | 1.75 | Jeweled | 55% |
| | | Satin black | 45% |
| Stock Finish: | 1.66 | Low gloss | 89%** |
| | | High gloss | 11%*** |
| Barrel Contour: | 1.63 | BDL | 57% |
| | | Lightweight | 43% |
| Follower Finish: | 1.55 | Plated | 79%** |
| | | Black oxide | 21%*** |
| Receiver Configuration: | 1.25 | Rounded | 65%* |
| | | Faceted | 35%** |
| | | Integral scope mounts | 69% |
| | | None | 15% |
| Fore-End Tip: | 1.19 | Yes | 50% |
| | | No | 46% |
| Grip Cap: | 1.19 | Yes | 60%*** |
| | | No | 36% |
| Butt Pad Color: | 1.02 | Black | 60% |
| | | Brown | 35% |
| Spacers: Color: | .92 | None | 68% |
| | | Black | 26% |

* Mean score derived by assigning a value of 2 for "matters a lot"; 1 for "matters a little" and 0 for "matters not at all." The score is based on the number who responded.

** Distribution increased choice by 5% or more.

*** Distribution decreased choice by 5% or more.

SUMMARY OF RESULTS (CONT'D)

AS SHOWN BY THE CHART, FOR SIX OF THE TEST ISSUES, THE MANDATE IS CLEAR; THE LARGE MAJORITY OF CONSUMER RESPONDENTS PREFER:

- LOW GLOSS STOCK FINISH (VS. HIGH GLOSS)
- PLATED FOLLOWER FINISH (VS. BLACK OXIDE)
- INTEGRAL SCOPE MOUNTS (VS. NONE)
- NO SPACERS (VS. (BLACK) SPACERS)
- CHEEKPIECE (VS. NONE)
- ROUNDED RECEIVER CONFIGURATION (VS. FACETED)

FOR FOUR OTHER FEATURES, ONE OPTION "WINS" OVER THE OTHER, BUT NOT AS SIGNIFICANTLY AS THOSE ABOVE:

- BLACK BUTT PAD (VS. BROWN)
- GRIP CAP (VS. NONE)
- ALL SATIN METAL FINISH (VS. ALL POLISHED OR MIXED)
- MONTE CARLO STOCK (VS. STRAIGHT)

FOR THE REMAINING THREE ISSUES, CONSUMER PREFERENCES ARE LESS DEFINITE:

- BARREL CONTOUR (STANDARD BDL VS. LIGHTWEIGHT)
- BOLT BODY FINISH (JEWELLED VS. SATIN BLACK)
- FORE-END TIP (INCLUDED OR NOT)

#

#

#

DETAILED FINDINGS

STOCK CONFIGURATION

ALTHOUGH TWO DESIGN APPLICATIONS ARE AT ISSUE HERE -- MONTE CARLO VS. STRAIGHT STOCK CONFIGURATION AND INCLUSION OR NOT OF A CHEEKPIECE -- THE CLEAR PREFERENCE FOR A CHEEKPIECE IN GENERAL (IN ALL THREE AREAS) AND FOR THE SPECIFIC MONTE CARLO DESIGN (MORESO IN DALLAS) IS EVIDENT, AND ESPECIALLY WHEN BOTH ELEMENTS APPEAR TOGETHER.

REGARDING A CHEEKPIECE IN GENERAL, TWO-THIRDS PREFER IT FOR COMFORT REASONS...

- IT FITS IN THE HOLLOW OF MY CHEEK
- IT FEELS NATURAL AGAINST YOUR CHEEK
- IT SOFTENS THE RECOIL

...AND FUNCTIONAL REASONS:

- IT HELPS ME GET INTO POSITION QUICKER
- IT GETS YOUR GUN A LITTLE STRAIGHTER

BUT A FEW DISAGREE ON BOTH COUNTS:

- IT FEELS TOO FAT
- IT LOOKS FUNNY; IT'S AN ODDITY ON THE GUN
- IT CUTS RIGHT INTO MY CHEECK
- HANDLES POORLY
- IT GETS IN THE WAY WHEN SIGHTING

STOCK CONFIGURATION (CONT'D)

REGARDING THE FOUR STOCK CONFIGURATIONS EXAMINED...

| <u>LIKE BEST</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|------------------------------------|------------------------------|-----------------------------|
| MONTÉ CARLO WITH CHEEKPIECE (S) | 43% | 39% |
| STRAIGHT WITH CHEEKPIECE (Q) | 26 | 24 |
| MONTÉ CARLO WITHOUT CHEEKPIECE (T) | 20 | 19 |
| STRAIGHT WITHOUT CHEEKPIECE (N) | 11 | 9 |
| NO PREFERENCE | - | 9 |

...THE MONTÉ CARLO -- ESPECIALLY WITH A CHEEKPIECE -- IS MOST PREFERRED FOR TWO REASONS: APPEARANCE (BETTER STYLING, EUROPEAN DESIGN, OLD WORLD CRAFTSMANSHIP)...

"HAVING BOTH THE MONTÉ CARLO DESIGN AND THE CHEEKPIECE GIVE IT A REALLY GOOD STYLE. THEY GO TOGETHER."

"IT'S A EUROPEAN STYLE. A LOT OF PEOPLE LIKE THE LOOKS OF IT. BUT THE MORE DROP YOU HAVE, THE MORE YOU WILL FEEL THE RECOIL."

"STRICTLY FROM AN AESTHETIC STANDPOINT, I PREFER THE MONTÉ CARLO DESIGN. IT LOOKS LIKE SOMEONE PUT MORE CARE INTO MAKING IT, MAKING THE SHAPE JUST RIGHT."

"THE CHEEKPIECE AND THE MONTÉ CARLO DESIGN GIVE IT A GOOD ACCENT, A TOGETHERNESS STYLE."

...AND COMFORT...AGAIN MORE SO WITH THE CHEEKPIECE:

"TO SOME DEGREE I SUPPOSE THEY ARE RELATED AS FAR AS OVERALL COMFORT. YOU CAN GET IT CLOSER TO YOUR FACE AND BE MORE COMFORTABLE."

"THE CHEEKPIECE IS MORE COMFORTABLE ON THE MONTÉ CARLO DESIGN. I CAN GET IT HIGHER UP ON MY CHEEK WHERE IT FITS BETTER."

-11-

STOCK CONFIGURATION (CONT'D)

"IT FEELS MORE NATURAL WHEN I THROW IT UP THERE."

"THE CHEEKPIECE FOR ME IS COMFORT AND THE MONTE CARLO STOCK SITS A LITTLE LOWER ON MY SHOULDER (WHICH IS BETTER) AS OPPOSED TO RIDING HIGH LIKE A STRAIGHT STOCK."

"IT DEPENDS ON THE INDIVIDUAL; STRAIGHT STOCKS TEND TO RIDE A LITTLE HIGH AND YOU ABSORB A LITTLE MORE RECOIL IN THE WRONG PLACES THAT WAY. THE MONTE CARLO GETS DOWN CLOSER TO YOUR ARMPIT AS OPPOSED TO RIDING UP HIGHER ON THE BONE; A STRAIGHT STOCK WILL SLIP UP TO YOUR COLLARBONE SOMETIMES."

"I HAD ONE GUN WITH THAT STRAIGHT STOCK WITH NO CHEEKPIECE AND THAT THING JUST KEPT MY CHEEK CUT UP ALL THE TIME. I NEVER HAD ANOTHER ONE OF THOSE."

COMFORT (WITH OR WITHOUT A CHEEKPIECE) IS A SPECIAL ISSUE FOR CERTAIN BODY SIZES...

"I NEED A LITTLE BIT OF TIME IF I WANT TO CRANK THIS BABY UP. I'M TALL AND LANKY AND THAT LITTLE BIT OF RISE IS TO MY BENEFIT BUT I CAN SEE WHERE IT WOULD NOT BE FOR HIM." (WITH A SHORT NECK.)

"I HAVE SMALLER SHOULDERS, THAT'S WHY I LIKE THE MONTE CARLO."

"I HAVE LONG ARMS, A SHORT NECK, AND A FAT FACE, AND THE MONTE CARLO CHEEKPIECE DOESN'T KICK ME AS BAD. IT SEEMS TO FIT ME BETTER."

BUT:

"I LIKE THE MONTE CARLO STYLE, BUT I DON'T LIKE THE CHEEKPIECE. I HAVE LONG ARMS AND USUALLY HAVE TO ADD A LITTLE BIT TO MY STOCK. SOMETIMES I MAY HAVE TO ADD A SPACER IN BETWEEN THE STOCK AND THE BUTT PLATE BUT THEN THE CHEEKPIECE IS IN THE WRONG PLACE."

STOCK CONFIGURATION (CONT'D)

THE MONTE CARLO DESIGN IS ALSO ADVANTAGEOUS IF A SCOPE IS USED:

"THE MONTE CARLO GETS YOUR FACE UP SO YOU CAN SEE BETTER. THAT'S THE WHOLE IDEA OF IT, BE ON YOUR SHOULDER BUT GET YOUR HEAD UP HIGH ENOUGH TO SEE THROUGH THE SCOPE."

"I LIKE THE MONTE CARLO FIRST OF ALL BECAUSE I THINK IT'S THE MOST ATTRACTIVE; SECONDLY, I THINK IT MIGHT BE MY IMAGINATION BUT I THINK THE SCOPE MOUNTS ON IT BETTER."

THE STRAIGHT CONFIGURATION -- AGAIN MORESO WITH A CHEEKPIECE -- IS PREFERRED BECAUSE IT'S THE CLASSIC, TRADITIONAL (ARMY) STYLE THE MEN ARE FAMILIAR WITH...AND IT'S EASIER AND MORE COMFORTABLE FOR THEM TO USE:

"I DON'T LIKE THE MONTE CARLO. IT'S JUST A BIG DIP IN THE STOCK AND IT DOESN'T IMPRESS ME."

"I LIKE THE STRAIGHT. IT'S LIKE GOVERNMENT ISSUE. THERE'S NOTHING TO INTERFERE WITH MY SIGHTING. I DIDN'T LIKE HAVING THE DROP IN THE MONTE CARLO. IF YOU'RE COMING UP FAST YOU CAN HIT ON SOMETHING."

"IT SEEMED LIKE THE RISE IN THAT MONTE CARLO WOULD HIT ME IN THE CHEEKBONE AND DISTRACT ME."

"I LIKE TO EYE THE ANIMAL MYSELF. I'M NOT IN A HURRY SO I CAN PLACE IT WHERE I WANT TO AND IT DOESN'T KICK AS BADLY."

"IF YOU LOOK AT ALL YOUR AUTOMATIC ASSAULT WEAPONS...THE M16, THE CIVILIAN VERSION AND THE AR15, THEY'RE BUILT WITH THE STRAIGHT STOCK. IT COMES STRAIGHT BACK FROM THE BARREL, THERE'S NO DROP WHATSOEVER AND IT ALLOWS YOU TO HOLD IT ON TARGET BECAUSE THERE'S LESS FELT RECOIL AND WHEN YOU'RE SHOOTING A FULLY AUTOMATIC WEAPON THAT'S VERY IMPORTANT."

STOCK CONFIGURATION (CONT'D)

"IT'S A PROVEN FACT THAT WITH ANY WEAPON, THE LESS DROP IN THE WEAPON...BY DROP I MEAN THE LINE FROM THE BARREL TO WHERE IT COMES INTO YOUR SHOULDER...THE LESS FELT RECOIL YOU HAVE. THIS IS WHY THEY BUILT ALL YOUR ASSAULT WEAPONS WITH A STRAIGHT LINE."

BUT ON THE LATTER POINT, THERE IS DISAGREEMENT:

"WITH THE MONTE CARLO, WHENEVER YOU DO HAVE A VERY HIGH POWERED RIFLE AND YOU SHOOT, IT HAS MORE OF A TENDENCY TO GO AWAY FROM YOUR FACE; WITH A STRAIGHT STOCK YOU HAVE MORE OF A TENDENCY FOR IT TO HIT YOU IN THE FACE."

"I DON'T LIKE THE STRAIGHT STOCK BECAUSE I BELIEVE THAT IT'S MORE SUSCEPTIBLE TO KICKING THE HELL OUT OF YOU. I THINK THE MONTE CARLO WILL ABSORB MORE RECOIL."

*

*

*

IN SUM, THE GROUPS' PREFERENCE FOR A MONTE CARLO OR A STRAIGHT STOCK ARE DRIVEN BY THREE TYPES OF BENEFITS -- (COSMETIC) APPEARANCE, FUNCTION, AND COMFORT -- WITH THE MONTE CARLO'S STRENGTHS IN COSMETIC AND COMFORT BENEFITS MAKING IT THE WINNER.

INCLUSION (OR NOT) OF A CHEEKPIECE ALSO REFLECTS ALL THREE ISSUES, AND IN THE CASE OF THE CHEEKPIECE ITS GOOD "FIT" WITH THE MONTE CARLO DESIGN.

METAL FINISH

ON THE RECEIVER, A SATIN FINISH IS CLEARLY PREFERRED OVER A POLISHED FINISH OR A COMBINATION FINISH. CONCERN ABOUT GLARE IS THE OVERRIDING ISSUE, FOLLOWED BY AN AESTHETIC PREFERENCE FOR A SHINY OR A FLAT/ SATIN FINISH.

| <u>LIKE BEST</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|-------------------------------------------------|------------------------------|-----------------------------|
| ALL SATIN METAL WORK (S) | 65% | 59% |
| ALL POLISHED METAL WORK (N) | 28 | 32 |
| SATIN RECEIVER WITH POLISHED SIDE PANELS (Q) | 7 | 7 |

THE SATIN FINISH CLEARLY IS MORE PRACTICAL FOR THOSE TO WHOM THE GLARE ISSUE IS A CONCERN:

"BEING A RETIRED MARINE INVOLVED WITH FIREARMS FOR 22 YEARS, WHEN WE'D GO TO THE RANGE TO FIRE, THE FIRST THING THAT WE'D DO IS GET A CARBIDE LAMP OUT AND BLACKEN THOSE PARTICULAR AREAS ON OUR SERVICE WEAPON TO MAKE THEM NON-REFLECTIVE, TO GET A BETTER SIGHT PICTURE, NOT DISTRACTED BY SOMETHING UP THERE THAT MIGHT HAVE A LITTLE SHINY SPOT."

"IT'S THE DISTRACTION POINT. WHENEVER I SEE A REAL GLOSSY GUN I THINK OF A BB GUN. I DON'T LIKE IT, DON'T LIKE THE LOOKS OF A REAL SHINY BARREL; I THINK SOMETHING LESS FLASHY IS BETTER."

"I LIKE THE MATTE FOR CONCEALMENT, LACK OF GLARE -- IT MAKES A DIFFERENCE."

"THE HIGHLY POLISHED FINISH WILL REFLECT MOONLIGHT."

"DEER DON'T SEE COLOR. DEER HAVE HIGH CONTRAST VISION. THEY SEE DARK OR THEY SEE LIGHT SO THEY PERCEIVE MOVEMENT; AND WHEN THEY SEE SOMETHING OF HIGH CONTRAST MOVING THAT'S WHAT THEY INTERPRET. THE MATTE FINISH DOESN'T REFLECT, IT WON'T GLARE."

METAL FINISH (CONT'D)

TO SOME, THE SATIN IS NOT ONLY PRACTICAL IN USE, IT HAS AND KEEPS A BETTER "QUALITY LOOK":

"IN FAVOR OF THE SATIN, I THINK THAT'S BEEN COVERED. IT LOOKS BETTER, DOESN'T SHOW THE FINGERPRINTS AS MUCH. AND AS FAR AS THE Q IS CONCERNED, I JUST SEE NO POINT IN HAVING A LITTLE PIECE THAT'S DIFFERENT. A RIFLE IS SUPPOSED TO BE FUNCTIONAL AND EASY TO MAINTAIN."

"I'VE NEVER LIKED A SHINY FINISH. IT SCRATCHES TOO MUCH AND LOOKS LIKE HELL, HARDER TO TAKE CARE OF."

"IT BLENDS IN BETTER WITH THE WOOD. DOESN'T OUTSHINE IT."

"A SHINY FINISH IS MORE SUSCEPTIBLE TO MOISTURE; THE DULL FINISH HAS A PROTECTIVE COATING."

ALTHOUGH IMPRACTICAL IN USE, BECAUSE OF THE GLARE, SOME OF THE SATIN PREFERRERS ADMIT A SHINY POLISHED FINISH IS AESTHETICALLY ADVANTAGEOUS:

"I PICKED S BECAUSE OF THE FACTOR OF DISTRACTION. IF I WANTED TO HANG IT ON THE WALL I'D WANT THE OTHER ONE, THE HIGH GLOSS, BUT IF I'M GOING TO BE HUNTING WITH IT I'D PREFER THE OTHER ONE."

"ALL MY RIFLES ARE POLISHED AND THEY DO WORK GOOD, BUT FUNCTIONALLY A SATIN FINISH IS MORE DESIRABLE. I BUY THE CONCEPT OF REFLECTION."

ON THE OTHER HAND, THOSE WHO PREFER THE POLISHED LOOK FEEL IT IS MORE PRACTICAL, EASIER TO MAINTAIN...

"IN THE PACIFIC NORTHWEST YOU HUNT A LOT IN THE RAIN. IF YOU LOOK CAREFULLY AT THE MATTE FINISH, YOU'LL SEE LITTLE NOTCHES IN IT. WATER GETS UNDER THOSE NOTCHES AND STARTS TO RUST. THE POLISH DOESN'T HOLD MOISTURE; IT BEADS AND SLIDES OFF."

METAL FINISH (CONT'D)

"I PICKED THE SHINY ONE BECAUSE IT HAD BEEN POLISHED BETTER AND TO ME WHEN YOU'RE OUT IN THE WEATHER, IT'S EASIER TO CLEAN BECAUSE IT HAD BEEN INITIALLY POLISHED. WITH YOUR DULL FINISH IT'S APT TO RUST QUICKER."

"THE HIGHER POLISHED ONE MIGHT NOT RUST AS MUCH BECAUSE THE PORES IN THE METAL ARE A SLICKER FINISH. IT'S ALSO LESS SUSCEPTIBLE TO MARS AND SCRATCHES BECAUSE IT'S SEALED UP. IT WOULD SHED WATER."

"SHINE TAKES MUCH MORE ABUSE."

"WITH THE POLISHED, YOU MAY SEE ALL THE FINGER-PRINTS SOONER BUT YOU CAN WIPE THEM OFF SO EASILY. IT ALL DEPENDS ON HOW MUCH YOU CARE ABOUT HOW YOUR GUN LOOKS."

...AND MORE AESTHETICALLY DESIRABLE:

"IF I'M GOING TO BUY SOMETHING IT BETTER SHINE. I AIN'T GOING TO BUY A CAR IF IT'S FLAT BLACK."

"THE SATIN ONE LOOKS LIKE THE INSIDE OF MY SHOTGUN BARREL AFTER I'VE BEEN SHOOTING; LOOKS LIKE IT'S COVERED WITH RESIDUE, NOT POLISHED, NOT CLEAN."

"YOU PICK UP A RIFLE AND WHAT APPEALS TO YOU IS WHAT YOU'RE GOING TO BUY. MOST OF THE MANUFACTURERS THAT ARE ON THE MARKET TODAY NORMALLY HAVE GOOD QUALITY MERCHANDISE, A GOOD RIFLE, GOOD BARREL, GOOD RECEIVERS, EVEN THE BOLTS ARE WELL MACHINED, SO I THINK IT'S WHEN YOU PICK IT UP IT'S HOW IT FEELS IN YOUR HAND AND WHAT APPEALS TO THE EYE. A GOOD POLISH SAYS SOMEONE CARES."

METAL FINISH (CONT'D)

ONLY FOUR HUNTERS -- THOSE WHO REALLY PREFER A POLISHED LOOK BUT FEAR THE GLARE -- CHOOSE THE COMPROMISE BECAUSE THE SHINY SIDES WON'T BE AS VISIBLE AS A SHINY TOP WOULD BE:

"THIS IS BETTER THAN THE TOTAL SATIN FINISH, BECAUSE THE DULL FINISH DOESN'T APPEAR TO BE WHAT I CONSIDER QUALITY. THIS IS DULL FINISH FOR A REASON, TO CUT DOWN ON ANY GLARE OR REFLECTION THAT YOU MIGHT GET OUT OF BRIGHT SUNLIGHT BUT ENOUGH SHINE TO LOOK GOOD."

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IN SUM, ALTHOUGH A SINGLE FUNCTIONAL ISSUE -- NO GLARE -- MAKES THE SATIN FINISH A FAVORITE, APPEARANCE (BOTH COSMETIC AND MAINTENANCE) BENEFITS ALSO IMPACT HEAVILY, AND ABOUT EQUALLY, ON RESPONDENTS' CHOICES.

BOLT BODY FINISH

WHEN LIMITED TO THE FINISH OF THE BOLT BODY, THE PREFERENCE FOR A JEWELLED OR A SATIN BLACK OXIDE FINISH IS ALMOST A DRAW,,,PROBABLY BECAUSE IN THIS CASE THE OVERRIDING ISSUE OF GLARE IS NOT AS SERIOUS A CONCERN; NOR IS THE POSSIBILITY OF DAMAGE TO THE FINISH. THE EXCEPTION IS THE SEATTLE GROUPS, WHERE THE PREFERENCE IS CLEARLY FOR THE JEWELLED FINISH.

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|-----------------------|------------------------------|-----------------------------|
| JEWELLED (BDL) (N) | 55% | 55% |
| SATIN BLACK OXIDE (R) | 45 | 45 |

PREFERENCE FOR THE JEWELLED FINISH IS BASED ON BOTH AESTHETIC AND FUNCTIONAL ADVANTAGES. AESTHETICALLY IT IS SEEN AS MORE ATTRACTIVE, WITH A HIGH QUALITY LOOK AND THE MARK OF CRAFTSMANSHIP:

"IT SHOWS CRAFTSMANSHIP MORE THAN THAT OLD UGLY BLACK MATTE FINISH. I DON'T CARE HOW GOOD IT IS, IT JUST LOOKS CRUDDY. I NEVER HAVE LIKED THAT."

"I THINK THE BLACK LOOKS CHEAP. THE OTHER ONE (THE JEWELLED) LOOKS LIKE IT'S SUPPOSED TO LOOK, NICE CLEAN MACHINED BOLT."

"THE JEWELLED BOLTS HOLD THEIR RETAIL VALUE. IF YOU BUY BOTH GUNS AND BOTH GUNS ARE THE SAME PRICE, THE JEWELLED BOLT WOULD HOLD ITS VALUE MORE."

BOLT BODY FINISH (CONT'D)

"WHEN THEY MAKE A NICE FINISH LIKE THAT (THE JEWELLED FINISH), IT SHOWS THAT THEY SPENT A LITTLE MORE TIME ON IT. WITH THE BLACK OXIDE THEY JUST BASICALLY DROP IT IN A TANK AND LET IT GO AND YOU DON'T SEE WHAT YOU GET, ESPECIALLY ON A LOT OF IMPORTED MACHINERY. IT WAS CRANKED OUT ON A LATHE, THEY JUST MADE THE THING AND YOU CAN'T REALLY TELL ANY BLEMISHES OR FLAWS IN IT."

"I SAID THE JEWELLED ONE WOULD BE BETTER AND I'D LIKE TO OWN IT. IT SHOWS IT WAS MORE CARED FOR. I HAVE BLACK ON EVERYTHING I HAVE, IT'S ALL OLD AND BEAT UP. IF I WERE GOING TO BUY ONE I'D BUY THE JEWELLED."

"THE GUNSMITH WILL CHARGE YOU \$50 TO PUT THAT JEWELLED FINISH ON THAT BOLT BUT I'D PAY THE \$50. I THINK THE JEWELLED LOOKS LIKE IT'S GOT MORE QUALITY."

"I THINK THE JEWELING MAKES IT LOOK BETTER. IN HUNTING SITUATIONS IF YOU'RE WORRIED ABOUT THE REFLECTION OFF OF IT, YOU CAN ALWAYS COVER IT UP, BUT THAT BLACK IS WITH YOU FROM NOW ON, IT'S GOING TO SCRATCH."

AND THE JEWELLED SURFACE HAS FUNCTIONAL ADVANTAGES, TOO. THE SMOOTH SURFACE AND SHINY FINISH WILL MAKE IT EASIER TO SEE AND CLEAN THE DIRT; ITS (MAINTAINABLE) SMOOTHNESS WILL ALSO RESULT IN BETTER (SLIDING) OPERATION:

"WITH THE JEWELLED IT'S EASIER TO SEE EVERY SPECK OF DIRT. YOU CAN MAKE SURE ALL SEDIMENT IS REMOVED."

"THE JEWELLED FINISH FEELS SMOOTHER. BLACK STARTS TO WEAR AND STARTS TO SHOW SILVER STREAKS. SO ANIMALS WILL SEE THESE STREAKS AS READILY AS THE JEWELLED FINISH."

BOLT BODY FINISH (CONT'D)

"I THINK THE JEWEL FINISH WOULD BE A SMOOTHER OPERATION AND EASIER TO TAKE CARE OF. IT SEEMS LIKE THE ROUGHER FINISH WOULD HAVE PROBLEMS WITH IT IN DAMP WEATHER OR IF DROPPED OUT OF A TREE."

"IN MY OPINION, AND I LOOKED AT THEM BOTH PRETTY CLOSE...A RIFLE IS A PRECISION MACHINE AND ALTHOUGH THEY BOTH LOOKED TO BE PRETTY WELL MACHINED, I FEEL THAT THE JEWEL BOLT PROBABLY HAD A LITTLE MORE CARE PUT INTO THE MANUFACTURE OF IT, THAT THE TOLERANCES MIGHT BE A LITTLE CLOSER. YOU WANT THAT BOLT TO OPERATE SMOOTH. I'VE ALWAYS FELT IT'S A SIGN OF GOOD WORKMANSHIP, THE JEWEL BOLT, IT SHOULD HAVE A SMOOTHER ACTION."

AND BECAUSE OF ITS LOCATION, GLARE DISTRACTIONS WOULD BE MINIMAL:

"I QUESTION THAT IT'S DISTRACTING BECAUSE WHEN I SEE THAT DEER, THAT BOLT IS GOING TO BE IN THAT BARREL AND THAT DEER CAN'T POSSIBLY SEE THAT."

"YOU CAN HOLD YOUR HAND OVER IT IF NOTHING ELSE. ALSO, THERE ARE DIFFERENT TYPES OF CAMOUFLAGE PAINT THAT ARE READILY REMOVABLE WHEN YOU GET DONE HUNTING."

"WITH A BIG GAME GUN YOU'RE NOT GOING TO BE SHOOTING AN ANIMAL 20 OR 30 FEET WHERE YOU'RE WORRIED ABOUT HIM SEEING THE GUN; NORMALLY YOU'RE GOING TO BE 100 YARDS OR FURTHER OFF."

BUT MANY DISAGREE AND BASE THEIR PREFERENCE FOR THE BLACK OXIDE FINISH LARGELY ON A REJECTION OF THE PERCEIVED GLARE CAUSED BY THE JEWEL FINISH:

"I DON'T LIKE IT FROM A HUNTING POINT OF VIEW. IF THE SUN HIT IT RIGHT, AN ANIMAL WILL SPOT IT."

"I PICKED BLACK BECAUSE I FELT THE JEWEL BOLT WAS GOING TO BE A LITTLE DISTRACTING."

BOLT BODY FINISH (CONT'D)

"I DON'T PARTICULARLY CARE FOR THE BLACK OXIDE BUT MY PREFERENCE STILL WOULD BE A DARK FINISH, PRIMARILY FOR CONCEALMENT. I'M NOT SO MUCH WORRYING ABOUT THE ANIMAL I WAS GOING TO SHOOT BUT OTHER ANIMALS IN THE AREA. SOMETIMES YOU GET TWO SHOTS, BELIEVE IT OR NOT. COMING UP TO DRAW ON AN ANIMAL, THE GLARE OFF THE BOLT MIGHT VERY WELL SPOOK THE ANIMAL IN FRONT OF ME."

SOME DO PREFER THE LOOK OF THE DULL BLACK FINISH...

"I WOULDN'T MIND A SHINY FINISH IF IT WASN'T JEWELLED. IT LOOKS SO CHEAP. AT LEAST THE BLACK LOOKS LIKE A GUN IS EXPECTED TO LOOK."

"I LIKE THE BLACK ONE FOR APPEARANCE. IT BLENDS WITH THE OTHER BLACK TOUCHES."

"I JUST DON'T LIKE ANYTHING REAL SHINY OR WITH A LOT OF DOO-DAD SCROLL. A RIFLE HAS A PURPOSE. A SHOW TYPE PISTOL CAN HAVE A LOT OF DOO-DADS AND THAT'S OK. BUT A RIFLE IS BASIC."

"I LIKE THE BLACK FINISH -- BECAUSE IT'S BLACK. I'M REAL CONSERVATIVE. I THOUGHT IT LOOKED MORE EXPENSIVE."

...AND THE EASE OF MAINTAINING THAT LOOK:

"I PREFER THE DARK ONE BECAUSE I CAN ALWAYS GO BACK AND BLUE IT WHEN IT GETS SCRATCHED UP AND BEAT UP TOO BAD AND RUSTED OVER. I CAN GO BACK AND POLISH IT UP."

"I WOULD PREFER A DARK BOLT BECAUSE IT'S EASIER TO TAKE CARE OF, IT'S ALREADY OXIDIZED SO IT'S NOT GOING TO OXIDIZE THAT MUCH MORE. A JEWELLED FINISH, ONCE IT'S SCRATCHED YOU CAN'T DUPLICATE IT BECAUSE THE JEWELING IS OVERLAPPED."

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IN SUM, ALTHOUGH THE GROUPS' CHOICES ARE EQUALLY IMPACTED BY APPEARANCE BENEFITS (MORE COSMETIC THAN MAINTENANCE ORIENTED), IT IS THE INCLUSION OF MORE ATTRIBUTED FUNCTIONAL BENEFITS THAT MAKES THE JEWELLED FINISH THE (SLIGHT) FAVORITE.

STOCK FINISH

IN ALL THREE AREAS MOST OF THE HUNTERS CLAIM THEY PREFER A LOW GLOSS FINISH ON THE STOCK. BEYOND THE VERY REAL ISSUE OF GLARE, AND SOME SLIPPAGE CONCERNS, THE CHOICE IS ONE OF PERSONAL (AESTHETIC) PREFERENCE, SOMEWHAT MORE ALLIED TO MAINTENANCE FOR THE LOW GLOSS AND "LOOK" FOR THE HIGH GLOSS.

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|-------------------|------------------------------|-----------------------------|
| Low gloss (Q) | 82% | 89% |
| High gloss (P) | 18 | 11 |

BEYOND THE ALL-IMPORTANT GLARE ISSUE, LARGELY RESPONSIBLE FOR THE PREFERENCE FOR LOW GLOSS...

"I'VE SEEN A LOT OF HUNTERS COME THROUGH THE WOODS AND YOU'LL SEE A FLASH, IT MAY NOT EVEN BE THE GUN BARREL, A LOT OF TIMES IT'S THE STOCK -- THE FLASH OF LIGHT OFF THAT STOCK, YOU CAN SPOT IT, IT'S LIKE HAVING A MIRROR IN YOUR ARM."

"MYSELF, IF I HAD BOTH OF THEM SITTING THERE, SAME PRICE, SAME CALIBERS, SAME EVERYTHING, I'D GO WITH THE SLIGHTLY DULLER FINISH. YOU'D SPOOK EVERY HEAD OF GAME IN 10 COUNTIES WHEN THE SUN HITS IT."

...AND SOME INCREASED COMFORT IN HOLDING A NON-SLICK STOCK...

"I LIKE THE SATIN FINISH. I FEEL IT WOULDN'T SLIP OUT OF MY HANDS AS EASILY. IF YOUR HANDS ARE WET OR IF YOU DROP THE GUN YOU'RE NOT GOING TO BE ABLE TO HOLD (P) AS WELL BECAUSE HIGH GLOSS IS SLIPPERY."

"THE HIGH GLOSS FEELS MORE LIKE GLASS. IT MAKES ME FEEL LIKE I'VE GOT SWEATY HANDS."

STOCK FINISH (CONT'D)

"BECAUSE THE POLYURETHANE ON THE HIGH GLOSS IS SO HARD TO SAND DOWN. HAVE YOU EVER TRIED TO SAND THAT?"

"WITH THE HIGH GLOSS I'M PRETTY SURE IT DOES HAVE POLYURETHANE ON IT WHICH MAKES IT HARD TO SCRATCH, BUT WHEN IT DOES IT WOULD BE HARDER TO FINISH OUT."

"IT HAS A VERY THIN COATING WHICH IF I SCRATCHED IT UP I COULD SAND IT BACK DOWN AND REFINISH IT MYSELF WHICH I'VE DONE WITH MOST OF MY GUNS ANYHOW."

SOME WHO OPT FOR THE LOW GLOSS, ADMIT THAT THEY DO PREFER THE HIGH GLOSS LOOK BUT DON'T FEEL IT'S WORTH THE SACRIFICE:

"I HAD BOUGHT ONE WITH A GLOSS FINISH FOR THE COSMETICS. BUT IT IS SUBSTANTIALLY SLICKER THAN THE MATTE TO HANDLE AND IT DOES SHOW HANDPRINTS AND SCRATCHES REAL BAD."

OR OTHERS FEEL THE DECISION SHOULD BE BASED ON INTENDED USE:

"I THINK THAT WHAT YOU INTEND TO USE THE GUN FOR HAS A LOT TO DO WITH IT. IF IT'S GOING TO BE A GUN THAT YOU'RE GOING TO TAKE TO THE FIELD, THEN MY PREFERENCE WOULD BE THE LOW GLOSS. BUT IF IT'S A GUN FOR SHOW OR YOU'RE ONLY GOING TO PUNCH PAPER WITH IT THEN I MIGHT PREFER THE HIGH GLOSS."

"IF IT'S A WORKING GUN THAT'S GOING TO BE RATTLING AROUND IN THE BACK OF A PICKUP AND OUT IN THE FIELD I'D RATHER HAVE THE LOW GLOSS. BOTH OF MINE, I SCRAPED OFF THE ORIGINAL FINISH AND RE-DID THEM IN LINSEED OIL."

"IT'S TRUE THE FIRST TIME YOU CROSSED A BARBED WIRE FENCE IT WOULD PROBABLY SCRATCH IT, SO MAYBE THAT COULD BE YOUR SUNDAY GUN. IF I WERE GOING TO BUY ONE GUN AND HAVE ONE GUN IT WOULD PROBABLY BE THE DULLER FINISH, BUT I DO PREFER THE LOOKS OF THE SHINY."

STOCK FINISH (CONT'D)

"I LIKE THE STOCK AS IT WAS SHOWN THERE AND THE OTHER ONE DID LOOK LIKE IF YOUR HANDS WERE DAMP OR IF YOU HAD A GLOVE ON, THE THING WOULD SLIP ON YOU, I JUST PREFER A SEMI-GLOSS STOCK."

...THE REMAINING DECISIONS FOR THE LOW GLOSS STOCK ARE BASED ON A PERSONAL PREFERENCE FOR THE SATIN OR THE MATTE LOOK:

"THAT SOFTER FINISH BRINGS OUT THE BEAUTY OF THE WOOD."

"EVEN THOUGH I OWN ONE WITH THE HIGH GLOSS FINISH MY PREFERENCE WOULD BE THE LOOK OF THE MATTE FINISH. ACTUALLY MY PREFERENCE WOULD BE NO FINISH, JUST OIL TO COMPLEMENT THE GRAIN OF THE WOOD."

"IT LOOKS AND FEELS MORE NATURAL, NOT PLASTICKY LIKE THE HIGH GLOSS."

"I LIKE THE FEEL OF NATURAL WOOD AND WITH THIS I FEEL LIKE I'M HOLDING WOOD."

AND THE EASE OF MAINTAINING A LOW GLOSS FINISH IS ESPECIALLY IMPORTANT TO THOSE WHO DON'T LIKE TO FUSS:

"I PICKED THE LOW GLOSS BECAUSE I DON'T LIKE TO FUSS WITH MY GUNS. YOUR HIGHER GLOSS WILL SHOW YOUR SCRATCHES, YOUR LOW GLOSS I CAN JUST TAKE SOME OIL AND RUB OVER THEM AND IT KIND OF HIDES THEM. EVERYONE DOESN'T POINT THEIR FINGER AT YOU AND LAUGH BECAUSE YOUR GUN IS ALL MESSED UP."

"I LIKE LOW GLOSS BECAUSE IT CAN HAVE A HARD FINISH WITHOUT SHINE."

"IT DOESN'T GET CLOUDY WHEN WET LIKE THE GLOSS."

STOCK FINISH (CONT'D)

REGARDING THE HIGH GLOSS, THE PREFERRERS MAY BE FEWER IN NUMBER BUT THEY ARE MUCH MORE VOCAL. THEY REALLY ARE "INTO" THAT CHOICE, REJECTING ITS IMPRACTICAL ASPECTS AND SAYING THAT A HIGH GLOSS FINISH LOOKS AND FEELS BETTER, LOOKS MORE EXPENSIVE...

"I LIKE THE WAY IT LOOKS. IT'S NICE AND SHINY WHERE THE DULL FINISH IS PLAIN. IT LOOKS LIKE A MORE EXPENSIVE GUN."

"I HAVE A LOVE AFFAIR WITH MY GUN AND I CARE HOW IT LOOKS. IT'S PRETTIER WITH HIGH GLOSS."

"THE FACTORY PUT A LOT MORE WORK INTO THAT MODEL TO GET THAT GLOSS ON IT. IT SHOWS THE QUALITY OF THE WORKMANSHIP."

"I HAVE TO ADMIT FROM A HUNTER'S STANDPOINT THAT THE GLOSS MIGHT NOT BE THE BEST. I LIKE IT BECAUSE I LIKE TO SHOW OFF. I'VE GOT A WHOLE WALL FULL OF THE SUCKERS!"

...AND IS EASY TO KEEP THAT WAY:

"YOU CAN WIPE FINGERMARKS OFF WITH A DAMP CLOTH."

"THE DIRT AND RAIN SLIDE RIGHT OFF THAT FINISH. IT'S A TOUGHER FINISH AND WON'T SCRATCH AS EASILY."

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IN SUM, ONCE AGAIN THE (FUNCTIONAL) ISSUE OF GLARE (ABETTED BY A COMFORT BENEFIT) OVERRIDES ONE'S, SOMETIMES QUITE STRONG AESTHETIC PREFERENCE, MAKING THE LOW GLOSS FINISH AN APPARENT OVERWHELMING FAVORITE. NEVERTHELESS, A POSSIBLE RELUCTANCE ON THE PART OF MEN (IN A GROUP) TO ACKNOWLEDGE A SUSCEPTIBILITY TO BRIGHT, SHINY, "GLAMOROUS" SELLING APPEALS SUGGESTS THAT PREFERENCE FOR THE HIGH GLOSS STOCK FINISH MAY BE CONSIDERABLY UNDERSTATED HERE.

BARREL CONTOUR

AMONG THE SAMPLE AS A WHOLE, THE CHOICE BETWEEN A LIGHTWEIGHT OR STANDARD SIZE BARREL IS NON-DEFINITIVE, WITH SEATTLE HUNTERS SLIGHTLY MORE IN FAVOR OF THE LIGHTWEIGHT; KANSAS CITY HUNTERS MORE APT TO FAVOR THE STANDARD SIZE; AND DALLAS HUNTERS ABOUT EVENLY DIVIDED.

EACH BARREL CONTOUR HAS ITS OWN UNIQUE ADVANTAGE(S)...

- THE STANDARD BARREL IS PREFERRED FOR MORE ACCURATE SHOOTING; ITS WEIGHT MAKING IT MORE STABLE, STEADY AND STURDY
- THE LIGHTWEIGHT IS PREFERRED FOR ALL DAY HUNTING -- LESS SHOULDERING, LESS LUGGING

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|------------------------|------------------------------|-----------------------------|
| BDL CONTOUR (R) | 53% | 57% |
| LIGHTWEIGHT BARREL (Q) | 47 | 43 |

ON THE ACCURACY ISSUE PREFERRERS OF THE HEAVIER BARREL SAY:

"IT WILL MAKE ME A BETTER SHOT."

"IT'S THE WEIGHT. I ALSO SHOOT A BOW AND HAVING WEIGHT OUT AT THE END OF IT HELPS ME TO STEADY THE WEAPON."

BARREL CONTOUR (CONT'D)

"I'VE NOTICED YOUR SHARPSHOOTERS, THE GUYS WHO SHOOT ALL THE TIME, HAVE A THICKER BARREL."

"THE HEAVIER BARREL DEFINITELY HAS MORE STABILITY. THE MORE TOP HEAVY OR BARREL HEAVY YOU ARE, THE BETTER YOU WILL BE ABLE TO HOLD ON WITHIN REASONABLE LIMITS. OBVIOUSLY A 20 POUND RIFLE YOU'RE NOT GOING TO HOLD ON VERY WELL -- BUT YOU'LL HOLD AN EIGHT POUND RIFLE BETTER THAN YOU WOULD A SIX POUND."

"I WONDER ABOUT ACCURACY. NORMALLY A LIGHT, WISPY BARREL TENDS TO WHIP A LITTLE BIT. SOME OF THEM SHOOT VERY WELL, BUT MY OWN EXPERIENCE WITH THEM IS A LIGHT WISPY BARREL IS VERY FINICKY ABOUT WHAT KIND OF AMMUNITION YOU PUT IN THEM."

"I'M AN ACCURACY NUT AND I'VE HAD BETTER RESULTS OUT OF A STIFFER BARREL AND A STIFFER BARREL IS A THICKER BARREL."

"I'VE SHOT AN AWFUL LOT OF RIFLES AND I KNOW THE WEIGHT FORWARD WILL ALLOW YOU TO HOLD THE RIFLE MORE STEADY AND GET OFF A BETTER SHOT."

AND REGARDING STURDINESS:

"THERE'S A POINT I'D LIKE TO BRING UP ON THAT SMALL BARREL... I'M A LITTLE CLUMSY WHEN I HUNT AND I'D HATE TO DROP THAT; NOT ENOUGH METAL THERE TO WITHSTAND THE DROP THAT I'D PUT ON IT."

"I WOULDN'T POLE VAULT BARBED WIRE FENCES WITH THAT."

"I HAVE SLIPPED AND I HAVE DROPPED AND I THINK THAT LIGHTER BARREL WOULD BEND."

BARREL CONTOUR (CONT'D)

ON THE OTHER HAND, PREFERRERS OF THE LIGHTWEIGHT BARREL OPT FOR COMFORT...

"I SPENT A WHOLE WEEKEND PULLING MY SHOULDER OUT OF ITS SOCKET WITH A HEAVY BARREL."

"I PREFER THE TAPERED BARREL FROM THE STAND-POINT OF LIGHTNESS BECAUSE I'VE GOT A HEAVY BARREL AND I'M SICK AND TIRED OF LUGGING IT AROUND -- IT'S NINE AND A HALF POUNDS."

...ESPECIALLY FOR CERTAIN SITUATIONS:

"I LIKE THE FEEL AND THE WEIGHT OF THE LIGHTER BARREL, IF I'M GOING TO CARRY THE DAMN THING ALL DAY. I'M CONSCIOUSLY TRADING OFF RECOIL AND STABILITY -- BUT I CAN GIVE THOSE UP FOR PACKING THE THING AROUND ALL DAY."

"WHEN I DEER HUNT, I DEER HUNT FOR A WEEK AND DO A LOT OF WALKING. I HAD THIS WEATHERBY AND I WAS GOING TO GO TO A SHORTER AND A LOT LIGHTER GUN. I WENT TO THE RUGER AND IT'S GOT A LIGHTER BARREL, A LOT SHORTER BARREL THAN THE WEATHERBY - IT'S GOT AN 18½ INCH BARREL AND I AM VERY PLEASED WITH ITS ACCURACY."

"WEIGHT IS MORE OF AN ISSUE DEPENDING UPON HUNTING. IF YOU WERE GOING UP A MOUNTAIN AND YOU'VE GOT AN EXTRA HALF A POUND YOU DON'T WANT TO LUG IT UP THAT MOUNTAIN BECAUSE IT CAN BREAK YOU DOWN. BUT IF YOU'RE STANDING DOWN THERE IN THE TARGET RANGE YOU DON'T HAVE TO LUG THAT EXTRA HALF A POUND, YOU CAN PUT IT OUT THERE ON THE END OF THE BARREL WHERE IT WILL HOLD YOU DOWN A LITTLE MORE SOLID."

TO A LESSER EXTENT, OTHER ISSUES INFLUENCING THE PREFERENCE FOR A LIGHTWEIGHT BARREL ARE ITS SLEEK APPEARANCE...

"I LIKE THE LOOKS. TRUE, IF YOU'RE SHOOTING FIVE OR 10 SHOTS A THICKER BARREL IS MORE ACCURATE, BUT I DON'T USUALLY NEED THAT MANY SHOTS."

"I PICKED THE LIGHTWEIGHT JUST FOR ITS STREAM-LINED LOOK. I'M BUYING THIS MANUFACTURER'S WEAPONS ANYWAY AND THEY MAKE THE FINEST IN THE WORLD. YOU CAN'T TELL TOO MUCH ABOUT PERFORMANCE, YOU'VE GOT TO GO ON LOOKS."

...AND THE FACT THAT BALANCE AND PERFORMANCE ARE MORE SIGNIFICANT THAN WEIGHT:

"THE SLENDER BARREL NOT ONLY LOOKS BETTER BUT INCIDENTALLY IT DOESN'T OBSTRUCT MY SIGHT AS MUCH."

"THE (COMPANY) WITH ITS ULTRA LIGHT RIFLES SHOWED THAT ALTHOUGH IT MIGHT VIBRATE, IT VIBRATES THE SAME ALL THE TIME AND IT IS CONSISTENT. IT'S A GOOD SHOOTING RIFLE, SO WHY BOTHER WITH LUGGING THE EXTRA STEEL AROUND, YOU'RE OUT THERE TO HUNT."

THE MEN HAVE MIXED REACTIONS AS TO WHICH BARREL CONTOUR CAN BETTER WITHSTAND HEAT AND SOFTEN THE RECOIL. ADVOCATES OF THE HEAVIER BARREL SAY:

"A HEAVIER BARREL WILL SOFTEN THE RECOIL EFFECT WHEREAS WITH A LIGHT ONE, YOU'D BE TAKING THE KICK."

"TO ME A HEAVIER BARREL WILL WITHSTAND MORE HEAT AND IT'S MORE DURABLE. IT WILL LAST LONGER BECAUSE THE HEAT WILL MAKE A GUN EXPAND AND IF YOU'RE OUT IN THE COLD IT WILL HOLD THE HEAT, NOT JUST ABSORB AND MAKE THE BARREL WARP."

"AT A RIFLE RANGE, THE BARREL GETS GOOD AND TOASTY. I DON'T KNOW IF THE LIGHTWEIGHT BARREL COULD TAKE IT."

BUT THE SAME ADVANTAGES ARE SOMETIMES ATTRIBUTED TO THE LIGHTER BARREL:

"I CHOOSE THE LIGHTWEIGHT BECAUSE THERE ISN'T AS MUCH METAL TO HOLD THE HEAT."

"IT'S LIGHTER AND WON'T KICK AS HARD."

"THAT HEAVIER GUN IS GOING TO KICK MY SHOULDER OUT OF THE SOCKET.:"

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IN SUM, CONSUMER PREFERENCES REFLECT INTEREST IN THE VERY DIFFERENT PERCEIVED ATTRIBUTES OF THE TWO BARREL CONTOURS: PREFERENCE FOR THE STANDARD BDL BARREL IS DRIVEN BY FUNCTIONAL AND (MAINTENANCE) APPEARANCE BENEFITS; FOR THE LIGHTWEIGHT BARREL, BY COMFORT AND (COSMETIC) APPEARANCE BENEFITS.

FOLLOWER FINISH

FOR THIS FEATURE, UNLIKE THE PREVIOUS TWO METAL FINISH OPTIONS (RECEIVER AND BOLT BODY), THE PLATED FINISH IS CLEARLY MORE DESIRABLE THAN THE BLACK OXIDE FINISH...AND BECOMES EVEN MORE SO AFTER THE DISCUSSION. AGAIN, SEATTLE HUNTERS SHOW AN EVEN HIGHER PREFERENCE (VS. THOSE FROM THE OTHER TWO CITIES) FOR A SHINY FINISH.

THE POSSIBILITY OF GLARE EMANATING FROM SUCH AN OBSCURE LOCATION IS LESS A CONCERN FOR THIS FEATURE, RESULTING IN THE FUNCTIONAL BENEFITS ASSUMING GREATER IMPORTANCE.

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|-------------------|------------------------------|-----------------------------|
| PLATED (T) | 70% | 79% |
| BLACK OXIDE (R) | 28 | 21 |
| NO PREFERENCE | 2 | |

THE PLATED FINISH OFFERS TWO ADVANTAGES -- A SLICK SURFACE AND A BRIGHT SURFACE. THE SLICK SURFACE WILL RESIST RUST AND INSURE A SMOOTHER OPERATION:

"THE SHINY IS A LITTLE SMOOTHER AND IT WILL SHOW UP ANY DIRT OR RUST CAUSING SEDIMENT THAT'S IN THERE SO YOU'LL GET A SMOOTHER INSERTION OF THE CARTRIDGE INTO THE CHAMBER, THAN OVER THE DARKER."

FOLLOWER FINISH (CONT'D)

"IF A GUN WASN'T PLATED, I'D TAKE IT OUT AND HAVE IT PLATED. I WANT IT TO BE SHINY AND SLICK BECAUSE THAT'S WHERE THE ROUNDS HAVE TO GO, SO I WANT THE FUNCTIONALLY BETTER FEEDING."

"BECAUSE OF THE SMOOTHER OPERATION I WOULD GO WITH PLATED. SMOOTH SURFACES ALWAYS SEEM TO OPERATE BETTER THAN ROUGH."

THE BRIGHTNESS WILL ENABLE THE HUNTER TO SEE AND REMOVE ANY DIRT OR PARTICLES THAT MAY BUILD UP AND THAT COULD HAMPER THIS SMOOTH OPERATION:

"I PREFER THE DULL LOOK INSIDE BUT I WENT WITH THE SHINY BECAUSE WHEN YOU CLEAN IT, IT WOULD BE EASIER TO SPOT STUFF INSIDE, TO MAKE SURE YOU GOT IT ALL."

"WHENEVER I NEED TO GET INSIDE THE GUN I NEED TO HAVE SOME LIGHT BECAUSE WITH THE LIGHT OBVIOUSLY YOU CAN SEE DIRT AND SCRATCHES AND YOU ALSO CAN USE THAT REFLECTION TO SEE IF YOU HAVE A STILL LOADED GUN...A WHOLE BUNCH OF THINGS."

"WHENEVER YOU OPEN AN ACTION UP IT'S A LITTLE HARD TO SEE IN THERE. THE LIGHT REFLECTING OFF OF THAT PLATE GIVES YOU A CLEAR VISION OF WHAT'S IN THERE SO YOU CAN SEE BETTER, EVEN OUT IN THE FIELD WHERE YOU POSSIBLY PICKED UP SOME TWIGS OR SOME GRAINS OF SAND."

A PLATED FINISH ALSO CONNOTES QUALITY MORE THAN FLAT BLACK...
AT LEAST IN THE WORLD OF GUNS;

"I PICKED THE BRIGHT PLATED BECAUSE IT LOOKED LIKE BETTER QUALITY WORKMANSHIP. IF I BOUGHT A RIFLE LIKE THAT I'D BE SURE IT WAS MADE OUT OF GOOD METAL OR STEEL. THE BLACK MATTE COULD BE MADE OUT OF ANYTHING."

FOLLOWER FINISH (CONT'D)

PREFERENCE FOR A BLACK OXIDE FINISH IS VOICED BY THOSE WHO ARE STILL CONCERNED ABOUT GLARE:

"YOU'D GO BLIND IF IT WERE SUNSHINY."

"I HAVE A DEFINITE FEAR OF ANYTHING THAT SHINES ON A WEAPON; ANYTHING THAT SHINES WILL GIVE AWAY YOUR POSITION."

"WHEN THAT BOLT IS CLOSED IT'S STILL OPEN TO VIEW. IF YOU CLOSE THAT BOLT YOU'RE STILL GOING TO SEE THAT FINISH."

BUT THEY ARE CHALLENGED BY THE OTHER CAMP, AS ILLUSTRATED BY THE FOLLOWING:

"YEAH, BUT WHAT COLOR IS MY UNDERWEAR? IF IT'S INSIDE THE GUN I'M NOT GOING TO WORRY ABOUT IT."

A FEW OF THE BLACK OXIDE PREFERRERS STILL RESIST THE LOOK OF SHINY SURFACES ON THEIR GUNS, OR ANY OF THE BENEFITS ATTRIBUTED TO SHINE:

"I JUST DON'T LIKE A LOT OF CHROME OR SHINE ON MY GUN."

"I CAN'T SEE WHY YOU WOULD WANT IT SHINY. IT JUST SEEMS LIKE IT WOULD BE MORE ELBOW WORK IN THE END."

FOLLOWER FINISH (CONT'D)

DURING THE DISCUSSION, THE ISSUE AROSE OF REAL STAINLESS STEEL VERSUS JUST METAL PLATING. IN SPITE OF THEIR UNCERTAINTY AS TO WHAT THE FINISH IS -- SOLID OR PLATE -- THE PLATE PREFERRERS HOLD THEIR GROUND; THE ISSUE OF RUST BEING AN IMPORTANT ONE:

"A PLATED PIECE IS NOT GOING TO RUST UNTIL THE PLATING WEARS OFF, AND THAT'S GOING TO TAKE A LONG TIME."

"YOU COULD SAY THE STAIN OXIDE FINISH WOULDN'T RUST BECAUSE IT WAS ALREADY OXIDIZED, BUT IT WILL. BUT IF IT'S PLATED THEN OXYGEN IS NOT GOING TO GET AT THE RUST, SO I WOULD RATHER GO WITH PLATED."

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IN SUM, CONSUMERS' CHOICES ARE BASED ON APPEARANCE (COSMETIC AND MAINTENANCE) AND FUNCTIONAL BENEFITS -- BOTH OF THESE STRONGER FOR THE PLATED FINISH MAKING IT THE CLEAR FAVORITE.

RECEIVER CONFIGURATION

ALTHOUGH THE HUNTERS, OVERALL, SHOW A SLIGHT PREFERENCE FOR A ROUNDED VERSUS A FACETED RECEIVER, THE RESULTS DO DIFFER BY AREA. BEFORE THE DISCUSSION, BOTH SEATTLE AND KANSAS CITY MEN TEND TO PREFER THE FACETED OPTION, WITH SEATTLE MOVING OVER TOWARD THE ROUNDED ONE AFTER THE DISCUSSION. DALLAS HUNTERS CLEARLY PREFER THE ROUNDED RECEIVER...BEFORE AND AFTER DISCUSSION.

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|----------------------------------------------|------------------------------|-----------------------------|
| ROUNDED RECEIVER WITH INTEGRAL MOUNTS (S) | 56% | 65% |
| FACETED RECEIVER WITH INTEGRAL MOUNTS (R) | 40 | 35 |
| NO PREFERENCE | 4 | - |

THE ROUNDED RECEIVER USUALLY IS PREFERRED FOR COSMETIC REASONS:

"IT LOOKS MORE STREAMLINED, A SMOOTHER LOOK.

"IT MATCHES THE ROUND BARREL. MAKES THE WHOLE THING LOOK MORE UNIFORM."

"I LIKED THE ROUNDED BECAUSE, IT SHOWED A LITTLE MORE WORKMANSHIP, IT'S A LITTLE BIT HARDER TO TURN A CORNER LIKE THAT THAN IT IS TO TURN AN ANGLE. IT LOOKS LIKE THERE'S BEEN MORE EFFORT PUT INTO THE WEAPON."

"I PICKED THE ROUNDED FROM AN AESTHETIC STANDPOINT. IT LOOKED LIKE IT HAD A LITTLE MORE CRAFTSMANSHIP."

RECEIVER CONFIGURATION (CONT'D)

ONLY A FEW FOCUS ON FUNCTIONAL ADVANTAGES -- MAINLY INVOLVING THE BETTER WEAR MADE POSSIBLE BY A ROUNDED DESIGN:

"IT DOESN'T HAVE A SHARP EDGE. IT WOULD BE EASY TO BEAT UP THAT ANGLED EDGE."

"IF YOU GET DIRT ON THE ROUNDED ONE, IT MIGHT BE EASIER TO WIPE."

"BECAUSE THOSE ANGLES ARE WEAR POINTS ON THE BLUING AND VERY SHORTLY THAT RIFLE, IF YOU USE IT VERY MUCH, WILL SHOW LITTLE SILVER STREAKS DOWN THERE, WEAR POINTS -- THAT'S WHERE IT WILL RUST FIRST."

"THE ROUNDED ONE APPEARED TO HAVE MORE METAL IN THE RECEIVER. WITH THE FACETED ONE, TO MACHINE THAT OFF FLAT I HAVE A FEELING THAT THEY WOULD HAVE TAKEN SOME METAL OFF TO GET A FLAT SURFACE THERE. IF THAT RIFLE IS GOING TO BLOW UP IT'S MOST LIKELY GOING TO BE IN THE RECEIVER AREA AND I LIKE TO HAVE THAT MINUTE LITTLE BIT OF EXTRA METAL BACK THERE TO HOLD IT TOGETHER, WHICH PUTS ME WITH THE ROUNDED ONE."

AND TO A VERY FEW THE POSSIBILITY OF GLARE REFLECTING OFF THE ANGLE MAKES THE ROUND SHAPE THEIR PREFERENCE.

RECEIVER CONFIGURATION (CONT'D)

CONVERSELY, PREFERENCE FOR THE FACETED RECEIVER IS BASED MORE ON FUNCTIONAL BENEFITS -- OFTEN INVOLVING EASIER SIGHTING...

"WITH THE OCTOGON SHAPE, IT'S EASIER TO CENTER FOR OPEN SIGHTING."

"THE ANGLE FACETS CUT AWAY, THE METAL ON THE TOP GIVING A CLEARER SIGHTING."

"THERE'S MUCH LESS BULK WHERE YOU SIGHT AND IT MAKES UP FOR IT BY BEING BEFFIER AND STRONGER BELOW."

...AND ADDED STRENGTH:

"TO ME THE FACETED HAS MORE THICKNESS AT THE BOTTOM, WHICH COULD MAKE IT STRONGER AND MORE DURABLE."

"I WENT WITH THE FACETED ONE JUST BECAUSE IT LOOKS STRONG, IT HAS MORE METAL."

"IT ISN'T SO MUCH THAT THE RECEIVER IS FACETED BUT IT IS NOT TURNED DOWN. THE ROUNDED ONE IS TURNING MORE DOWN TOWARD THE DIAMETER OF THE BARREL AND IT'S THINNER, LIGHTER, WITH LESS METAL. THE LARGE ONE, THE FACETED ONE HAS THE APPEARANCE OF STRENGTH WHERE YOU'RE GOING TO NEED IT THE MOST."

RECEIVER CONFIGURATION (CONT'D)

ONLY A VERY FEW CITE COSMETIC ADVANTAGES:

"I LIKE THE LARGER (FACETED) RECEIVER, I THOUGHT IT HAD A DISTINCTIVE LOOK SUCH AS THE OLD WINCHESTER MODEL 12. THE SQUARE TYPE RECEIVER MAKES IT KIND OF STAND OUT. I DIDN'T THINK ABOUT THE STRENGTH OR ANYTHING ELSE."

BEFORE DISCUSSION: IN GENERAL...

| | |
|------------------------------------------|-----|
| PREFER TO HAVE INTEGRAL SCOPE MOUNTS | 69% |
| PREFER NOT TO HAVE INTEGRAL SCOPE MOUNTS | 15 |
| NO PREFERENCE | 16 |

ON THE ISSUE OF INTEGRAL SCOPE MOUNTS IN GENERAL, THE OVERWHELMING PREFERENCE IS TO HAVE THEM BECAUSE OF THE ADVANTAGES OF SCOPES -- THEY OFFER SECURITY, COMFORT AND ARE ESPECIALLY NECESSARY WHEN HUNTING IN THE BRUSH OR FOR A HUNTER WITH POOR EYESIGHT:

"WITH A PEEP SITE YOU CAN REACH OUT FURTHER. AT 200 YARDS YOU CAN PICK OUT THE HAIRS ON A DEER."

"I HAVE A MUCH MORE COMFORTABLE FEELING WHEN I USE MY SCOPED RIFLE."

BUT ALSO BECAUSE TO HAVE THE HOLES DRILLED FOR SCOPE MOUNTS AFTER PURCHASE IS COSTLY AND YOU HAVE TO "TRUST THE EYE OF WHOEVER DRILLS THE HOLES."

A FEW DON'T USE SCOPES -- THEY PREFER OPEN SIGHTING...

"I'D RATHER HAVE MY HEAD OUT IN THE BUSHES. A SCOPE IS A DETRIMENT IN HEAVY BRUSH."

"I PREFER MY OWN EYE TO A MECHANICAL DEVICE."

...OR DON'T WANT TO BE TIED DOWN TO A SPECIFIC MOUNTING:

"YOU'RE TIED TO THAT ONE KIND OF AN INTEGRAL MOUNT, YOU DON'T HAVE THE LATITUDE, YOU CAN'T USE ALL THE SIGHTS THAT ARE AVAILABLE. IT TIES YOU TO THAT ONE MOUNT, THAT KIND OF TELESCOPE."

RECEIVER CONFIGURATION (CONT'D)

ONE HUNTER WHO SHOOTS ABOUT EQUALLY WITH AND WITHOUT A SCOPE CONCEDES THAT HE WOULD RATHER HAVE THE SCOPE THERE AND READY WHEN HE WANTS TO USE IT:

"I GO DOWN TO TENNESSEE HOG HUNTING AND YOU DEFINITELY DON'T WANT A SCOPE DOWN THERE BECAUSE HE'S LOOKING FOR YOU AND YOU DON'T WANT TO TAKE TIME LOOKING FOR HIM IN THE SCOPE. BUT IF I WERE TO GO IN THE STAND THAT SAME AFTERNOON I COULD PUT THE SCOPE BACK ON THE MOUNT AND THERE'S A REASONABLE CHANCE THAT THE SCOPE WOULD BE ABSOLUTELY RIGHT BACK IN PLACE. SO IT'S EASE OF 'ON AND OFFING.' I DO THAT A LOT -- TAKE MY SCOPE ON AND OFF."

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IN SUM, THE GROUPS' PREFERENCES ARE MORE APT TO BE DRIVEN BY (BOTH TYPES OF) APPEARANCE BENEFITS FOR THE ROUNDED; BUT FUNCTIONAL BENEFITS FOR THE FACETED.

PREFERENCE (OR NOT) FOR INTEGRAL SCOPE MOUNTS IS ALMOST ALWAYS FUNCTIONAL AND OFTEN DEPENDENT UPON THE TYPE OF HUNTER/HUNTING.

FORE-END TIP

THE HUNTERS ARE ABOUT EQUALLY INTERESTED (OR NOT) IN A FORE-END TIP IN GENERAL AND REGARDING THE TWO SPECIFIC MODELS SHOWN. HOWEVER, IN BOTH CASES THE CHOICES DIFFER BY AREA -- SEATTLE HUNTERS PREFER THE FORE-END TIP (TWO TO ONE); KANSAS CITY HUNTERS TEND TO FAVOR NO TIP; AND DALLAS HUNTERS ARE EQUALLY DIVIDED.

BEFORE DISCUSSION: IN GENERAL...

| | |
|--------------------------------|-----|
| PREFER HAVING FORE-END TIP | 52% |
| PREFER NOT HAVING FORE-END TIP | 46 |
| NO PREFERENCE | 2 |

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|-------------------|------------------------------|-----------------------------|
| BDL STYLE (S) | 54% | 50% |
| NONE (N) | 46 | 46 |
| NO PREFERENCE | - | 4 |

ADVOCATES OF THE FORE-END TIP FEEL IT SERVES A GOOD PURPOSE...IT PROTECTS A VERY VULNERABLE PART OF THE RIFLE:

"OUT HERE THE HUNTING TERRAIN IS ROUGH, YOU NEED ALL THE PROTECTION YOU CAN GET."

"I WANT TO KEEP MY GUNS NICE SO I CAN PASS THEM DOWN TO MY KIDS."

"I'D BUY ONE WITH A TIP TO PROTECT MY GUN, ESPECIALLY FOR BRUSH HUNTING."

FORE-END TIP (CONT'D)

"YOU CAN CHIP THAT FORE TIP AND THE CHIP WILL RUN BACK A WAYS. WITH PLASTIC YOU'LL BANG UP THE TIP BUT WILL JUST BE A DENT AND ANYHOW IT'S EASY TO REPLACE."

"IF YOU HAD NAKED WOOD UP THERE AND YOU REALLY BANGED IT ON SOMETHING YOU COULD REALLY HIT IT HARD ENOUGH TO CAUSE THAT STOCK TO SPLIT."

AND NOT ONLY DOES IT HAVE A FUNCTIONAL PURPOSE, THEY LIKE THE OVERALL FINISHED, EXPENSIVE-LOOKING APPEARANCE IT GIVES...

"I LIKE THE LOOKS. IT FRAMES THE TIP. IT'S TASTEFULLY DONE. IT MATCHES THE BUTT PAD AND IT'S GOT THE SPACERS, GIVES IT A FINISHED LOOK."

"HISTORICALLY, THE TIP HAS ALWAYS BEEN ON MORE EXPENSIVE GUNS. IF YOU FIND SOMETHING IN A PIGEON GRADE OR A REALLY FANCY STOCK IT WILL ALWAYS HAVE A TIP ON IT."

"I'VE GOT THAT TIP ON A 1938 MODEL 70 WINCHESTER AND IT'S VALUED AT ABOUT \$1200."

"IT'S KIND OF A TRADEMARK OF THE OLD ENGLISH STOCK MAKERS. THAT WAS ONE OF THE FINISHING TOUCHES. THEY PUT ON THE REAL FINE WEAPONS THAT THEY BUILT AND IT WAS ALWAYS A PIECE OF TEAK. THEY'RE NOT TEAK ANYMORE. BUT IF I WERE BUYING THAT GUN TOMORROW I WOULD WANT THE TIP BECAUSE OF THE CONNECTION WITH THE CRAFTSMANSHIP."

"IT'S LIKE COPE MOLDING ON A CEILING. IT GIVES YOUR EYE SOMETHING TO COMPARE TO -- IT ENHANCES THE WOOD."

FORE-END TIP (CONT'D)

BUT OTHERS DISAGREE. INDEED, A FORE-END TIP CAN MEAN CRAFTSMANSHIP, BUT NOT A PLASTIC ONE:

"IF YOU'RE TALKING ABOUT A PIECE OF IVORY VS. A PIECE OF WHITE PLASTIC IT'S NOT A FAIR COMPARISON.

"WE'RE TALKING ABOUT A PRODUCTION GUN COMPARED TO A CUSTOM MADE GUN AND I DON'T THINK YOU CAN COMPARE THEM.

THOSE WHO DO NOT WANT A FORE-END TIP PREFER THE WOOD LOOK...

"I GO BACK TO THE WORKMANSHIP...TO ME IT LOOKS LIKE THE STOCK ISN'T FINISHED. FOR WHATEVER REASON THEY COULDN'T TURN THE END SO THEY STUCK SOMETHING ELSE ON THERE.

"LOOKS LIKE A WART ON THERE."

"I WENT WITH NO TIP. MY PERSONAL FEELING IS IT LOOKS MORE BALANCED AND MORE ATTRACTIVE WITHOUT THAT ON THERE. WITH THE TIP IT LOOKS LIKE IT'S CUT OFF TOO SHORT EVEN THOUGH IT'S NOT.

"IF YOU STICK THAT HUNK OF PLASTIC ON THERE, I THINK IT REALLY DETRACTS FROM THAT REAL DARK STOCK.

"I'M A WOOD FAN. I DON'T LIKE FRILLS, BUT IT (FORE-END TIP) MAY NOT BE (UNDESIRABLE) ENOUGH TO SWAY MY PURCHASE.

...OR THEY FEEL THAT THE TIP REPRESENTS JUST ONE MORE PART THAT MIGHT GET LOST.

* * *

IN THOSE GROUPS WHERE THE GRIP CAP WAS SHOWN FIRST, MANY MEN COMPARE THE TWO (GRIP CAP AND FORE-END TIP), AND MOST COME TO THE CONCLUSION THAT IT SHOULD BE BOTH OR NONE:

"I WOULD THINK THEY BOTH HAVE TO BE THERE. IF YOU HAD ONE ON THE FRONT OF IT, IT WOULD LOOK FUNNY IF IT DIDN'T HAVE AN ACCENT SOMEWHERE ELSE."

* * *

IN SUM, THE RESPONDENTS BASE THEIR PREFERENCE FOR (OR AGAINST) A FORE-END TIP ON APPEARANCE ISSUES -- BOTH COSMETIC AND MAINTENANCE/ PROTECTION FOR THE TIP; COSMETIC ONLY FOR NO TIP.

GRIP CAP

BOTH IN GENERAL AND IN RELATION TO THE SPECIFIC MODELS SHOWN, THE MEN IN OUR SAMPLE ARE TWICE AS APT TO PREFER A GRIP CAP AS NOT. SEATTLE HUNTERS ARE THE MOST INTERESTED, DALLAS HUNTERS THE LEAST (AND EVEN LESS SO FOLLOWING THE DISCUSSION).

THE CHOICE IS MAINLY A MATTER OF PERSONAL (AESTHETIC) PREFERENCE, BUT TO SOME THE CAP SERVES A PROTECTIVE PURPOSE AS WELL.

IN GENERAL...

| | |
|------------------------------|-----|
| PREFER HAVING A GRIP CAP | 63% |
| PREFER NOT HAVING A GRIP CAP | 26 |
| NO PREFERENCE | 11 |

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|-------------------|------------------------------|-----------------------------|
| NEW DESIGN (S) | 66% | 60% |
| NO GRIP CAP (Q) | 32 | 36 |
| NO PREFERENCE | 2 | 4 |

A GRIP CAP LOOKS NICER; GIVES A MORE FINISHED LOOK; TWO TONE LOOK; EXPENSIVE LOOK; IT LENDS A TOUCH OF CRAFTSMANSHIP:

"IT'S A LITTLE MORE FRILL, A LITTLE MORE FINISHED LOOK TO IT, JUST SOMETHING ADDED TO IT, LIKE AN OPTION ON A CAR."

"IT ADDS A LITTLE BIT TO THE APPEARANCE. I THINK IT'S A MORE FINISHED LOOK WHEN YOU COMPARE THE TWO OF THEM, THE PLAIN ONE IS JUST MORE WOOD."

GRIP CAP (CONT'D)

"I DON'T KNOW IF IT HAS ANY FUNCTIONAL ADVANTAGES BUT IT SURE LOOKS GOOD, AND MAKES MY WHOLE GUN LOOK GOOD."

"I LIKE THE LOOKS -- IT'S KIND OF PUTTING A PIECE OF CHROME ON THE SIDE OF A CAR. IF IT'S TASTE-FULLY DONE, IT LOOKS GOOD."

"IT'S A MARK OF WORKMANSHIP -- A MARK OF A VERY EXPENSIVE WEAPON. YEARS AGO THOSE THINGS WERE ALL HAND CARVED AND THEY WERE WORKS OF ART. THEY'RE PLASTIC NOW AND THEY COST A TENTH OF A CENT APIECE, BUT IT SURE MAKES THAT GUN LOOK MORE EXPENSIVE THAN IT IS."

"I LIKE THE LOOKS OF A GUN THAT DOES HAVE THAT GRIP CAP. IT'S A SYMBOL OF CRAFTSMANSHIP."

AT THE SAME TIME, THE GRIP CAP HAS A PRACTICAL PURPOSE. IT WILL PROTECT THE WOOD, AND IF THE GRIP CAP ITSELF BECOMES SCRATCHED OR DAMAGED IT CAN BE REPLACED:

"I PREFER THE GRIP CAP. I'VE HAD A LOT OF RIFLES, ESPECIALLY WHEN YOU'RE SHOOTING, SIGHTING THEM ON A BENCH OR SOMETHING, YOU'RE ALWAYS KNOCKING THAT PISTOL GRIP ON IT AND SKINNING IT ALL UP. IF YOU DO MESS ONE UP WITH A GRIP CAP ON IT YOU CAN ALWAYS GET THAT GRIP CAP OFF AND REPLACE IT. BUT IF IT'S JUST THE NAKED STOCK DOWN THERE AND YOU BANG IT, IT LOOKS LIKE HELL FOREVER."

"I WENT WITH A GRIP CAP AS A LITTLE ADDED BUFFER BETWEEN THE WOOD AND ANYTHING IT MIGHT HIT. WALKING THROUGH THE BRUSH, I USUALLY TURN MY RIFLE A LITTLE BIT BECAUSE I DON'T WANT TO HIT MY SIGHTS AND THAT LITTLE CAP THERE GIVES YOU THAT LITTLE EXTRA BUFFER BETWEEN WHATEVER IS COMING AT YOU AND THAT WOOD STOCK."

"IT PROTECTS CORNERS WHICH HAVE A TENDENCY TO WEAR."

FOR LARGER MEN A GRIP CAP EXTENDS THE HOLDING RANGE, GIVING THEIR HAND/FINGERS MORE ROOM...

"IT SEEMED WITH THE GRIP CAP ON THERE IT WOULD GIVE YOU A LITTLE MORE DEPTH IN YOUR FINGER GRIP. WHEN YOU'RE HANGING ON TO IT, I WOULDN'T LIKE ANYTHING TOO SHORT THERE."

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GRIP CAP (CONT'D)

...AND ESPECIALLY WITH A SPACER:

"WITH A SPACER, IT WOULD GIVE ME EVEN MORE ROOM TO GRIP. THE MORE LENGTH I HAVE TO HOLD ONTO, THE MORE SECURE I FEEL."

THE PROBLEMS WITH A GRIP CAP ARE ALSO PRIMARILY COSMETIC -- ITS PLASTICKY LOOK DETRACTS FROM AND OFTEN DOESN'T BLEND WITH THE (LOOK OF THE) WOOD:

"WOOD IS SO IMPRESSIVE LOOKING, WHY COVER IT UP WITH PLASTIC?"

"I TAKE PRIDE IN AND TAKE GOOD CARE OF THE WOOD ON MY GUN. I DON'T WANT TO HIDE IT."

"IF YOU'VE GOT A PIECE OF SOMETHING THAT LOOKS LIKE WHITE PINE, PUTTING A GRIP CAP ON ISN'T GOING TO MAKE IT LOOK BETTER. YOU CAN PUT ALL YOUR BELLS AND WHISTLES ON THE CHEAP WOOD AND IT'S STILL GOING TO LOOK LIKE A CRUDDY PIECE OF WOOD. AND TO THE OTHER EXTREME, IF YOU'VE GOT A REAL NICE STOCK, A \$200 PIECE OF WOOD I WOULDN'T WANT A CAP ON IT BECAUSE I WOULD WANT ALL THE WOOD TO SHOW. YOU WOULDN'T WANT TO COVER THAT UP."

AND THE GRIP CAP ITSELF CAN BE A DETRIMENT RATHER THAN AN ADVANTAGE:

"WHEN I GO HUNTING I GO THROUGH A LOT OF BRUSH AND IF I KNOCK THAT OFF I DON'T WANT TO SPEND TWO HOURS TRYING TO FIND THE DAMN THING. IT'S PRETTY, I GRANT, BUT I DON'T WANT TO HUNT FOR THE DAMN THING."

"I DON'T THINK THAT'S GOING TO STOP IT FROM GETTING SCRATCHES ON; IN FACT IT WOULD GET SCRATCHED ITSELF AND LOOK WORSE. I THINK IT WOULD BE ONE MORE THING IN THE WAY AND DON'T SEE MUCH USE FOR IT."

"I'VE BEEN KNOWN TO BE KIND OF TOUGH ON MY WEAPONS AND IF I WANT TO SAND THAT THING DOWN AND REFINISH IT WITH A COAT OF VARNISH OR LINSEED OIL THAT PIECE OF PLASTIC (OR WHATEVER THAT MATERIAL IS) IS SOMETHING ELSE. I'VE GOT TO FIDDLE AROUND."

* * *

IN SUM, BOTH COSMETIC AND MAINTENANCE APPEARANCE ISSUES IMPACT ON THE GROUPS' CHOICES FOR A GRIP CAP OR NOT, WITH REASONS INCLUDING SOME (MINIMAL) COMFORT BENEFITS ATTRIBUTED TO THE GRIP CAP.

BUTT PAD COLOR

ON THIS PURELY AESTHETIC ISSUE, CONSUMERS FAVOR THE BLACK BUTT PAD; A CHOICE DRIVEN BY THE HUNTERS FROM SEATTLE AND DALLAS. THOSE FROM KANSAS CITY ARE EQUALLY SPLIT IN THEIR PREFERENCES. YET, WHATEVER THEIR CHOICE, THE ANSWER INVOLVES BLENDING -- WHICH COLOR EACH MAN FEELS BETTER BLENDS IN WITH THE REST OF THAT PARTICULAR GUN. RARELY IS THE CHOICE MADE ON A PREFERENCE FOR THAT COLOR PER SE.

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|-------------------|------------------------------|-----------------------------|
| BLACK (R) | 61% | 60% |
| BROWN (Q) | 39 | 35 |
| NO PREFERENCE | - | 5 |

PREFERRERS OF THE BLACK BUTT PAD LIKE THE WAY IT BALANCES THE OTHER BLACK ACCENTS ON THE GUN; AND BLENDS WITH/COMPLEMENTS THE WOOD...

"BLACK CONTRASTS WITH THE BLACK METAL AND THE BLACK GRIP CAP."

"TRADITIONALLY, RUBBER WOULD BE BLACK, NOT A PHONY WOOD COLOR."

"BLACK DRAWS MY EYE TO THE WOOD."

"WITH THE TRIGGER, THE BARREL AND THE BUTT PAD ALL BLEND, IT BALANCES THE AMOUNT OF BLACK ON THE GUN. IT'S A BETTER COUNTER BALANCE OF COLOR."

"IF I HAD A REAL LIGHT WOOD I'D GO WITH THE RED BUT WITH THE DARKER COLOR WOOD LIKE WE HAVE HERE, THE BLACK JUST KIND OF MESHES WITH IT BETTER, LOOKS LIKE IT BELONGS TO IT."

BUTT PAD COLOR (CONT'D)

...RATHER THAN ATTEMPT TO MATCH THE WOOD:

"THE THING ABOUT MATCHING THE WOOD IS YOU CAN NEVER GET IT TO REALLY MATCH AND THEN IT LOOKS A LITTLE STRANGE TO HAVE TWO ALMOST MATCHING BROWNS. SO THE BLACK IS MY PREFERENCE."

"THE BLACK SETS OFF THE WOOD, DOESN'T ATTEMPT TO BE A NEAR MATCH."

ON THE OTHER HAND, PREFERRERS OF THE BROWN...OR AS MANY SAY, THE RED...FEEL IT PRODUCES A BETTER OVERALL LOOK:

"I THINK THE BROWN LOOKS MORE EXPENSIVE. THE BLACK LOOKS LIKE IT WAS CUT OFF A TIRE."

"THE BROWN BLENDS IN BETTER WITH THE WOOD ON THE STOCK."

"ON THE RED ONE WITH THE CONTRASTING BLACK STRIPE, AND THE FORE-END TIP WITH THE CONTRASTING BLACK, IT ALL FITS TOGETHER AND THAT'S HOW IT SHOULD BE DONE, IF YOU'RE BUILDING A FIRST RATE STOCK."

"YOU CALL IT BROWN BUT IT'S REALLY RED, AND THAT'S THE COLOR IT'S SUPPOSED TO BE, IN MY HEAD, THAT'S THE ONLY COLOR IT SHOULD BE."

"THE BLACK STANDS OUT LIKE A SORE THUMB. THERE ISN'T ENOUGH OTHER BLACK ON THERE."

BUT WHATEVER THEIR PREFERENCE, MOST AGREE THAT THE COLOR OF THE WOOD STOCK SHOULD DICTATE THE BUTT PAD COLOR:

"I THINK BOTH OF THOSE PADS FIT ON BOTH OF THOSE RIFLES. THEY PICKED THE RIGHT COLORS; THE BLACK ONE IS ON A REAL DARK WOOD AND THE RED ON A LIGHT WOOD. IF YOU REVERSED THEM THEY'D LOOK TOTALLY OUT OF PLACE."

"REAL LIGHT WOOD I'D WANT THE RED, BUT IF IT WERE DARKER I'D PREFER THE BLACK."

IN SUM, THE COSMETIC EFFECT OF THE COLOR OF THE BUTT PAD, ESPECIALLY AS IT "GOES WITH" THE COLOR OF THE STOCK, IMPACTS THE MEN'S CHOICES.

SPACERS

IN ALL THREE AREAS, THE GENERAL CONSENSUS FAVORS NO SPACERS, AND SPECIFICALLY THE TEST MODEL WITHOUT THE SPACERS IS OVERWHELMINGLY PREFERRED OVER THE ONE WITH BLACK SPACERS. HOWEVER, THE DISCUSSION DOES SERVE TO MAKE A FEW DECIDE THAT IT IS AN UNIMPORTANT ISSUE.

BEFORE DISCUSSION: IN GENERAL...

| | |
|---------------------------|-----|
| PREFER NOT HAVING SPACERS | 64% |
| PREFER HAVING SPACERS | 28 |
| NO PREFERENCE | 8 |

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION</u> |
|------------------------|------------------------------|-----------------------------|
| NO SPACERS (T) | 72% | 68% |
| BLACK LINE SPACERS (S) | 26 | 26 |
| NO PREFERENCE | 2 | 6 |

REJECTION OF (BLACK) SPACERS IS USUALLY AN AESTHETIC DECISION:

"IT'S TOO FLASHY. IT MAKES IT LOOK LIKE AN INEXPENSIVE GUN."

"I DON'T LIKE SPACERS. IT GOES BACK TO THE CAP ON THE PISTOL GRIP. IF I WANT TO PUT A COAT OF VARNISH OR LINSEED OIL ON THERE THEN I'M DEALING WITH SOMETHING ELSE. IS THAT FINISH GOING TO AFFECT THAT PIECE OF PLASTIC?"

"I THINK IT LOOKS CLEANER AND NEATER WITHOUT THE EXTRA STRIP."

SPACERS (CONT'D)

BUT JUST AS OFTEN AND PROBABLY EVEN MORE (NEGATIVELY) IMPORTANT,
SPACERS MAY BE HIDING POOR WORKMANSHIP:

"WHENEVER SOMEBODY PUTS A SPACER IN THERE OTHER THAN A CONTRASTING COLOR FOR A VISUAL OR AESTHETIC DIFFERENCE, TO ME IT SAYS THAT THEY MADE A MISTAKE AND THEY'RE TRYING TO COVER IT UP. BLACK ON BLACK SAYS WE'RE COVERING UP SOMETHING THAT WE DON'T WANT YOU TO SEE."

"ONE OF THE THINGS YOU LOOK AT IN THE OVERALL FINISH OF A GUN IS HOW WELL ALL THE PIECES FIT TOGETHER, WHETHER YOU'RE TALKING ABOUT HOW WELL THE BARREL IS SET IN THE STOCK OR THE BOLT INTO THE RECEIVER, OR WHAT-EVER. TO ME A SPACER'S JUST SOMETHING TO COVER UP A FAULT. IT'S NOT THAT GOOD OF A FIT SO THEY STICK SOMETHING IN THERE TO MAKE IT FIT BETTER."

"IT'S LIKE A WASHER. IT'S SUPPOSED TO MAKE A BETTER FIT -- GETS TWO PIECES TO FIT TOGETHER BETTER, TO COVER UP THE IMPERFECTIONS. YOU CLAMP IT DOWN AND IT FILLS A SPACE."

"YOU SEE THEM ON LESS EXPENSIVE GUNS THAT ARE SLAPPED TOGETHER AND THE SPACERS HOLD THEM TOGETHER."

"IF TWO PIECES DON'T MATCH, THEY DON'T WORRY, THEY JUST PUT A SPACER IN."

"IT MEANS LESS GOOD WORKMANSHIP."

"IT'S JUST SOMETHING ELSE TO COME LOOSE AND FALL OFF."

"IT ISN'T EVEN GLUED SO IT WON'T EVEN BE WATER TIGHT."

SPACERS (CONT'D)

TO SOME THEY SIMPLY ARE USELESS...

"EVEN IF IT HAD A FUNCTION I WOULDN'T WANT IT. IT'S EXTRA MONEY FOR A MINISCULE THING."

"IT'S A VERY TRIVIAL PART OF A RIFLE."

...OR PRESENT ADDITIONAL PROBLEMS:

"I FOUND OUT IN SOME OF MY HUNTING THAT WHAT COULD GO WRONG MIGHT WELL GO WRONG, LIKE A SPACER LOSING ITS GLUE AND COMING OFF, SO WHY NOT FORGET IT AND HAVE THE BLOOMIN' THING THERE WITHOUT THE SPACER? THEN INSTEAD OF HAVING TWO PLACES TO GLUE, YOU ONLY HAVE ONE."

WITH A FEW EXCEPTIONS (ONE CITING A SPECIFIC FUNCTIONAL ADVANTAGE AND ONE CITING AN AESTHETIC ADVANTAGE)...

"A SPACER ACTS AS A SEALANT. A LOT OF TIMES WHENEVER YOU HAD TWO PIECES THAT DIDN'T QUITE FIT OR MATCH THEY WOULD USE A SPACER IN BETWEEN SO THAT WHENEVER THE WOOD SWELLED IT WOULD STILL MATCH THE SPACER A LITTLE, BETTER THAN IF IT WERE METAL AND WOOD."

"IT HAS NO PURPOSE WHATSOEVER BUT IT'S ONE OF THOSE THINGS THAT YOU LOOK FOR IN A FINE OLD GUN THAT TELLS YOU WHETHER IT WAS BUILT TO BE A GENTLEMAN'S WEAPON OR WHETHER IT WAS MADE FOR A FARMER TO CARRY WITH HIM ON A PLOW."

...THOSE WHO OPT FOR SPACERS MORE OFTEN THAN NOT EXHIBIT SOME MODICUM OF DOUBT IN DESCRIBING THE FUNCTIONAL ADVANTAGES THEY ATTRIBUTE TO THE USE OF SPACERS:

SPACERS (CONT'D)

"I THOUGHT IF YOU'RE GOING TO HAVE THOSE ON THERE, THE SPACERS WOULD GIVE YOU A PLACE TO REPAIR WITHOUT BEING ATTACHED DIRECTLY TO THE GUN. IF SOMETHING WENT WRONG WITH YOUR CAP ON YOUR PISTOL GRIP OR THE END, THAT IT COULD BE REPLACED WITHOUT TEARING THE WOOD ON YOUR GUN. WHETHER THAT'S TRUE OR NOT I DON'T KNOW. IT'S THE ONLY THING I COULD THINK OF TO PREFER ONE TO THE OTHER."

"THE ONLY REASON I CHOSE THE SPACER WAS THAT IT MIGHT HAVE SOME KIND OF FUNCTION TO MAKE THE PLASTIC ADHERE TO THE WOOD BETTER. IF IT DID HAVE A FUNCTION I WOULDN'T CARE WHAT COLOR IT WAS, I JUST CHOSE THE SPACER ON THE CHANCE IT MIGHT HAVE SOME FUNCTION, BUT IT LOOKS NOT TOO IMPORTANT."

"IT'S PROBABLY THERE TO ABSORB THE SHOCK."

"THE SPACER REALLY MAKES IT EASIER TO FIT THAT RECOIL PAD ON THERE, IF YOU'RE PUTTING ONE ON YOURSELF."

"MAYBE THE RUBBER COULD ADHERE TO THE WOOD BETTER THROUGH SOME KIND OF SPACING MATERIAL. POSSIBLY IT MIGHT HAVE SOME FUNCTION THAT WAY."

"IF YOU HAVE BRITTLE WOOD, IT WOULD ADD PROTECTION."

AND MANY ATTACH "IF'S" TO THEIR PREFERENCE FOR SPACERS...

"IF THEY ARE FLUSH."

"IF THEY HAVE A GOOD SEAL."

"IF THEY'RE SOFTER."

"IF THEY ACT AS SHOCK ABSORBERS."

"IF THEY FIT LIKE A GLOVE."

"ONLY UNDER THE GRIP CAP OR AT THE END OF THE FORE-END TIP, IF THEY ARE GLUED ON WITH WATERTIGHT GLUE."

SPACERS (CONT'D)

...AND IMPORTANTLY:

"IF THEY WERE ANOTHER COLOR."

"IF IT WERE A GOOD COLOR, MAYBE ROSEWOOD,
THAT SAYS QUALITY."

"I'VE SEEN SOME RIFLES WITH SPACERS, AND
THEY USUALLY HAVE A WHITE LINE SPACER IN
BETWEEN THERE. I THINK THAT LOOKS A
LITTLE SHARPER."

"THEY USED TO BE IVORY. IT'S ONE OF THOSE
MARKS OF THE OLD CRAFTSMANSHIP, LIKE THE
FORE-END TIP."

IN SPITE OF THIS DESIRE FOR ANOTHER COLOR, ONLY A HANDFUL OF
MEN WOULD CHANGE THEIR PREFERENCE AND OPT FOR SPACERS, WERE
THERE MORE COLOR CHOICES THAN JUST BLACK.

*

*

*

IN SUM, THEN, SPACERS RAISE MORE QUESTIONS THAN THEY ANSWER,
AND MOST HUNTERS APPARENTLY WOULD NOT MISS THEM.

CHECKERING PATTERNS

IN ALL GROUPS THE MORE ORNATE CHECKERING PATTERNS -- ESPECIALLY THE FLEUR DE LIS -- ARE MORE PREFERRED AND THE PLAINER DESIGNS OF MODELS K AND L LEAST PREFERRED.

- DALLAS HUNTERS DIFFER IN THEIR EQUAL PREFERENCE FOR THE FLEUR DE LIS AND THE LARGE DIAMOND PATTERN

| <u>LIKE BEST</u> | <u>BEFORE DISCUSSION</u> | <u>AFTER DISCUSSION *</u> |
|--------------------------|------------------------------|-------------------------------|
| NEW DESIGN (M) | 33% | 13% |
| CURRENT BDL DIAMONDS (J) | 20 | 13 |
| NEW DESIGN (K) | 15 | 9 |
| NEW DESIGN (L) | 19 | 2 |
| NEW DESIGN (P) | 13 | 11 |
| NO CHECKERING | - | 6 |
| NO ANSWER | - | 46 |

EXPECTEDLY, THE CHOICES ARE AESTHETICALLY DRIVEN. HOWEVER, A FEW HUNTERS -- ESPECIALLY FROM SEATTLE -- FEEL FUNCTIONAL/ DURABILITY AND COMFORT BENEFITS MATTER EVEN MORE.

"HOW MUCH GRIP WILL I HAVE?"

"WILL THE LARGER PIECES BREAK OFF?"

"HOW WILL IT FEEL AGAINST MY FACE?"

"HOW DEEP IS THE CHECKERING?"

DESIGN-WISE, THE IDEAL SEEMS TO BE FOR SOME ADDITIONAL DESIGN FOR AESTHETIC APPEAL BUT NOTHING TOO FLAMBOYANT NOR TOO PLAIN.

-
- * ALTHOUGH THE DISCUSSION APPEARS TO GREATLY AFFECT DECISIONS, KEEP IN MIND THAT THIS OUT-OF-CONTEXT CHOICE WAS A DIFFICULT ONE TO MAKE, ESPECIALLY WHEN THE FATIGUE FACTOR ENTERED THE PICTURE. THIS WAS NEXT TO THE LAST OF MANY SUCH RATINGS.

OPEN VERSUS CLOSED GRAIN

WHETHER HIGH GLOSS OR LOW GLOSS STOCKS ARE COMPARED, THE PREFERENCE IS CLEARLY FOR THE CLOSED GRAIN. OVERWHELMINGLY, THE MEN IN SEATTLE AND DALLAS PREFER THE CLOSED GRAIN STOCK VERSUS THE OPEN GRAIN; THE MEN IN KANSAS CITY ALSO PREFER THE CLOSED GRAIN BUT BY A FAR LESSER MARGIN.

| <u>PREFERENCE</u> | <u>BEFORE DISCUSSION</u> (34) | <u>AFTER DISCUSSION</u> (34) |
|------------------------------|--------------------------------------|-------------------------------------|
| LOW GLOSS: CLOSED GRAIN (L) | 88% | 88% |
| LOW GLOSS: OPEN GRAIN (K) | 12 | 3 |
| NO PREFERENCE | - | 9 |
| <hr/> | | |
| | (18) | (18) |
| HIGH GLOSS: CLOSED GRAIN (P) | 78% | 78% |
| HIGH GLOSS: OPEN GRAIN (J) | 22 | 22 |

IN ALL THE GROUPS, THE MEN ARE FAMILIAR WITH THE TERMS OPEN-GRAIN AND CLOSED-GRAIN, AND PREFER THE LATTER FOR THE SAME REASONS; BUT INTERESTINGLY, THEY ATTRIBUTE MANY AND VARIED (CORRECT AND INCORRECT) UNDERSTANDINGS AS TO WHY THE TWO STOCKS ARE DIFFERENT: EITHER IT'S THE WOOD ITSELF,,,

- DIFFERENT TYPES OF WOOD (E.G., OAK VS. WALNUT VS. PINE)
- THE SAME WOOD FROM DIFFERENT PARTS OF THE TREE
- THE SAME WOOD BUT CUT DIFFERENTLY (E.G., CROSSCUT, STRAIGHT CUT, ETC.)
- THE SAME WOOD BUT OF DIFFERENT (QUALITY) GRADES

OPEN VERSUS CLOSED GRAIN (CONT'D)

...OR, ON THE SAME WOOD OR DIFFERENT WOOD, DIFFERENT PROCESSING:

- DIFFERENT FINISHING TECHNIQUES (E.G., DEGREE OF SANDING, NUMBER OF COATS OF SEALER, THICKNESS OF COATS, ETC.)
- DIFFERENT TYPES OF FINISH (E.G., OIL VS. VARNISH)
- FILLING TECHNIQUES (E.G., MANY LAYERS, ONE LAYER, THICK OR THIN FILLERS, DIFFERENT FILLING MATERIAL)

REGARDING THE WOOD:

"YES SIR, THEY'RE ALL AMERICAN WALNUT. ALL OF THEM PROBABLY GREW WITHIN 200 MILES OF KANSAS CITY."

"THE NATURAL PORES OF THE WOOD MAKE IT OPEN OR CLOSED GRAIN. THE CLOSED GRAIN IS MORE DENSE WOOD, HEAVIER WOOD."

"WALNUT BY SPECIES IS CLOSED GRAIN, OAK YOU HAVE TO FILL BEFORE YOU CAN FINISH IT."

"LOOKED LIKE BETTER QUALITY ON THE L -- A WIDER GRAIN. WHEN I'VE WORKED WITH WOOD LIKE K I'VE HAD MORE SPLITTING TENDENCIES WITH WOOD OF THAT TYPE THAN THIS (L). THE WAY K LOOKED RIGHT THROUGH HERE I THOUGHT IT MAY BE DEFECTIVE."

"MORE POROUS, NOT HARD WOOD. IT LOOKS LIKE A SOFTER WOOD."

"IT'S THE GRAIN -- CLOSED GRAIN OR TIGHT GRAIN AND OPEN GRAIN. IT'S THE TYPE OF WOOD -- ENGLISH WALNUT OR AMERICAN WALNUT. ENGLISH WALNUT IS A TIGHTER GRAIN WOOD THAN AMERICAN WALNUT. THESE APPEAR TO BE DIFFERENT TYPES OF WOOD. IN K THERE ARE LITTLE DOTS, PORES OF THE WOOD BUT YOU DON'T SEE THOSE IN L; IT'S A VERY SMOOTH PIECE OF WOOD."

"YES, THEY ARE A DIFFERENT KIND OF WOOD. TO ME THIS LOOKS MORE LIKE OAK (P) AND J IS SOME KIND OF WALNUT."

OPEN THE GUN (CLOSE) GRAIN (CONT'D)

REGARDING THE PROCESSING:

"IT'S THE FINISH COAT. IT'S THE DIFFERENCE IN THE KIND OF FINISH THAT'S BEEN PUT ON THEM."

"ONE (P) WAS SANDED BETTER THAN THIS ONE (J). IT'S BEEN SANDED DOWN AND SMOOTHED DOWN."

"I THINK WHAT WE'RE PICKING UP IS THE DIFFERENCE IN WORKMANSHIP OF THE TWO GUYS WHO DID THEM."

"THE GRAIN NEVER WAS AN ISSUE WITH ME. I LOOK AT THE WORKMANSHIP IN THE FINISH ITSELF. I LOOK AT THE EXTRA CARE THAT IS APPARENT IN THE WOOD. WITH THIS RIFLE HERE (K) IT SEEMS TO ME THAT THIS GUY WAS DONE A LOT SOONER THAN THE OTHER GUY WAS. IN THE OLD DAYS YOU USED TO PUT ON 30 COATS OF LACQUER AND POLISH ON AN AUTOMOBILE. I'VE NEVER KNOWN OF A STOCK TO BREAK, ESPECIALLY NOT AMERICAN WALNUT."

"I'VE SEEN THEM FILL WALNUT BEFORE. THE THING IS HOW MANY COATS AND WHAT KIND OF DIFFERENCE IN THE FINISHING. THAT ONE YOU'VE GOT WITH SORT OF A PLASTICIZED FINISH AND THE OTHER ONE NOT SO. I HAVE SEEN SOME FILLERS PUT A VERY THICK COATING ON AND THEN BUFF IT OUT."

"THE ONLY THING WRONG WITH K IS IT HASN'T BEEN BUFFED ENOUGH, IT'S NOT SANDED ANYWHERE NEAR THE DEGREE OF L. WITH BETTER BUFFING AND SANDING YOU'LL BRING OUT MORE OF THE GRAIN."

"AS FAR AS I KNOW THE BETTER STOCK MAKERS DO FILL THE GRAIN. LIKE THIS GUN HERE (L) THEY'VE TRIED TO FILL IT IN. A GOOD STOCK MAKER USUALLY FILLS ABOUT 4 TIMES TO GET IT EVEN LIKE THIS."

OPEN VERSUS CLOSED GRAIN (CONT'D)

YET, WHATEVER THE REASON MAY BE, THE DIFFERENCES IN THE FOUR STOCKS ARE OBVIOUS. THE OPEN GRAIN STOCKS EVOKE MANY NEGATIVES...

- LOW QUALITY; A POOR/CHEAP STOCK
- MORE POROUS/MORE SUSCEPTIBLE TO ROT/LESS DURABLE/WEAK
- DIPS BETWEEN GRAIN/INDENTATIONS IN WOOD
- LOOKS USED/DEFECTIVE
- CHEAPER LOOKING
- WOOD HAS WRINKLES
- PITTED/FULL OF PITS/CAN'T SAND AWAY THE PITS
- BUMPY
- GRAIN TOO STRAIGHT/UNNATURAL
- SURFACE IS UNEVEN
- HAS HARD AND SOFT SPOTS
- NOT AS DENSE/AS STURDY

...AND FEW POSITIVES:

- GRAIN IS LESS UNIFORM/MORE NATURAL
- FEELS MORE LIKE WOOD
- MORE PATTERN TO THE WOOD

OPEN VERSUS CLOSED GRAIN (CONT'D)

CONVERSELY, MANY MORE POSITIVE COMMENTS ARE MADE ABOUT THE CLOSED GRAIN STOCKS...

- BETTER QUALITY WOOD
- FINER PIECES OF WOOD
- WIDE GRAIN
- MORE WEATHER RESISTANT/ROT RESISTANT
- LARGER SMOOTH GRAIN
- STRONGER/MORE DURABLE
- UNEVEN GRAIN PATTERNS, MORE NATURAL

...AND FEW NEGATIVES:

- WIDER GRAIN, WILL PEEL
- TOO PERFECT/LOOKS FAKE
- MUST BE FILLED/FILLED WITH PLASTIC

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APPENDIX

DESCRIPTION OF R.F.L.E.S

| | <u>Q</u> | <u>R</u> | <u>T</u> | <u>S</u> | <u>N</u> |
|------------------------------------------|----------|----------|----------|----------|----------|
| <u>Four Stock Configuration Options</u> | | | | | |
| Monte Carlo with cheekpiece | | | | X | |
| Straight with cheekpiece | X | | | | |
| Monte Carlo without cheekpiece | | | X | | |
| Straight without cheekpiece | | | | | X |
| <u>Three Metal Finish Options</u> | | | | | |
| All satin metalwork | | X | | X | |
| All polish metalwork | | | X | | X |
| Satin receiver with polished side panels | X | | | | |
| <u>Bolt Body Finish</u> | | | | | |
| Jeweled | X | | X | | X |
| Satin black | | X | | X | |
| <u>Stock Finish</u> | | | | | |
| Low gloss | X | | | X | |
| High gloss | | | X | | X |
| <u>2 Barrel Contours</u> | | | | | |
| BDL | | X | X | X | X |
| Lightweight | X | | | | |
| <u>Follower Finish</u> | | | | | |
| Plated | X | | X | | X |
| Black oxide | | X | | X | |
| <u>2 receiver configurations</u> | | | | | |
| Rounded | | | | X | X |
| Faceted | X | X | X | | |
| Scope Mounts | X | X | X | X | X |
| <u>Fore-End Tip</u> | | | | | |
| Yes | | | X | X | |
| No | X | | | | X |
| <u>Grip Cap</u> | | | | | |
| Yes | | | | X | |
| No | X | | | | X |
| <u>Butt Pad Color</u> | | | | | |
| Black | X | X | | X | |
| Brown | | | X | | X |
| <u>Spacers</u> | | | | | |
| None | X | | | | X |
| Black | | | | X | |

SELF-ADMINISTERED
BOOKLET RESPONSE

STOCK CONFIGURATION

Before Discussion: In general...

| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
|----------------------|--------------|----------------|--------------------|---------------|
| | (54) | (18) | (17) | (19) |
| Prefer a cheekpiece | 67% | 67% | 71% | 63% |
| Prefer no cheekpiece | 30 | 28 | 29 | 32 |
| No answer | 3 | 5 | - | 5 |

Before Discussion

After Discussion

| | <u>Net Score*</u> | | | | <u>Like Best</u> | | | | <u>Like Best</u> | | | |
|------------------------------------|-------------------|----------------|--------------------|---------------|------------------|----------------|--------------------|---------------|------------------|----------------|--------------------|---------------|
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| Monte Carlo with cheekpiece (S) | 24% | 11% | 18% | 42% | 43% | 33% | 29% | 63% | 39% | 33% | 29% | 53% |
| Straight with cheekpiece (O) | 7 | 22 | 18 | -16 | 26 | 33 | 41 | 5 | 24 | 33 | 41 | - |
| Monte Carlo without cheekpiece (T) | -19 | -17 | -18 | -21 | 20 | 23 | 18 | 21 | 19 | 23 | 18 | 16 |
| Straight without cheekpiece (N) | -11 | -17 | -18 | - | 11 | 11 | 12 | 11 | 9 | 11 | 12 | 5 |
| No preference | - | - | - | - | - | - | - | - | 9 | - | - | 26 |

* Percentage of those who like it best less those who like it least.

| METAL FINISH | | | | | | | | | | | |
|--------------------------------------------------|---------|-------------|--------|------------|---------|-------------|--------|-------------------------|---------|-------------|--------|
| <u>Before Discussion</u> | | | | | | | | <u>After Discussion</u> | | | |
| Net Score* | | | | Liked Best | | | | Liked Best | | | |
| Total | Seattle | Kansas City | Dallas | Total | Seattle | Kansas City | Dallas | Total | Seattle | Kansas City | Dallas |
| (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| All satin metal-work (S) 46% | 17% | 41% | 79% | 65% | 50% | 65% | 78% | 59% | 44% | 59% | 73% |
| All polished metal-work (N) -18 | 6 | - 6 | -53 | 28 | 44 | 29 | 11 | 32 | 50 | 35 | 11 |
| Satin receiver with polished side panels (Q) -26 | -17 | -35 | -26 | 7 | 6 | 6 | 11 | 7 | 6 | 6 | 11 |
| No preference - | - | - | - | - | - | - | - | 2 | - | - | 5 |

STOCK FINISH

| <u>Preference</u> | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|-------------------|--------------------------|----------------|--------------------|---------------|-------------------------|----------------|--------------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| Low gloss (Q) | 82% | 83% | 76% | 84% | 89% | 94% | 82% | 89% |
| High gloss (P) | 18 | 17 | 24 | 16 | 11 | 6 | 18 | 11 |

BOLT BODY FINISH

| <u>Preference</u> | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|-----------------------|--------------------------|----------------|--------------------|---------------|-------------------------|----------------|--------------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| Jeweled (BDL) (N) | 55% | 67% | 53% | 47% | 55% | 72% | 53% | 42% |
| Satin black oxide (R) | 45 | 33 | 47 | 53 | 45 | 28 | 47 | 58 |

BARREL CONTOUR

| <u>Preference</u> | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|------------------------|--------------------------|----------------|------------------------|---------------|-------------------------|----------------|------------------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| BDL contour (R) | 53% | 44% | 65% | 53% | 57% | 56% | 65% | 53% |
| Lightweight barrel (Q) | 47 | 56 | 35 | 47 | 43 | 44 | 35 | 47 |

FOLLOWER FINISH

| <u>Preference</u> | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|-------------------|--------------------------|----------------|--------------------|---------------|-------------------------|----------------|--------------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| Plated (T) | 70% | 83% | 71% | 58% | 79% | 94% | 76% | 68% |
| Black oxide (R) | 28 | 17 | 29 | 37 | 21 | 6 | 24 | 32 |
| No preference | 2 | - | - | 5 | - | - | - | - |

RECEIVER CONFIGURATION

Before Discussion: In general...

| | Total | Seattle | Kansas City | Dallas |
|------------------------------------------|-------|---------|----------------|--------|
| | (54) | (18) | (17) | (19) |
| Prefer to have integral scope mounts | 69% | 56% | 65% | 84% |
| Prefer not to have integral scope mounts | 15 | 28 | - | 16 |
| No preference | 16 | 16 | 35 | - |

Preference

| | Before Discussion | | | | After Discussion | | | |
|------------------------------------------------|-------------------|---------|----------------|--------|------------------|---------|----------------|--------|
| | Liked Best | | | | Liked Best | | | |
| | Total | Seattle | Kansas City | Dallas | Total | Seattle | Kansas City | Dallas |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| Rounded receiver with integral mount(s) (S) | 56% | 50% | 41% | 74% | 65% | 56% | 47% | 89% |
| Faceted receiver with integral mount(s) (R) | 40 | 50 | 59 | 16 | 35 | 44 | 53 | 11 |
| No preference | 4 | - | - | 10 | - | - | - | - |

FORE-END TIP

Before Discussion: In general...

| | Total | Seattle | Kansas City | Dallas |
|--------------------------------|-------|---------|----------------|--------|
| | (54) | (18) | (17) | (19) |
| Prefer having fore-end tip | 52% | 67% | 41% | 47% |
| Prefer not having fore-end tip | 46 | 33 | 59 | 47 |
| No preference | 2 | - | - | 6 |

Preference

Before Discussion

Liked Best

| <u>Total</u> | <u>Seattle</u> | <u>Kansas</u> | <u>Dallas</u> |
|--------------|----------------|---------------|---------------|
| (54) | (18) | City (17) | (19) |
| 54% | 61% | 41% | 58% |
| 46 | 39 | 59 | 42 |
| - | - | - | - |

After Discussion

Liked Best

| <u>Total</u> | <u>Seattle</u> | <u>Kansas</u> <u>City</u> | <u>Dallas</u> |
|--------------|----------------|------------------------------|---------------|
| (54) | (18) | (17) | (19) |
| 50% | 61% | 41% | 47% |
| 46 | 33 | 59 | 47 |
| 4 | 6 | - | 6 |

GRIP CAP

Before Discussion: In general...

| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
|------------------------------|--------------|----------------|------------------------|---------------|
| | (54) | (18) | (17) | (19) |
| Prefer having a grip cap | 63% | 72% | 64% | 52% |
| Prefer not having a grip cap | 26 | 22 | 24 | 32 |
| No preference | 11 | 6 | 12 | 16 |

Preference

| | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|-----------------|--------------------------|----------------|------------------------|---------------|-------------------------|----------------|------------------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| New design (S) | 66% | 78% | 65% | 58% | 60% | 78% | 65% | 42% |
| No grip cap (Q) | 32 | 22 | 35 | 37 | 36 | 22 | 35 | 48 |
| No preference | 2 | - | - | 5 | 4 | - | - | 11 |

BUTT PAD COLOR

| <u>Preference</u> | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|-------------------|--------------------------|----------------|--------------------|---------------|-------------------------|----------------|--------------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | <u>(54)</u> | <u>(18)</u> | <u>(17)</u> | <u>(19)</u> | <u>(54)</u> | <u>(18)</u> | <u>(17)</u> | <u>(19)</u> |
| Black (R) | 61% | 67% | 53% | 63% | 60% | 61% | 47% | 68% |
| Brown (Q) | 39 | 33 | 47 | 37 | 35 | 28 | 47 | 32 |
| No preference | - | - | - | - | 5 | 11 | 6 | - |

SPACERS

Before Discussion: In general...

| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
|---------------------------|--------------|----------------|------------------------|---------------|
| | (54) | (18) | (17) | (19) |
| Prefer not having spacers | 64% | 67% | 59% | 69% |
| Prefer having spacers | 28 | 22 | 35 | 26 |
| No preference | 8 | 11 | 6 | 5 |

| <u>Preference</u> | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|------------------------|--------------------------|----------------|------------------------|---------------|-------------------------|----------------|------------------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| No spacers (T) | 72% | 78% | 71% | 68% | 68% | 72% | 65% | 68% |
| Black line spacers (S) | 26 | 22 | 29 | 26 | 26 | 28 | 35 | 16 |
| No preference | 2 | - | - | 5 | 6 | - | - | 16 |

CHECKERING PATTERNS

| | <u>Before Discussion</u> | | | | | | | | <u>After Discussion</u> | | | |
|--------------------------|--------------------------|----------------|--------------------|---------------|-------------------|----------------|--------------------|---------------|-------------------------|----------------|--------------------|---------------|
| | <u>Net Score*</u> | | | | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas City</u> | <u>Dallas</u> |
| | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) | (54) | (18) | (17) | (19) |
| New Design (M) | 13% | 11% | 12% | 16% | 33% | 33% | 34% | 32% | 13% | 22% | 18% | -% |
| Current BDL diamonds (J) | 5 | - | 6 | 11 | 20 | 22 | 18 | 20 | 13 | 22 | 6 | 11 |
| New design (K) | 4 | - | 12 | - | 15 | 17 | 18 | 11 | 9 | 17 | 6 | 5 |
| New design (L) | - 5 | 6 | 35 | 11 | 19 | 11 | 12 | 32 | 2 | 5 | - | - |
| New design (P) | - 7 | - 6 | 6 | -32 | 13 | 17 | 18 | 5 | 11 | 17 | 12 | 5 |
| No checkering | - | - | - | - | - | - | - | - | 6 | - | - | 16 |
| No answer | - | - | - | - | - | - | - | - | 46 | 17 | 58 | 63 |

* Percentage of those who like it best less those who like it least.

WOOD GRAIN

| | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|-----------------------------|--------------------------|----------------|---------------|---------------|-------------------------|----------------|---------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas</u> | <u>Dallas</u> |
| | <u>(34)</u> | | <u>City</u> | | <u>(34)</u> | | <u>City</u> | |
| <u>Preference</u> | | | | | | | | |
| Low gloss: closed grain (L) | 88% | 94% | 60% | 91% | 88% | 100% | 60% | 82% |
| Low gloss: open grain (K) | 12 | 6 | 40 | 9 | 3 | - | - | 9 |
| No preference | - | - | - | - | 9 | - | 40 | 9 |

| | <u>Before Discussion</u> | | | | <u>After Discussion</u> | | | |
|------------------------------|--------------------------|----------------|---------------|---------------|-------------------------|----------------|---------------|---------------|
| | <u>Liked Best</u> | | | | <u>Liked Best</u> | | | |
| | <u>Total</u> | <u>Seattle</u> | <u>Kansas</u> | <u>Dallas</u> | <u>Total</u> | <u>Seattle</u> | <u>Kansas</u> | <u>Dallas</u> |
| | <u>(18)</u> | | <u>City</u> | | <u>(18)</u> | | <u>City</u> | |
| High gloss: closed grain (P) | 78% | 78% | -% | -% | 78% | 78% | -% | -% |
| High gloss: open grain (J) | 22 | 22 | - | - | 22 | 22 | - | - |

Description of Sample

Occupation

| | |
|--------------|-----|
| White collar | 50% |
| Blue collar | 46 |
| Student | 4 |

Education

| | |
|--------------------|-----|
| College experience | 78% |
| No college | 22 |

Income

| | |
|---------------------|-----|
| \$10,000 - \$19,999 | 13% |
| \$20,000 - \$29,999 | 31 |
| \$30,000 or more | 56 |

Age

| | |
|---------|-----|
| 21 - 24 | 19% |
| 25 - 44 | 66 |
| 45 - 64 | 35 |

Number of Days Hunted

| | |
|--------|-------------|
| Median | 7 days |
| Mode | 6 days |
| Range | 1 - 60 days |

Number of Guns Owned

| | |
|--------|---------|
| Median | 5 |
| Mode | 1, 6 |
| Range | 1 - 600 |

Age

Brands of Guns Owned

| | |
|-------------|----|
| Remington | 24 |
| Winchester | 14 |
| Ruger | 8 |
| Springfield | 7 |
| Whitworth | |

| | |
|-----------|---|
| Mauser | 5 |
| Weatherby | 4 |
| Browning | 3 |

| | |
|-----------------|---|
| Savage | 2 |
| Marlin | 2 |
| British Enfield | 2 |

| | |
|------------------|---|
| Swedish Military | 1 |
| Russian Mortar | 1 |
| U.S. Army | 1 |

| | |
|-------|---|
| S & W | 1 |
| W M | 1 |
| Klog | 1 |

| | |
|----------|---|
| Japanese | 1 |
| Colt | 1 |
| Salco | 1 |

Remington Model

| | | | |
|------|---|--------------|---|
| 270 | 1 | 3030 | 1 |
| 3-08 | 1 | 7 MM | 1 |
| 306 | 1 | 700/700 ADL/ | 2 |
| 722 | 1 | BDL | |

DETAILED REASONS FOR CHOICES
FROM DISCUSSIONS

STOCK CONFIGURATION

| | <u>MONTE CARLO</u> | <u>STRAIGHT</u> | <u>CHEEKPIECE</u> | <u>NONE</u> |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| (Cosmetic) | Better styling European design/ style Look of crafts- manship Goes with cheek- piece More attractive looking | Classic style Traditional Army style | Goes with Monte Carlo design/ complements it | Better looking/less cumbersome looking More traditional looking |
| APPEARANCE: | | | | |
| (Maintenance) | | | | |
| | Works better with a scope Easier to mount scope Easier to handle with cheekpiece, easier to sight | Won't interfere with sighting Won't distract Easier to hold on target Better if like to eye animal | Gets me into position faster/ shoot faster Send fingers automatically to trigger Holds gun straighter | Easier handling Better visual field/ can eye animal better |
| FUNCTION: | | | | |
| | Gets closer to face Get it higher on cheek Feels natural Sits lower on shoulder. Force absorbs less recoil Gets closer to armpit/won't slip Won't cut cheek Better fit for long arms, fat face, short reach | Less recoil felt | Fits hollow of cheek Feels natural Softens the slap | Doesn't cut cheek |
| COMFORT: | | | | |

METAL FINISH

| | <u>All Satin</u> | <u>All Polished</u> | <u>Mixed</u> |
|---------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| (Cosmetic) | Better looking/less flashy/ less like a BB gun | Looks like owner/manu- facturer care about the gun | Offers quality look... Better workmanship/ harder to make in two finishes |
| APPEARANCE: | Doesn't show fingerprints Blends with wood/compli- ments wood | Eye appealing, attract- ive | Not as gaudy |
| | Better quality look | Looks cleaner, better cared for; for show, for hanging, display | |
| (Maintenance) | Less susceptible to moisture | Moisture slides right off | |
| | Easier to maintain appear- ance | Easier to clean/wipe off | |
| | Less apt to scratch | Less apt to rust Well sealed Slick finish less suscep- tible to damages | |
| | No glare to scare off animals | | ...with minimal glare |
| | No distraction when sighting | | glare on side won't get in way of vision |
| FUNCTION: | Even reflects moonlight | | |
| | | Feels better | |
| COMFORT: | | | |

COLT BODY FINISH

| | <u>Jeweled</u> | <u>Satin Black</u> |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| (Cosmetic) | More attractive High quality look Mark of craftsmanship (More) expensive looking | Better quality/not shiny/fiasny Blends with other black touches No doo-dads/scrolls More conservative looking |
| APPEARANCE | Has a clean(er) look Better retail value/holds value | (More) expensive looking More suitable for a rifle |
| (Maintenance) | Less susceptible to damage/dampness Easier to see and clean the dirt/ sediment | Easier to repair scratches Easier to duplicate finish |
| FUNCTION | Easy to cover to avoid glare Smoother operation/better sliding operation Looks like a precision machine Smoother bolt action Bolt covers glare Feels smoother so must operate more smoothly | No glare No distraction |
| COMFORT | | |

STOCK FINISH

| | <u>Low Gloss</u> | <u>High Gloss</u> |
|---------------|-----------------------------------------------|----------------------------------------|
| (Cosmetic) | Softer finish/brings out beauty of wood | Good looking |
| | Complements/shows wood grain | Looks expensive |
| | More natural looking/not "plasticky" | Not dull looking |
| APPEARANCE | A hard finish without a shine | Looks like manufacturer cared |
| | Doesn't cloud when damp | Quality workmanship |
| | | Brings out beauty of grain |
| | | Proud to display/to use in competition |
| (Maintenance) | Easy to oil over scratches | Better seal/won't warp |
| | Easy to sand down | Resists dirt and rain/slide off |
| | Takes more abuse | Easy to sand down |
| | Easier to patch | Easy to wipe off fingermarks |
| FUNCTION | Less glare | |
| | High gloss flashes light/like a mirror | |
| | mirror/like a flashlight | |
| COMFORT | Won't slip out of hands/especially damp hands | |
| | Feels good/feels more like actual wood | |

BARREL CONTOUR

| | <u>BDL Standard</u> | <u>Lightweight</u> |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Cosmetic) | | Sleek looking <u>Streamlined</u> |
| APPEARANCE (Maintenance) | More metal/withstand abuse Won't bend Won't warp | |
| FUNCTION | More accurate/stiffer barrel Stable/won't whip around Steady/easier to hold on target Weight at end steadies a weapon More versatile Less distortion Uses any type of ammunition | Doesn't obstruct my sight as much A consistent vibration doesn't affect accuracy |
| COMFORT | Less recoil/weight softens recoil Withstands more heat/more comfortable to hold Won't burn hands if target shooting | Less shouldering effort/won't pull shoulder out of socket Less lugging For all day hunting Not as much metal to hold heat Less metal, won't kick as hard For mountain hunting/long term hunting |

FOLLOWER FINISH

| | <u>Plated</u> | <u>Black Oxide</u> |
|---------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| (Cosmetic) | Better quality look/quality metal Looks like good workmanship | Not flashy |
| APPEARANCE | | |
| (Maintenance) | Will show scratches/wear and tear more Can see dirt, rust, sediment; easier to clean Slick will resist rust | Easier to clean/polish Less susceptible to rust |
| FUNCTION | Smoother insertion of cartridge into chamber Smoother operating machine Better feeding Can see if gun is loaded | No glare to scare off animal Metal blinds you |
| COMFORT | | |

RECEIVER CONFIGURATION

| | <u>Rounded</u> | <u>Faceted</u> | <u>Integral Scope Mounts</u> | <u>None</u> |
|---------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| (Cosmetic) | Streamlined Smooth look/not harsh Matches the round barrel/more uniform look | Distinctive looking | | |
| APPEARANCE | Looks like better workmanship/crafts- manship The curvature | | | |
| (Maintenance) | Easier to clean out/ no corners Easier to wipe off No sharp edges to wear/to hit/to rust/ nick | | | |
| FUNCTION | More metal/less apt to blow up No angles to re- felct glare | Angle cut away gives easier/ cleaner sighting Beefier/stronger below/more metal safer Easier to bend over Sharp edges Strength where you need it Easter to center scope Better balanced | Offer security Better in brush Better if eyesight is poor Can reach out further You can take it off and put it on and it's right in place | Prefer own eye Don't want detriment in heavy brush Doesn't tie you to one kind of scope |
| COMFORT | | | More comfortable sighting | |
| | | | (Less expensive) | |

FORE-END TIP

| | <u>FORE-END TIP</u> | <u>NO FORE-END TIP</u> |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Cosmetic) | <p>A finishing look/adds a finishing touch</p> <p>Expensive look/found on expensive guns</p> <p>A trademark of old English stock makers</p> <p>Enhances the wood</p> <p>Frames the rifle</p> <p>Gives a more balanced look (fore-end tip <u>and</u> grip cap)</p> | <p>Prefer to see wood than plastic/ don't like to cover wood</p> <p>Looks more finished/nothing to hide</p> <p>Looks more balanced</p> <p>More attractive</p> <p>Detracts from wood</p> <p>Don't like frills on guns</p> <p>Tip gives it a blunt, not graceful look</p> |
| APPEARANCE | | |
| (Maintenance) | <p>Protects most vulnerable part of rifle/a point of impact</p> <p>Can easily be replaced if damaged</p> <p>Protect fore-end from splitting/ chipping</p> <p>Protects stock from wear</p> | |
| FUNCTION | <p>Necessary for rough hunting terrain</p> | <p>Tip doesn't serve any function so not necessary</p> |
| COMFORT | | <p>(Nothing to get lost)</p> |

BUTT PAD COLOR

| | <u>BLACK</u> | <u>BROWN</u> |
|---------------|--------------------------------------------------------------|--------------------------------------------|
| (Cosmetic) | Balances the other black accents/ parts on rifle | Looks more expensive |
| APPEARANCE | Blends with/complements the dark wood | Blends in better with the stock |
| | Doesn't attempt to match wood/to look like imitation wood | Shows off the contrasting black spacers |
| (Maintenance) | | Traditional color for butt pads |
| FUNCTION | | |
| COMFORT | | |

GRIP CAP

| | <u>GRIP CAP</u> | <u>NO GRIP CAP</u> |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| (Cosmetic) | A more finished look/like chrome on car Looks more expensive Two tone effect is attractive Tough of crafstmanship/workmanship Makes whole gun look good/better | Prefer look of wood uncovered Plastic doesn't blend with wood Quality look |
| APPEARANCE | | |
| (Maintenance) | Protects vulnerable part of rifle Can be replaced if lost or damaged Acts as a buffer Protects corners from wearing dow | Can't sand down scratches on plastic like on wood Linseed oil will discolor plastic cap/look terrible No worries about losing/replacing |
| FUNCTION | | |
| COMFORT | (For large men) A better grip/ more room for hand/fingers -- especially with a spacer | |

SPACERS

| | <u>NO SPACERS</u> | <u>BLACK SPACERS</u> |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Cosmetic) | Looks more expensive/not flashy/ cleaner, neater look Spacers look like a cover-up for a mistake/for poor workmanship Parts should fit without spacers | Looks like an expensive/gentleman's gun (Like the look of spacers but prefer another color) |
| APPEARANCE | | |
| (Maintenance) | Can't oil the plastic spacers Something else to come loose/fall off | Acts as a gasket Protects brittle wood Acts as a sealant/prevent swelling Easier to repair gun without tearing wood Rubber adheres to wood better than plastic |
| FUNCTION | | Shock absorber |
| COMFORT | | Adds space for holding/hands more comfortable |

To: J.W. Bower
From: D.W. Shumway

March 20, 1986

HISFOT NBAR FACTORY COSTS

A very quick evaluation has been completed to determine the factory cost of the proposed New Bolt Action Rifle. A ratio was developed from an old estimate of standard costs and was then applied to the average 1985 M/700 factory cost. As a result the factory cost of the NBAR is estimated to be \$200. The average 1985 M/700 factory cost is \$188. Volumes for this gun were obtained for marketing and are as follows;

| | | |
|------|-------|---------------------|
| 1988 | 61.7M | 66% of M/700 volume |
| 1989 | 73.5M | 75% of M/700 volume |
| 1990 | 89.3M | 85% of M/700 volume |

The NBAR Receiver will require 1.2 T-10 machining centers if it is produced on the FMS. A hi spot evaluation indicates a gross savings of \$137M can be realized by machining this part on the FMS as opposed to conventional machining. This does not take into account the Capital avoidance that would occur if the FMS is utilized over newly purchased conventional machinery. This would greatly enhance the economics for utilizing the FMS.

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

NBAR MEETING

MARCH 24, 1986

o Magazine Boxes:

- current development testing is being done with BDL boxes.
- boxes to the new design should be out of the Model shop by March 24. Some print dimensions need to be resolved. These boxes will be fit into development guns 3/24.

o Bolt Lock:

- new springs are in test.
- the drawing needs to be changed to specify qualification of the bolt and bolt plug.

Upsetting has occurred where the bolt lock contacts the bolt plug. The diameter of the bolt plug will be increased.

o Trigger Block Safety:

- two rifles that were not working correctly were disassembled from the stock and appeared to work ok. They were reassembled and still worked ok.

- o Extractor:
 - no malfunctions or part breakage.
 - looking at a common extractor with M/7400. Until a decision is made on which extractor to put into confirmation guns, the Model Shop is held.
 - during the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.
- o Trigger Pull Adjustment Screw:
 - screw back out
 - nyloc screws are being shipped
- o Magazine Follower:
 - special coated follower is in development rifles. What is cost comparison with chrome plate?
- o Stock Configuration:
 - configuration determined except cheekpiece, fore-end and grip caps, and checkering patterns, which Marketing will supply.
 - basic configuration has been modelled on CV. Tool paths have started.
 - need (without checkering, cheekpiece, etc.) by May 1.
- o Drop testing will be done at the end of the development test.
- o Blow up testing to be done at the end of the development test.
- o Drawings have been supplied to the Model Shop for design verification testing rifles.
 - receiver is critical path.
- o Design verification testing is scheduled to start on May 1, and be complete by June 15.
 - 30 rifles total; 6 each of 30-06, 280, 270, 7mm Rem. Mag. calibers (calibers are listed in order that they will be tested).

JWBower:js

HARDING MANUFACTURING CORP.

RR #2, BOX 115
ROME, NEW YORK 13440

(315) 339-0162

March 24, 1986

Remington Arms
Ilion, N.Y. 13357
Attn: Mr. Skip Smith

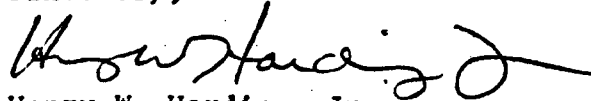
Dear Mr. Smith,

I have studied the long stock prints and have come to the conclusion that it is a project way out of my league. I feel strongly that this part is a candidate for injection molded Thermoplastic.

I can see numerous problems such as gating, warp and surface appearance. My concern is that even with straight forward predictable parts we run into unforeseen circumstances. A mold to produce a gun stock of this complexity would be a major undertaking for us and those unforeseen problems could break us. I think, while we do take on many very challenging projects, this one is just too risky. If you were to build this tool yourself and Remington or DuPont were willing to accept responsibility for the results, we would gladly quote on the cost of sampling and running the mold.

I appreciate the opportunity of quoting on this project and I hope you will consider us on any future work. I am returning the prints with this letter.

Sincerely,



Henry W. Harding, Jr.
President

HWH:sb

Enc: Prints

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.
PETERS


xc: J.W. Bower

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

March 26, 1986

TO: Bruce Rau

FROM: Randy Murphy *RM*NBAR Stock Configuration

I am still waiting for a decision on the NBAR cheekpiece configuration that was promised by March 21. Please correct me if I am wrong, but I am working under the assumption that aesthetic concerns are the responsibility of the Marketing Department whereas technical improvements are the responsibility of Research. Since the stock shape is primarily cosmetic I am expecting some direction from you.

I have voiced my concerns about differentiating the NBAR from our current 700 line and I feel the cheekpiece shape is one area where we can easily achieve this. If product differentiation is not an issue, please let me know so we can use the Model 700 cheekpiece. If product differentiation is important but not the exact shape of the new cheekpiece, let me know and we will select one.

The design acceptance testing and transmittal dates are approaching too rapidly. Please respond at your earliest convenience.

RSM:sps

MARCH 26 86

XP100 STOCK JOINT BOND CONSIDERATIONS

- * JOINT FAILURE APPEARANCE IS THAT OF TACK GLUE JOINT WITH LITTLE INDICATIONS OF JOINT FUSION, IN THE STOCK JOINT IMMEDIATE WITH THE STOCK BOLT.
- * TRY A METAL (~~STEEL~~ ^{ETEC} OR ~~BRASS~~) CROSS PIN INSIDE THE STOCK IN-SIDE THE GLUE JOINT COFINES IMMEDIATELY FORWARD AND REARWARD OF THE STOCK FORWARD SCREW. IE DRILL HOLE IN EACH STOCK HALF, INSERT GLUED (PHENOL) CROSS PIN AT GLUE OPERATION, $\frac{1}{2}$ " IN TO EACH STOCK HALF.
- * TRY ELIMINATION OF HOT WATER BOLL ANNEAL OPERATION.
 - ✓ DETERMINE IF STOCKS CAN BE MACHINED WITHOUT ANNEAL.
 - ✓ IF ANNEAL IS NEEDED TRY STEEL WITHOUT ANNEAL WHEN CUTTING BARREL CHANNEL.
 - ✓ DETERMINE IF LOOSE DIAMOND MESH IS OCCURRING WITH ANNEAL OPERATION.

TTL. RDS. FIRED: 2
TTL. MALFUNCTIONS: 0
MALFUNCTION RATE: 0

TOTAL (PER ML.)

GUN TOTAL WEIGHT = 442.05
GUN WEIGHT = 365.705

DATES AND REASONS FOR REVISIONS 1/30/84-NEW (was Op. 20 in Stock Sub-Assem.) -RLS-283870

PART NAME STOCK ASSEMBLY COOLANT SET UP TIME MODEL No. NYLON 66 OPER No. 20
MACHINE DEPT No. 62 PAGE 1 OF

PROCESS RECORDS

DATES AND REASONS FOR REVISIONS 9/29/80 - New for MRP - RLJ - 279110

APPROVAL AND DATES

[illegible]

| | | | | | | | |
|------------|-----------------|---------|-------------|----------|--------|----------|--------|
| PLANT NAME | Stock Assembly. | COOLANT | SET UP TIME | MODEL No | XP-100 | OPER. No | 85 |
| TYPE | | Bench | | DEPT No | 62 | PAGE | 1 OF 1 |

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER

R2539987

| DATES AND REASONS FOR REVISIONS | 9/29/80 - New for MRP - R/W - 279110 |
|---------------------------------|--------------------------------------|
| PROCESS RECORDS | |

[illegible]

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



xc: J.W. Bower

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The design acceptance testing and transmittal dates are approaching too rapidly. Please respond at your earliest convenience.

RSM:sps

DON'T SAY IT—WRITE IT

To B.W. RAU
From J.W. BOWER

Date 3/27/86

Xc: R.S. Murphy
File: NBAR

NBAR

Please provide Research with the model designation for the New Bolt Action Rifle. We will need this at least one month prior to the July 1 transmittal. Thanks. Let me know if I can help.

JWB:js

"THE SAFE WAY IS THE SMART WAY"



REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



A

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

xc: T. C. Douglas
R. S. Murphy
K. C. Rowlands
J. R. Snedeker
File-Monthly Reports

Ilion, New York
January 5, 1987

TO: W. H. COLEMAN, II

FROM: T. C. DOUGLAS

R

NEW PRODUCTS DEVELOPMENT QUARTERLY REPORT - DECEMBER

NBAR

Research efforts are being directed at resolving bedding, bolt lock, and magazine system questions. Schedules have been developed for these programs, however, delays in prototype fabrication and vendor negotiations have adversely affected them to the point where they must be altered. Rynite to Rynite and Rynite to wood bonding questions still remain unanswered.

NBAR Program Status

Bedding

- Have tried 3M 2214 one part epoxy, did not cure properly, suspect adhesive at fault.
- Tested Devcon glued-in insert, failed.
- Have 3M 2216 two part epoxy to try, need inletting sample from N/C.
- Loctite is sending sample of "Depend" adhesive to try.
- Round bottom receivers are in N/C.
- Inserts for round bottom receivers are in Model Shop.
- Stocks in N/C to be inletted.

Bolt Lock

- CV group design failed to unlock after firing. Fred Martin is investigating.
- Nyloc set screw from bottom of bolt plug positively overrides bolt lock.
- Fred Martin has been assigned bolt lock development.

Magazine System

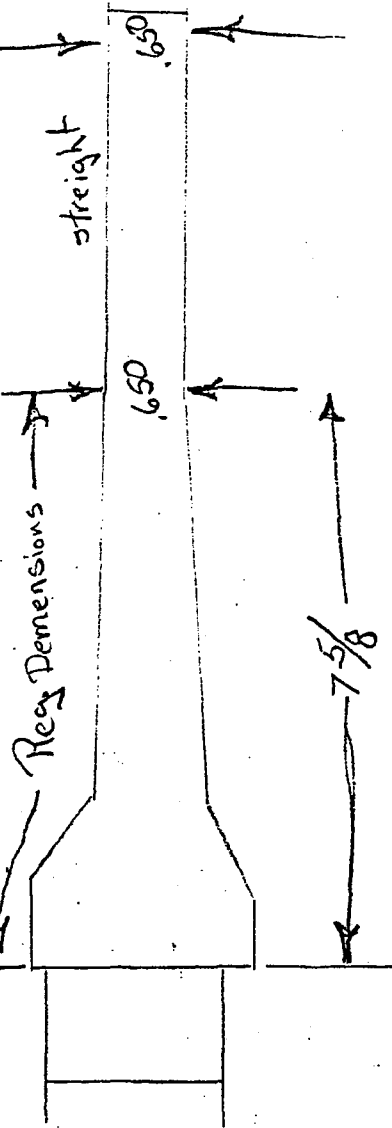
- Negotiations with Trexler were not fruitful; he will be asked to quote on prototype boxes.
- Kwik Klip variation must be designed.
- Jim Ronkainen design works, sample of two, design needs to be finalized.

DON'T SAY IT—WRITE IT

To W. CABLERFrom A. HUGGIEDate MARCH 21, 86

15" Long

Make ① 35 Rem XP-100



B75-13899- XP-100-35REM BARREL CONSOLE
 RECOMMENDED BY W. CABLER
 "AN UNGUARDED MINUTE HAS AN ACCIDENT IN IT"

APRIL 1, 86

PROPOSED CHANGES FOR PREP FOR AT FORM D

.625 DIA AT MUZZLE SIGNATURE SECTION
 .0357 INCL. TP1. RHF 0.7 →
 (8.25 POSITION) FROM RECOIL LUGS

223 / XP100

~~1. REVIEW~~
~~2. SHOOT~~ (??)

966,507
3. SHOOT FEO 40 & WIN 65
4. SHOOT GALLERY PSP & PLHP

4. ~~SELECT WHITEHOLE~~

~~5. ...~~

6. PREPARE FINAL TRANSMITTAL

7. PAINTED STOCK?

8. 35 REM BEDDING / PERMIT

9. 223 ENDURANCE

10. REPORT (PROJECT)

11. SCORES (RIFLE VS PISTOL)

12. POLISH & COCK
ACTIONS, BOLTS, STORIES
(CUSTOM VS ARM SERVICE)

606, 214, 261, 192 (14)

428, 425, 065 (12)

DATE

| LABOR VALUE | MATERIAL VALUE | TOTAL VALUE | QUANTITY | RESPONSIBLE OPERATION | MODEL | PLANT ORDER | PART NUMBER | OPERATION | N/A | COMP ACCT | CHG DEPT | LABOR PER 100 | MATERIAL PER 100 | CR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|-------------------|----------------|----------------|--------------------------|-------|----------------------|----------------|-----------|-----|--------------|-------------|------------------|---------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | |
| QUANTITY | | | MAIN ACCT. | | | LABOR PER 100 | | | 1 | | | | | | | | | | 2 | | | | | | | | | | 3 | | | | | | | | | | 4 | | | | | | | | | | 5 | | | | | | | | | | 6 | | | | | | | | | | 7 | | | | | | | | | | 8 | | | | | | | | | | 9 | | | | | | | | | |
| RESPONSIBLE OPERATION | | | CHG. DEPT. | | | MATERIAL PER 100 | | | 2 | | | | | | | | | | 3 | | | | | | | | | | 4 | | | | | | | | | | 5 | | | | | | | | | | 6 | | | | | | | | | | 7 | | | | | | | | | | 8 | | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | |
| MODEL | | | PART NAME | | | DESCRIPTION OF FAULT | | | 4 | | | | | | | | | | 5 | | | | | | | | | | 6 | | | | | | | | | | 7 | | | | | | | | | | 8 | | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PART NUMBER | | | LAST OPERATION | | | PLANT ORDER | | | 5 | | | | | | | | | | 6 | | | | | | | | | | 7 | | | | | | | | | | 8 | | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BBL LENGTH | | | GAUGE | | | INSPECTOR'S NAME | | | 6 | | | | | | | | | | 7 | | | | | | | | | | 8 | | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | INSPECTOR'S NO. | | | 7 | | | | | | | | | | 8 | | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | FOREMAN'S SIGNATURE | | | 8 | | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

DD-M20364

RD 5956 REV.

SERIAL NO. B7513899

TEST TITLE. INITIAL DESIGN TEST w/7mm
CONVOUR BARREL
"MALFUNCTIONS"

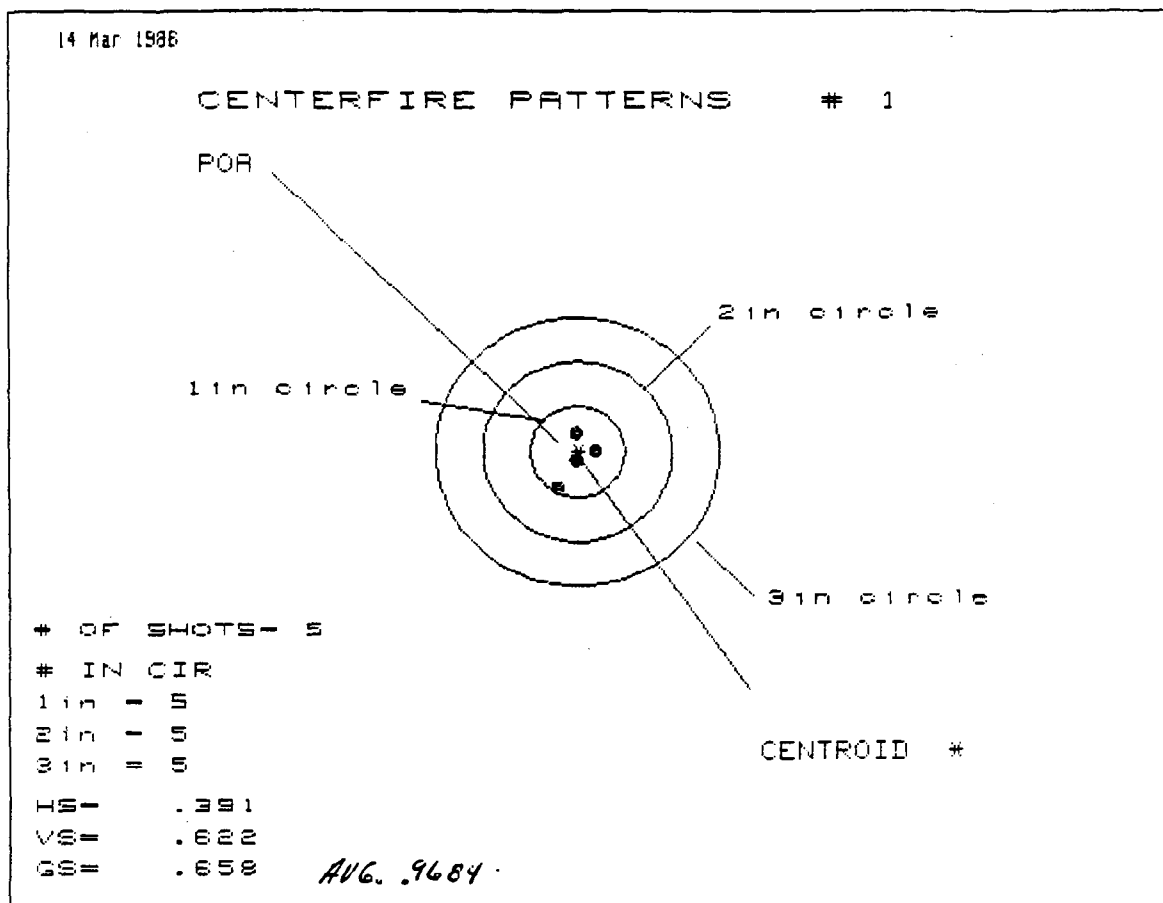
MALFUNCTION RATE:

TOTAL (PER ML.)

A. A. HUGICK
3/26/86

STOLIC W. KICHIZ. 11/02...

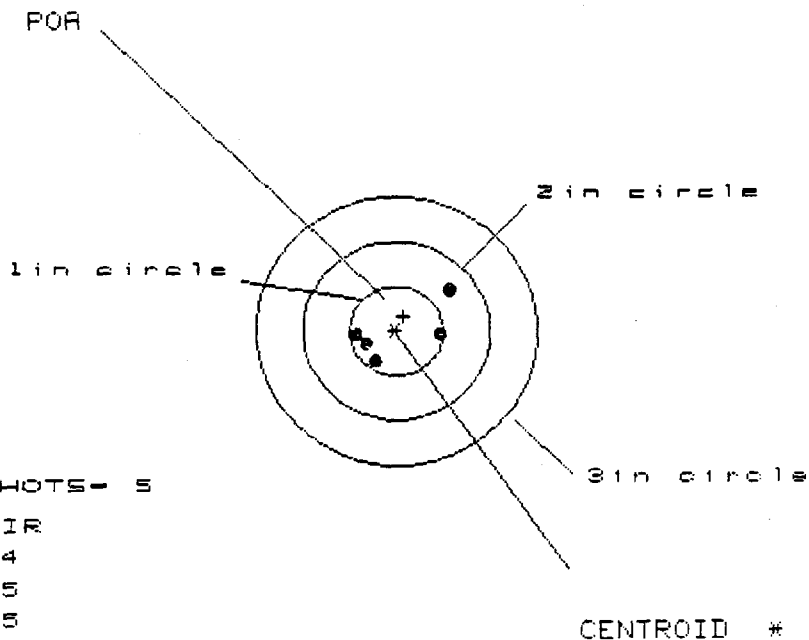
REM. 180 GR. SP



| PATTERN # | 1 | 2 | 3 |
|-------------------------------|-------|-------|-------|
| SHOTS (BEST OF) | 5 | 4 | 3 |
| MAXIMUM X | .200 | .152 | .145 |
| MINIMUM X | -.191 | -.071 | -.079 |
| MAXIMUM Y | .255 | .163 | .210 |
| MINIMUM Y | -.367 | -.190 | -.135 |
| CENTROID X | .014 | .061 | .069 |
| CENTROID Y | .092 | .183 | .129 |
| POA TO CENTROID in. | .093 | .194 | .146 |
| MIN RADIUS | .101 | .165 | .156 |
| MEAN RADIUS | .244 | .183 | .180 |
| MAX RADIUS | .413 | .203 | .220 |
| HORIZONTAL SPREAD | .391 | .224 | .224 |
| VERTICAL SPREAD | .622 | .353 | .345 |
| EXTREME SPREAD | .658 | .356 | .355 |
| NUMBER IN ONE INCH CIRCLE = | 5 | | |
| NUMBER IN TWO INCH CIRCLE = | 5 | | |
| NUMBER IN THREE INCH CIRCLE = | 5 | | |

14 Mar 1985

CENTERFIRE PATTERNS # 2



OF SHOTS- 5

IN CIR

1 in = 4

2 in = 5

3 in = 5

HS= .948

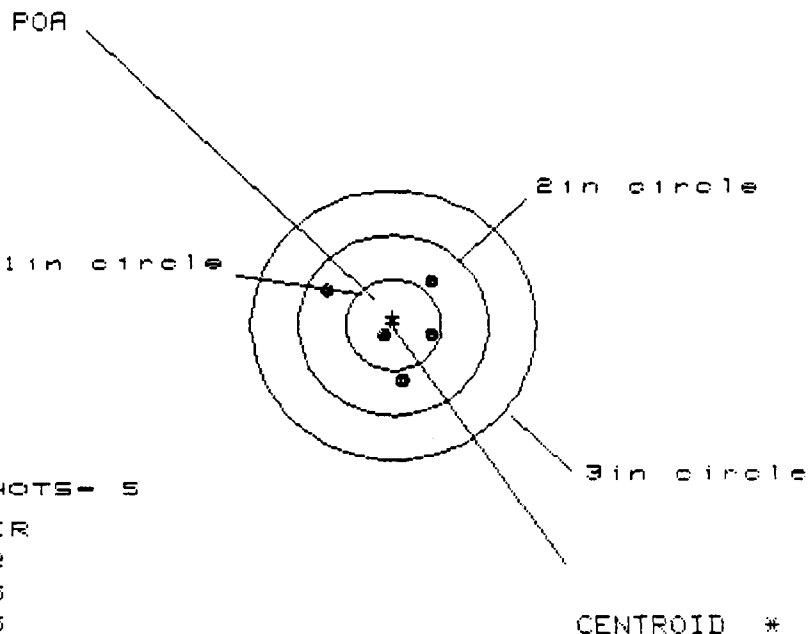
VS= .721

GS= 1.042

| PATTERN # | : | 2 | | |
|-----------------------------|---|-------|-------|-------|
| SHOTS (BEST OF) | : | 5 | 4 | 3 |
| MAXIMUM X | : | .536 | .564 | .106 |
| MINIMUM X | : | -.412 | -.278 | -.090 |
| MAXIMUM Y | : | .430 | .108 | .133 |
| MINIMUM Y | : | -.291 | -.183 | -.158 |
| CENTROID X | : | -.076 | -.210 | -.398 |
| CENTROID Y | : | -.167 | -.275 | -.300 |
| POA TO CENTROID in. | : | .184 | .346 | .498 |
| MIN RADIUS | : | .355 | .200 | .031 |
| MEAN RADIUS | : | .450 | .318 | .127 |
| MAX RADIUS | : | .688 | .569 | .191 |
| HORIZONTAL SPREAD | : | .948 | .842 | .196 |
| VERTICAL SPREAD | : | .721 | .291 | .291 |
| EXTREME SPREAD | : | 1.042 | .843 | .351 |
| NUMBER IN ONE INCH CIRCLE | = | | 4 | |
| NUMBER IN TWO INCH CIRCLE | = | | 5 | |
| NUMBER IN THREE INCH CIRCLE | = | | 5 | |

14 Mar 1966

CENTERFIRE PATTERNS # 3



OF SHOTS- 5

IN CIR

1in = 2

2in = 3

3in = 5

HS= 1.108

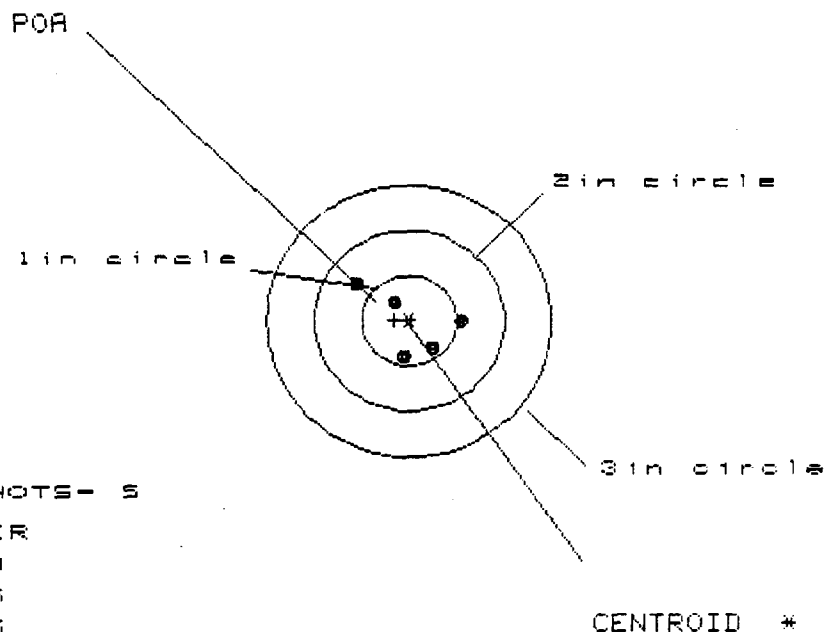
VS= 1.070

GS= 1.320

| PATTERN # | 3 | 4 | 3 |
|-------------------------------|-------|-------|-------|
| SHOTS (BEST OF) | 5 | 4 | 3 |
| MAXIMUM X | .403 | .226 | .196 |
| MINIMUM X | -.705 | -.317 | -.347 |
| MAXIMUM Y | .438 | .545 | .370 |
| MINIMUM Y | -.632 | -.525 | -.206 |
| CENTROID X | .004 | .181 | .211 |
| CENTROID Y | -.088 | -.195 | -.020 |
| POA TO CENTROID in. | .089 | .266 | .212 |
| MIN RADIUS | .169 | .228 | .284 |
| MEAN RADIUS | .524 | .413 | .356 |
| MAX RADIUS | .824 | .574 | .400 |
| HORIZONTAL SPREAD | 1.108 | .543 | .543 |
| VERTICAL SPREAD | 1.070 | 1.070 | .576 |
| EXTREME SPREAD | 1.320 | 1.105 | .730 |
| NUMBER IN ONE INCH CIRCLE = | 2 | | |
| NUMBER IN TWO INCH CIRCLE = | 5 | | |
| NUMBER IN THREE INCH CIRCLE = | 5 | | |

14 Mar 1986

CENTERFIRE PATTERNS # 4



OF SHOTS- 5

IN CIR

1 in = 3

2 in = 5

3 in = 5

HS= 1.023

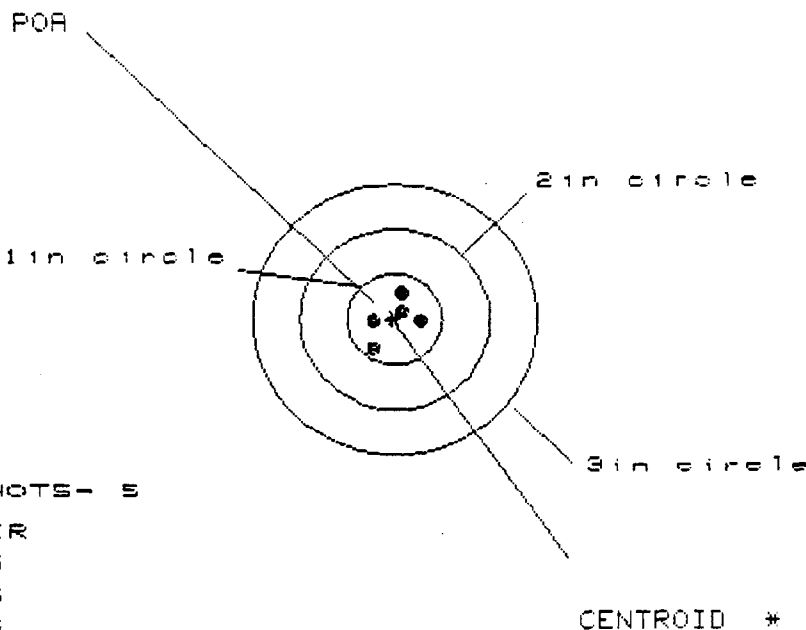
VS= .831

GS= 1.126

| | | | | |
|-----------------------------|---|-------|-------|-------|
| PATTERN # | : | 4 | | |
| SHOTS (BEST OF) | : | 5 | 4 | 3 |
| MAXIMUM X | : | .500 | .369 | .229 |
| MINIMUM X | : | -.523 | -.249 | -.126 |
| MAXIMUM Y | : | .452 | .331 | .362 |
| MINIMUM Y | : | -.379 | -.266 | -.235 |
| CENTROID X | : | .154 | .285 | .162 |
| CENTROID Y | : | -.007 | -.120 | -.151 |
| POA TO CENTROID in. | : | .154 | .309 | .221 |
| MIN RADIUS | : | .248 | .191 | .257 |
| MEAN RADIUS | : | .438 | .334 | .301 |
| MAX RADIUS | : | .691 | .414 | .384 |
| HORIZONTAL SPREAD | : | 1.023 | .618 | .355 |
| VERTICAL SPREAD | : | .831 | .597 | .597 |
| EXTREME SPREAD | : | 1.126 | .697 | .605 |
| NUMBER IN ONE INCH CIRCLE | = | | 3 | |
| NUMBER IN TWO INCH CIRCLE | = | | 5 | |
| NUMBER IN THREE INCH CIRCLE | = | | 5 | |

14 Mar 1986

CENTERFIRE PATTERNS # 5



OF SHOTS- 5

IN CIR

1in = 5

2in = 5

3in = 5

HS= .543

VS= .597

GS= .696

| | | | | |
|-----------------------------|---|-------|-------|-------|
| PATTERN # | : | 5 | | |
| SHOTS (BEST OF) | : | 5 | 4 | 3 |
| MAXIMUM X | : | .285 | .220 | .232 |
| MINIMUM X | : | -.258 | -.251 | -.239 |
| MAXIMUM Y | : | .283 | .204 | .082 |
| MINIMUM Y | : | -.314 | -.118 | -.050 |
| CENTROID X | : | .031 | .096 | .084 |
| CENTROID Y | : | .010 | .089 | .021 |
| POA TO CENTROID in. | : | .033 | .131 | .087 |
| MIN RADIUS | : | .110 | .015 | .083 |
| MEAN RADIUS | : | .259 | .185 | .187 |
| MAX RADIUS | : | .407 | .277 | .244 |
| HORIZONTAL SPREAD | : | .543 | .471 | .471 |
| VERTICAL SPREAD | : | .597 | .322 | .132 |
| EXTREME SPREAD | : | .696 | .471 | .471 |
| NUMBER IN ONE INCH CIRCLE | = | | 5 | |
| NUMBER IN TWO INCH CIRCLE | = | | 5 | |
| NUMBER IN THREE INCH CIRCLE | = | | 5 | |

TO: J. W. BOWER

3/13/86

FROM: T. C. DOUGLAS

SUBJ: QUARTERLY REPORT - 1Q86

M/1100 IMPROVEMENTS

Formal Transmittal of the M/1100 functional improvements took place on March 5, 1986. Included were the changes made to the current M/1100 requested by Marketing for product differentiation and simplification of plant processing.

The new firing pin retract spring and action spring follower have been released to be phased into current production. Phil Johnson has notified us that the plant cannot heat treat the piston/piston seals to the transmitted specifications. Samples are being made to reflect what the plant is capable of producing. These piston/piston seals will be tested starting March 21. This test will also include plant produced barrels with the valve ports brazed in using brazing rings versus the transmitted brazing washers.

M/870 IMPROVEMENTS

Research work is complete pending Production's Trial and pilot.

(2)

CHOKE TUBES - 20 GAUGE

The Firearms Business Team has approved the transmittal of a straight-wall barrel contour that will be non-retrofittable. A meeting with Bud Fini on March 5th finalized the barrel specifications to be offered. It was also requested by Marketing that we offer an improved-cylinder choke tube marked "Improved Skeet" for the skeet doubles events. Parts lists and drawings are currently be revised with formal transmittal scheduled for March 17th.

M/7400 IMPROVEMENTS

Vendor supplied reformed riveted (rivetless) extractors have been received by the plant. These extractors will be tested starting March 17th. The test will also include an extractor of the current design, but .005" thicker. Included in this test is a modification of the breech bolt to ease assembly of the extractor along with a 30° chamfer angle on the breech bolt to eliminate burrs in the extractor shroud cut.

Vendor supplied short action magazine boxes stamped "30-06" have been received. They are being measured and will be shot along with the extractor test. These boxes will not be adjusted by the plant.

The test of the extractors and the magazine box will be a design verification test. The test has been designed by Research and will be performed by the Plant due to the size of the test.

M/7400 (cont)

Preliminary destructive testing of rifles with the PBF extractor is underway with expected completion of April 4th.

Research personnel met with representatives of Connecticut Spring and Stamping on March 7th to discuss vendor fabrication of this extractor.

XP-100 in .223 CALIBER

Research work is complete pending Production's trial and pilot. The plant currently has orders for approximately 500 pistols.

M/700 in .338 WIN. MAG. CALIBER

The Transmittal of this caliber for 1987 reflects the classic version to be offered for 1987. Further work is necessary for 1988 when it will become an addition to the standard M/700 magnum line. This Transmittal will be complete by April 1, 1986.

3/6/86

SUPPLEMENTAL INFORMATION ON THE PURCHASED PARTS INSPECTION OF:

RECOIL PADS

DEFINITIONS

Mold: A unique expendable tool containing multiple cavities, typically from 4 to 16, which simultaneously produces one part per cavity.

Cavity: The smallest division of a mold; it produces a single, identified, unique part per shot.

Shot: One cycle of a mold which simultaneously produces one part from each desired cavity.

IDENTIFICATION SYMBOLS ON PART FOR: Vendor, mold, cavity.

Variables: The same mold can produce different part numbers; the difference is color.

Inspection Notes: A material or process problem will be common to a given shot (all cavities in use at time are subject to the problem).

A mechanical problem could be limited to an individual cavity. Other cavities in the shot could be unaffected or affected differently.

History: Most problems have been material problems. The reject rate at Purchase Parts Inspection has been less than 3%.

Shipping Lots: Remington does not require any segregation by mold or cavity for a given part number.

L. B. Ferreira
M. S. Hall
D. D. Ricci
W. A. Warren

WAW/bdm

SUPPLEMENTAL INFORMATION ON THE PURCHASED PARTS INSPECTION OF:

D I E C A S T I N G S

DIE: A unique expendable tool containing multiple cavities, typically one or two, which simultaneously produces one part per cavity.

SLIDE: A replaceable moving member portion of a die, which is subject to change for a given die.

CAVITY: The smallest division of a mold; it produces a single, identified, unique part per shot.

DATE OF PRODUCTION: Symbolic indication of month produced (only).

SHOT: One cycle of a die which simultaneously produces one part from each desired cavity.

IDENTIFICATION SYMBOLS ON PART FOR:

Trigger Plate: Vendor, die, cavity, slide, date of production.

700 A

Trigger Guard: Cavity

700 BDL

Trigger Guard: None

700 Floor Plate: None

552/572 Receiver: Vendor, die (single cavity)

VARIABLES: None

NOTE: We have now, or could have in the future, multiple vendors for all these parts.

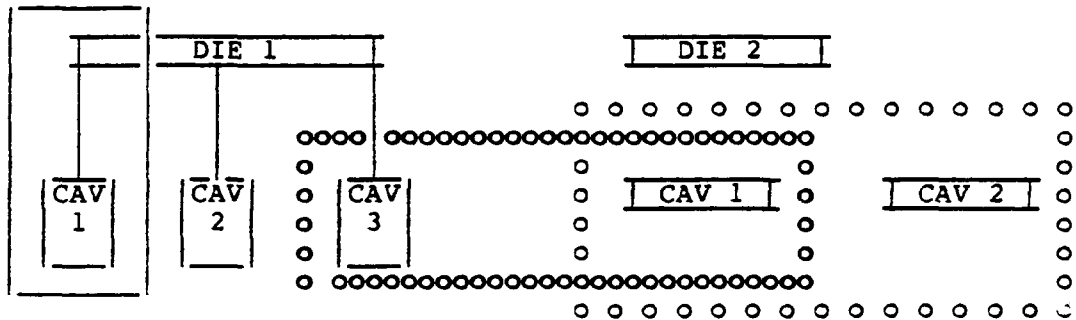
3/6/86

SUPPLEMENTAL INFORMATION ON THE PURCHASED PARTS INSPECTION OF:

D I E C A S T I N G S

PRODUCTIONS LOTS:

- o The parts from different dies are kept separate (via box or carton).
- o The parts from a given die are kept separate by cavity (via box or carton).



As boxed: YES: o o o
 NO: ooooo

NOTE: Cartons or boxes are identified by the vendor according to cavity (die).

SHIPPING LOTS:

It is Remington's expressed desire that a given pallet contain only parts from the same die (slide changes are acceptable). A shipping lot may contain multiple pallets consistent with above.

It is Remington's expressed desire that a pallet, if it contains parts from more than one cavity, be logically divided by cavity.

Example: With horizontal cardboard dividers separating the cartons (boxes) which came from different cavities.

INSPECTION NOTES:

We need to recognize a possible difference in acceptable quality between parts from different cavities contained on the same pallet or in the same shipment.

When a pallet contains parts from more than one cavity, it cannot be assumed that the quantity from each cavity is equal.

L. B. Ferreira
 M. S. Hall
 D. D. Ricci
 W. A. Warren

WAW/bdm

3/6/86

SUPPLEMENTAL INFORMATION ON THE PURCHASED PARTS INSPECTION OF:

D I E C A S T I N G S

DIE: A unique expendable tool containing multiple cavities, typically one or two, which simultaneously produces one part per cavity.

SLIDE: A replaceable moving member portion of a die, which is subject to change for a given die.

CAVITY: The smallest division of a mold; it produces a single, identified, unique part per shot.

DATE OF PRODUCTION: Symbolic indication of month produced (only).

SHOT: One cycle of a die which simultaneously produces one part from each desired cavity.

IDENTIFICATION SYMBOLS ON PART FOR:

Trigger Plate: Vendor, die, cavity, slide, date of production.

700 A

Trigger Guard: Cavity

700 BDL

Trigger Guard: None

700 Floor Plate: None

552/572 Receiver: Vendor, die (single cavity)

VARIABLES: None

NOTE: We have now, or could have in the future, multiple vendors for all these parts.

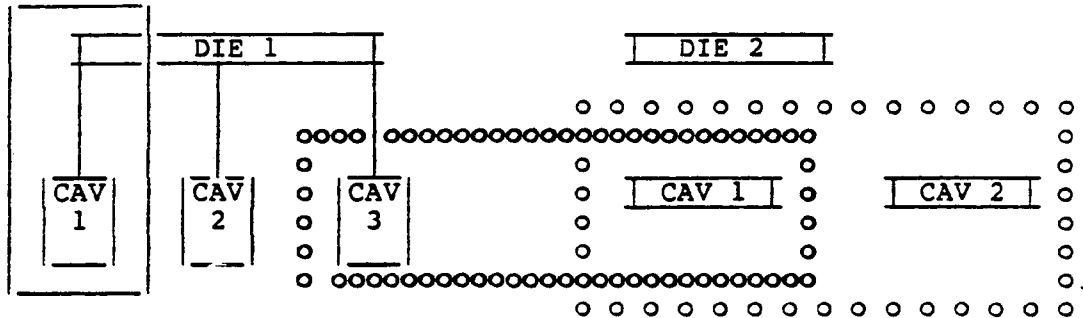
3/6/86

SUPPLEMENTAL INFORMATION ON THE PURCHASED PARTS INSPECTION OF:

D I E C A S T I N G S

PRODUCTIONS LOTS:

- o The parts from different dies are kept separate (via box or carton).
- o The parts from a given die are kept separate by cavity (via box or carton).



As boxed: YES: o o o
 NO: ooooo

NOTE: Cartons or boxes are identified by the vendor according to cavity (die).

SHIPPING LOTS:

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It is Remington's expressed desire that a pallet, if it contains parts from more than one cavity, be logically divided by cavity.

Example: With horizontal cardboard dividers separating the cartons (boxes) which came from different cavities.

INSPECTION NOTES:

We need to recognize a possible difference in acceptable quality between parts from different cavities contained on the same pallet or in the same shipment.

When a pallet contains parts from more than one cavity, it cannot be assumed that the quantity from each cavity is equal.

L. B. Ferreira
 M. S. Hall
 D. D. Ricci
 W. A. Warren

WAW/bdm

E. I. DuPont de Nemours & Company
Remington Arms Company, Inc.
Ilion, New York 13353

1) CC RA ~~2/10~~
✓ ~~2/10~~
File: TECH. Monthly Reports
REMINGTON ARMS CO.
RECEIVED

FEB 03 1988

February 3, 1988
FIREARMS RESEARCH DIVISION

2' TO: W. H. COLEMAN II

FROM: H. C. MUNSON *HCM*

MONTHLY REPORT - TOTAL QUALITY MANAGEMENT

SUPPLIER QUALITY - "STANDARDS FOR EXCELLENCE"

A program has been developed for presentation to key vendors, aimed at developing long-term partnerships with continual improvement in total quality. This program is getting off to a fast start because of the assistance of Fred Trombley and Dave Brown in FPD Logistics and Materials. The first presentation will be to H & P Die and Stamping Co., on February 12 in Cleveland.

Special focus is being placed on Connecticut Spring and Stamping Co., a supplier of 123 parts including the M/700 trigger connector - the part which has resulted in a massive Trigger Assembly Replacement Program. Two issues are being addressed: 1) The development of Connecticut Spring to an outstanding supplier on all parts; 2) Resolution of financial responsibility associated with the Trigger Assembly Replacement Program.

ECONOMICS OF QUALITY

Robert Poole will present his EOQ "Training the Manager" program to about 20 Ilion people, including the plant Staff, on February 25. This is an effective way to explain the benefits and the process of EOQ so that Ilion can decide how to best use it.

AWARENESS BUILDING

An increasing awareness of quality is apparent as more people are constructively challenging each other for real solutions vs. quick fixes. This trend will be encouraged.

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

February 12, 1986

TO: R.S. Murphy

FROM: F.E. Martin *M*

New Bolt Action Rifle

Five model guns are ready for testing by design and the R & D Test Lab. A test request has been submitted and awaits action. Parts are available to assemble the remaining five models as soon as testing is started on the initial five. With the exception of the bolt stop release, all parts will be prototype model shop parts. A new bolt lock spring and trigger spring have to be designed and fabricated.

Work remaining for new bolt action rifle samples:

- Design and fabricate trigger and bolt lock springs.
- Evaluate bolt stop release dimensions.
- Complete assembly of prototypes.
- Complete parts list and drawing corrections.

FEM:sps

xc: E.O. Fini
B.W. Rau
F.E. Martin
F.H. Smith

RD-89-R

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.



PETERS



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

February 13, 1986

TO: J.W. Bower

FROM: R.S. Murphy *RSM*

NBAR Introduction

The new bolt action as a functionally and aesthetically superior rifle should be well accepted. To capitalize on this opportunity with a minimum of risk an introduction strategy obviously is important.

Bruce Rau has indicated that he would like to see the NBAR introduced as a new line. This approach effectively minimizes the risk of a new product offering, however, after a review of our projected 1989 centerfire bolt action offerings, (attached) I don't see a place for an additional product line without being redundant. There is a place though for the NBAR in the following product line consolidation/simplification.

I understand that the Model Seven is not selling very well and that it faces an uncertain future. Given this, my proposal consists of three parts. First, drop the Model Seven and expand the Mountain Rifle to include 308, 7mm-08, 243, 6mm and .223. Second, introduce the NBAR in 270, 280, 30-06, 7mm Rem Mag and 300 Win Mag long action and magnum calibers. and third, given essentially a complete caliber coverage between the Mountain Rifle and NBAR, consolidate the ADL and BDL into an "ADL plus" product line. The ADL plus would include all of the BDL calibers and would be upgraded from the ADL through the addition of the BDL floorplate.

The advantages and disadvantages of this proposal are as follows. By shifting the Model Seven calibers to the Mountain Rifle we should increase our sales volume by discontinuing a weak seller and expanding what we expect to be a winner. The lightweight barrel contour extended from 18 1/2 to 22 inches will improve downrange ballistics and the longer barrel with the full size stock only

JW BOWER
February 13, 1986
Page 2

increases the total rifle weight from 6 1/4 lbs. to 6 3/4 lbs. If weight is a major consideration a molded Rynite stock would probably offset any weight increase. On the downside, one disadvantage is that we will be giving up our carbine bolt action offering. Another is that a new stock former and/or mold would be required although this should not be a problem since the Mountain Rifle stock exists as a CV model.

A five long action and magnum caliber NBAR introduction should result in a first year combined sales volume of about thirty thousand rifles (based on 1984 BDL sales). It will be a fine compliment to the Mountain Rifle as a medium to a big game heavy caliber hunting rifle line. Marketing's wish also for a stand alone addition would be served. A possible drawback would arise if a magnum barrel contour was required for the 7mm Rem Mag or 300 Win Mag calibers since a second stock former would also be required.

With the Mountain Rifle and NBAR representing our premium priced rifles there would be no need for a third high priced rifle line. Since the current trend is away from the high gloss white line spacer look, I expect that by 1989 our BDL volumes will begin to suffer. By eliminating the BDL and shifting its calibers to the moderately priced, popular ADL, we will fill the gap between the inexpensive Sportsman 78 (or Kit Gun) and the premium priced Mountain Rifle and NBAR. The varmint specials would not change except for a toned down 30-gloss finish.

I feel that as a result of these changes we will have a stronger centerfire line.

RSM:sps
Attach.

Proposed 1989 Product Line

| | 700 BDL | Varmint Special | 700 ADL | Mountain Rifle | Model Seven | Sportsman 78 | Kit Gun | Custom Shop | NEAR (1) | Mountain Rifle (2) | ADL Plus/Minus BDL (3) |
|----------------|---------|-----------------|---------|----------------|-------------|--------------|---------|-------------|----------|--------------------|------------------------|
| 17 Rem | 0 | | | | | | | | | | 0 |
| 222 Rem | 0 | 0 | | | | | | | | | 0 |
| 22-250 Rem | 0 | 0 | 0 | | | | | | | | 0 |
| 223 Rem | 0 | 0 | | | 0 | 0 | 0 | | | 0 | 0 |
| 6mm Rem | 0 | 0 | | | 0 | | | | | 0 | 0 |
| 243 Rem | 0 | 0 | 0 | | 0 | 0 | 0 | | | 0 | 0 |
| 7mm-08 Rem | 0 | 0 | | | 0 | | | | | 0 | 0 |
| 308 Win | 0 | 0 | 0 | | 0 | 0 | 0 | | | 0 | 0 |
| 25-06 Rem | 0 | | 0 | | | | | | | | 0 |
| 270 Win | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 |
| 280 Rem | | | | 0 | | | | | 0 | 0 | 0 |
| 30-06 | 0 | | 0 | 0 | | 0 | 0 | | 0 | 0 | 0 |
| 7mm Rem Mag | 0 | | 0 | | | | | | 0 | | 0 |
| 300 Win Mag | 0 | | | | | | | | | | |
| 8mm Rem Mag | | | | | | | | 0 | | | |
| 375 H&H Mag | | | | | | | | 0 | | | |
| 458 Win Mag | | | | | | | | 0 | | | |
| Total Offering | 13 | 7 | 7 | 3 | 5 | 5 | 4 | 3+ | 5 | 7 | 13 |

RSM:sps

2/13/86

February 14, 1986

TO: J. E. PREISER
FROM: E. O. FINI 
SUBJECT: DARBY I.E. (PRODUCT SAFETY FEATURES)

I personally think that integral safety of firearms is something for the most part taken for granted by Hunter's.

However, I think the issue can be raised and they, the shooters, will pay attention. It is not a dominant part of the purchase thought process. I say this with some confidence as a result of our focus group sessions.

I agree we don't do as good a job as possible in our advertising and will work with MCD to better capitalize on our strengths.

In any event we should never stop our efforts towards increased safety and security in our firearms - as long as they do not hinder or impair the products ability to perform in its environment.

EOF/tvm

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

TO: C.E. Ritchie

FROM: D.S. Findlay

xc: G.W. Bower

Copy to Feto - Monthly Report

Copy to Jim Hunter 52-1

Jim - For your information.
 due to the confidentiality of
 February 17, 1986
 this report, please destroy
 when you are finished
 with it.

Jim

Monthly Report - February - 1986CV Users GroupFMS Modeling

Modeling and detailing (model drawing and functional drawing) of the FMS 870 receiver model is complete. A new tape has been sent to EDL containing all of this information.

Remodeling of the M/1100 receiver is complete as is the detail model drawing. The functional drawing will be started as soon as Dick Stafford provides us with information to do it. This 1100 CV model and detail sheet have also been checked and sent to EDL for N/C tool path generation.

FMS Tool Drawings

FMS tool drawings for the M/1100 and 870 receivers are 70% complete. All drawings will be complete by February 26 for checking and review.

NBAR Modeling

NBAR drawing work is 85% complete with some of the remaining work being to:

1. model and detail stock
2. detail stock assembly
3. fore end tip
4. barrel assembly complete
5. miscellaneous drawing revisions
6. other part revisions as the designers require them (i.e. magazine box design)

CE RITCHIE
Page 2
February 17, 1986

Steve Miller is continuing to work on the stock design for the NBAR.

NCS Modeling

Work is 85% complete on a M/1100 stock on the CV system. The comb cut is the only outstanding area that needs definition. This stock model is for developing a plastic mold for this stock or for manufacturing press form dies. Bob Sanzo has been given a preliminary model of this part to make N/C tapes and cut out a prototype for a "look see" test piece. This may be done the week of 2/17.

Restyle/Misc. Drawing Work

At the present time the remaining work involved on the 870/1100 restyle small gauges is:

- o better definition of barrel specs
- o the parts list for the M/1100
- o check over both drawing packages
- o marking drawings for the lightweight.

Ron Webster is currently working on this as well as the M/11-87 change.

DSF:sps

2-19-86

To: JWB
From: RSM

Subject: Timely Monthly Report - February

NBAR

RSM FEM FHS

Five rifles will be at the 100 round level today (2/19). As we discussed problems with the stocks and bolt locks were encountered and corrective measures have been taken. The difficulty in measuring locktime has apparently been resolved and I understand the equipment is being setup. The assembly of the remaining five prototypes I have been assured will be complete by Friday (2/21).

The magazine box development is progressing. The new follower design appears to work well and a large sample of parts has been molded. A synthetic magazine well (stock insert) will be in the Model Shop by Thursday (2/20). A Model 700 test vehicle will be used for function testing.

Modeling of the stock should be complete without a cheekpiece by Friday (2/21). To check the model and verify the design the next step is to N/C machine a one to one stock in wood.

Synthetic Long Stocks

FHS

RSM

The request for quote/preliminary contract with Choate has been updated and is being returned to Choate (and the Business Team) for approval. Mold and stock design has begun and Skip will meet with Choate on March 3 to review their progress. American Plastics (Choate's molder) is planning to shoot Rynite stocks during this visit so John Shimel tentatively will accompany Skip.

Foamed Rynite was discussed during John Shimel's last visit and we are drafting a follow-up report. The foamed Rynite specialist/engineer will be here on February 28 to further discuss this alternative.

Other plastics molders contacted concerning long stocks will be investigated for a future second source.

xCO447

filed stock
clearance for wirebrm
near batch
guard screws
left side
safety

bent wirebrm

grand ends of wirebrm - 1 to each side

reformed lips to 395-405

bellmouthed lips

4 washers in stock - 2 front
- 2 rear

under receiver

XC0445

filed stock
clearance for waveform
for red latch
safety
bolt stop
filed screw holes

bent magazine lips to .395.405
bellmouthed lips

xCO448

releaved 3/22 -

for waveform

for reg latch

for safety

for bottom

= revent waveform

- bent lips to 395-405

- bellmouthed lips

XL 0450

- filed stock

- relieved for wireform

- relieved for rear door bar

- relieved for safety

- relieved for bolt stop

- filed mag well in guard - was tight

- filed latch surface

- reheat wireform

- adjusted mag lips to 395-405

- bellmouthed lips

XCO449

- two washers at front screw
under receiver
- filed stock - relief for wireform
- filed out screw holes
- filed recess of well - relief for recess latch
- filed safety clearance
- filed bolt stop clearance
- reformed wireform
- adjusted lips to 395-405 const
bell mouthed release points

XC-0451

filed 3/26/42
clearance 5/2

wirebram

secr latch

guard screws

safety

bolt stop

reborn mag lips to .355-.405
bellmouth rebar points

reborn wirebram

XC-0445 - 30-06 - Alter Bolt Plug For Bolt
Lock Change .690 Dim To .712
File Bolt Stop ^{Front Stop} Surface To Allow
Bend Bolt Stop Release
- Needs Clearance For
Trigg. Block Plunger
Change Fire Control Housing
- Sides Warped Seal Binding
File Bolt Stop Scot To
Remove Burrs
Grind Flat On Bolt Plug Washer
To Ease Assy.

XC-0450 - 30-06 - Alter Bolt Plug (As Above) Bend
Bolt Stop Release - Bolt Plug
Washer (As Above)

XC-0448 - 30-06 - Alter Bolt Plug (As Above) Bend
Bolt Stop Release - Bolt Plug Washer
Fire Control Housing Change
File Bolt Stop Scot To Remove
Burrs Filed Trigger Guard
For Safety Clearance

XC-0449 .30-06 - Polish Trip Back Plunger
Changed Fire Control Housing
Alter Bolt Plug -
Bend Bolt Stop Release

XC-0451 - 30-06 Alter Bolt Plug (As Above)
Bend Bolt Stop Release
(As Above)

XC-0447 - 30-06 - Alter Bolt Plug (As Above)
Bolt Stop Release (As Above)

LOCK TIME COMPARISON - NBAR VS STD. 700'S
22 FEB 86

| TRIAL # | NBAR | | | | | STD. 700'S | | |
|-----------|--------|--------|--------|--------|--------|------------|----------|----------|
| | XC0434 | XC0430 | XC0429 | XC0428 | XC0426 | B6333699 | B6328808 | B6750779 |
| 1 | 2.539 | 2.881 | 2.246 | 2.568 | 2.490 | 2.949 | 3.080 | 2.891 |
| 2 | 2.568 | 2.920 | 2.529 | 2.881 | 2.637 | 3.125 | 3.193 | 2.988 |
| 3 | 2.539 | 2.774 | 2.334 | 2.607 | 2.783 | 2.734 | 3.086 | 2.812 |
| 4 | 2.715 | 2.812 | 2.344 | 2.891 | 2.803 | 2.822 | 3.447 | 2.774 |
| 5 | 2.666 | 2.783 | 2.539 | 3.027 | 2.754 | 3.301 | 3.447 | 3.066 |
| AVE | 2.605 | 2.834 | 2.398 | 2.795 | 2.693 | 2.986 | 3.251 | 2.906 |
| STD.DEV | 0.080 | 0.064 | 0.130 | 0.198 | 0.131 | 0.229 | 0.185 | 0.121 |
| MIN | 2.539 | 2.774 | 2.246 | 2.568 | 2.490 | 2.734 | 3.080 | 2.774 |
| MAX | 2.715 | 2.920 | 2.539 | 3.027 | 2.803 | 3.301 | 3.447 | 3.066 |
| AVE(NBAR) | 2.665 | | | | | | | |
| AVE(700s) | 3.048 | | | | | | | |

ANAYLSIS OF VARIENCE

WHERE Nt = the total number of observations = 45

K = the number of groups = 2

MSb = 1.371 df (MSb) = K-1 = 2-1 = 1

MSw = 0.044 df (MSw) = Nt - K = 45 - 2 = 43

Fo = 31.209 Fc(.95) = 4.08

Fc < Fo THEREFORE , THERE IS A SIGNIFICANT DIFFERENCE AT THE 95% CONFIDENCE LEVEL
BETWEEN THE LOCK TIMES OF THE NBAR AND THE CONTROL M/700s.

FILE=LOCKTIME_NBAR_VS_700.DATA_2020

XC: R. MURPHY
FILE

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: J.W. BOWER TESTER: LAB DATE: 01/14/86
REPORT NO.: 860081 WORK ORDER NO.: G-0460
WRITTEN BY: F.L. SUPRY

TEST TYPE: WAREHOUSE AUDIT 500 rd. ENDURANCE

FIREARM STAT'S : MODEL: 700 MOUNTAIN RIFLE CAL or GAUGE: .280
BARREL TYPE: PROOFED: YES X NO

REASON FOR TEST :

During the September 1985 T&P evaluation of the Mountain Rifle (refer to Report# 851412) we had some fore-end tips come loose. This test was conducted to verify that the problem has been corrected.

EQUIPMENT REQUIRED :

Five Model 700 Mountain Rifles, Ramac# 5632, of varied manufacture dates. The serial numbers of the five rifles, randomly selected from the warehouse are:

B6759118 B6758336 B6760766 B6758659 B6757788

TEST PROCEDURE :

The rifles were withdrawn from the warehouse on 1/8/86. The headspace "as received" was taken on each rifle. Each rifle was subjected to the loading and firing of 500 rounds of Remington .280 ammunition, with the rifle placed in a shooting jack. The fore-end tip was checked every 20 rounds. At the completion of the 500 round endurance, each rifle was subjected to The loading and firing of 20 additional rounds, fired from various shoulders.

TEST RESULTS :

The adhesion of the fore-end tip on the Model 700 Mountain rifles tested was found to be acceptable. None of the fore-end tips came loose.

At the completion of the test all five rifles will be returned to production.

E. I. DuPont de Nemours & Company
Remington Arms Company, Inc.
Ilion, New York

March 1, 1988

TO: W. H. COLEMAN
FROM: H. C. MUNSON

QUALITY - FEBRUARY REPORT

QUALITY MEETINGS

A meeting was held involving a cross section of Ilion functions to discuss the value of periodic quality meetings. A list was generated which identified information that would be of greatest value to participants. A design team will organize a revised quality meeting, suggesting content, participants, process and frequency.

ECONOMICS OF QUALITY

Robert Poole, FPD Quality Consultant, presented his "Train the Manager" program on Economics of Quality. This was done to acquaint the Ilion staff and quality resources with the basic concepts of this program and to raise awareness of the huge stake available through quality improvement.

SUPPLIER QUALITY - VISIT TO H & P

A "Standards for Excellence" introduction was presented to H & P Die and Stamping Company, the first of our suppliers to hear this program. H & P people were very receptive to the "partnership" concept and encouraged us to take more advantage of the expertise in their organization.

An immediate follow-up meeting was scheduled, and five H & P people visited Ilion to see how some of their 200 different parts flow through our plant to Final Assembly.

Another visit to their plant is planned to review "quality values" in more depth and begin to resolve specific problems, one by one.

SUPPLIER QUALITY - CONNECTICUT SPRING & STAMPING CO.

A Remington team will visit Connecticut Spring on March 10th to conduct a Quality audit. The purpose of the audit is to establish understanding between our companies of essential quality control systems; this will include confirmation of a system for notifying Remington whenever a process change is implemented.

PREVENTIVE MAINTENANCE

Production supervisors have made up a list of (71) pieces of equipment that they would like to get into a Preventive Maintenance Program. An estimate of the manpower required to design each P.M. procedure and to administer such a program will be made and submitted to management for head count increases in the Maintenance Department to establish a P.M. program. An "up front" investment of manpower and material will be necessary before improved equipment performance can be attained.

MAINTENANCE MANAGEMENT

Ilion people visited Sabine River Works to observe the NEXUS Information System. This is an IBM Mainframe Based System that contains three major information modules and is organized as follows:

| <u>Materials Control Sys.</u> | <u>Mfg. Information System</u> | <u>Personnel Mgt. System</u> |
|-------------------------------|--------------------------------|------------------------------|
| Contract Management | Equipment Specifications | Pensioner Data |
| Requisitioning | Equipment | Organization |
| Purchasing | Work Order | Work History |
| Invoicing | Drawing Index | Training |
| Inventory | Reliability Maintenance | Skills |
| Disbursing | Special Functions | Attendance |
| Integrated Supply | Procedures & Methods Library | Benefits |
| | Overtime | Medical |

From a maintenance management perspective, NEXUS has all the necessary elements to assist us to improve equipment reliability and to reduce maintenance costs over the long-term.

Ilion is exploring the possibility of using excess IBM Mainframe capacity at Washington Works which now runs a NEXUS System.

HCM/rh

DON'T SAY IT-WRITE ITTo ALL RESEARCH PERSONNEL

Xc: R.A. Darby

Date 2/27/86From W.H. COLEMAN, IIR.F. Ulak
E.O. Fini
D.M. Condon
H.K. Boyle
J.R. Ayers

TO ALL RESEARCH PERSONNEL:

I hope everyone takes the time to read Rick Jamison's article in April's "Shooting Times". Note that Remington got the full color cover and complete centerfold plus seven pages of copy. The first two paragraphs tell the story:

The 1986 introductions top all other years since his attending from 1973 to date for number - and QUALITY of new products. They're all GOOD-WELL THOUGHT-OUT, WELL EXECUTED ideas.

This is an outstanding success story of GREAT TEAM EFFORT. And, team effort is what it takes. In this case Research; the Custom Shop, Production and Process Engineering (Ilion and Lonoke), Marketing, Sales and others all pulled together and all contributed significantly. This is the only way we can have this type of success.

Let's pull together even stronger for next year and put Remington way out front where it belongs.

Thanks for an outstanding job!



Bill

1/10/86

ST801 ZYTEL.

35 REM.

STOCK TEXTURE(?) PC(?)

1/10/86

Date

TO: SPORTING GOODS BUSINESS TEAM (SEE BELOW)

FROM: JOHN E. PREISER
Finishes & Fabricated Products Department
Sporting Goods - B-6232
Ext. 38326

W. H. COLEMAN
D. M. CONDON
E. O. FINI
L. E. ZEILLMANN
R. F. ULAK

Bob Darby in the attached note is questioning the marketable value of the safety features of our firearms. I would appreciate any thoughts you might have from a product liability standpoint on this subject. Also, helpful, would be any principles you would recommend that we follow in our marketing communications activity around product safety features.

JEP:dvg
Attachment

FROM: _____
Ext. 48348

ROBERT A. DARBY
Finishes and Fabricated Products Dept.
Research and Development Division
B-3324-5
Wilmington, Delaware

Date: December 30, 1985

TO: 1) ~~E. E. Woodacre~~ 1/30
2) J. E. Preiser 16

In reviewing the attached strategie summary on Firearms, one product feature which we stress internally, but to my knowledge we do not stress very extensively in the marketplace, is safety. (For example, our barrels will "bird-cage" rather than shatter like some competitive offerings.) The world is surely increasingly safety-conscious - I don't know whether macho hunters are concerned, but they should be. R & D is working on improved safety and security features which should have marketable value. (If they don't, we ought to stop the work.)

I'd be glad to discuss further with you and share views.

Thanks.

R.A. Darby

REMINGTON ARMS COMPANY, INC.
FIREARMS PROCESS RESEARCH DIVISION
MONTHLY REPORT
APRIL 1986

RECEIVER FLEXIBLE MANUFACTURING SYSTEM

Debugging of the M/870 process and fixture prove out at EDL are now complete. Twelve M/870 receivers were sent to Ilion 4/10/86 for finishing and assembly into finished guns. Five of these are scheduled for R&D functional testing beginning the week of 4/28/86. The new M/1100 NC program has also been debugged and refinements of the feeds and speeds and general fine tuning of the process is now in progress. M/1187 receivers from this process are scheduled to be ready for R&D testing the week of 5/5/86.

EDL is presently running the T-10 machine on a three shift basis. The first shift is being used for development of new programs, foot print data of machine alignments and testing of machine options. M/1100 receiver machining tests using the 16 part fixture are continuing on the second shift to gather additional tool life and thermal growth data. The machine runs unattended during the third shift to gain operating time for testing reliability of the machine components and maintain operating temperature.

The NBAR receiver drawing was reviewed with EDL on 4/9/86 to develop a manufacturing process using the FMS. Three options concerning the starting blank configuration discussed are now being outlined. A follow up meeting is scheduled at Ilion for 4/24/86.

A hi-spot evaluation has been completed to determine the factory cost of the proposed New Bolt Action Rifle. A ratio was developed from an old estimate of standard costs and was then applied to the average 1985 M/700 factory cost. As a result the factory cost of the NBAR is estimated to be \$200. The average 1985 M/700 factory cost was \$188.

The NBAR Receiver will require 1.2 T-10 machining centers if it is produced on the FMS. A hi-spot evaluation indicates a gross savings of \$137M can be realized by machining this part on the FMS as opposed to conventional machining. This does not take into account the Capital avoidance that would occur if the FMS is utilized over newly purchased conventional machinery. This would greatly enhance the economics for utilizing the FMS.

An estimate was also completed that compares the costs of conventional machining of the M/870 12 Ga. "B" cuts with FMS machining of the cuts. The "B" cuts will require 2.4 T-10 machining centers if done on the FMS. The evaluation indicates that it is slightly more economical to produce the "B" cuts on the FMS than on conventional machinery. The NROI is in the 1% to 2% range and as a result is not worth pursuing at this time.

A task force has been formed to develop a plan for completely clearing Building 60 to 97% of the machinery currently located there to allow for the renovation of the building to house Phase II of the FMS project. To meet current schedules, Building 60 must be cleared by January 1, 1987. The equipment currently in that building must either be relocated in the plant or sent to storage. The task force

has been asked to have this plan developed along with the resulting costs by the 1st week in May. Preliminary plans indicate that costs will be in the \$300M to \$500M range with approximately 250 machines needing to be relocated.

SHOTGUN BARREL AUTOMATION

P.E. & C. have completed their tests on a controlled lot of shotgun barrels to see if any potential problems arise from cutting off the barrels later in the process. No problems did occur but P.E. & C. want to continue the testing on a random basis until around May 1st to make sure no problems occur.

The first progress report from DCT was received. The report included a kinematic analysis of the GFM process with a plasticity analysis of the process expected as part of the second progress report. A similar analysis will be performed on other barrel forming options. The report also included the results of preliminary contacts with forging equipment vendors. A meeting is scheduled with DCT at Ilion on April 25, 1986 to discuss their progress to date and future direction.

Several proposals from forging equipment vendors have been received. These include an updated proposal for a feasibility testing program of the forward extrusion process proposed by Erie Press Systems. The proposal includes the cost of equipment, tooling and manpower necessary to demonstrate the large area reduction and long shallow taper required to produce shotgun barrels. These two requirements are those which are considered most difficult to achieve. This proposal will be discussed at the April 25 meeting with DCT and no plans to undertake the testing program will be made until after DCT has analyzed the process. A preliminary proposal from Autospin Inc, a manufacturer of spin forming equipment, was also received. The proposal was for a two step forming process which would generate a no turn-no ream barrel, however, a final machining operation would be required to produce the chamber. A clarification of several items and additional information on investment cost and cycle times is being requested.

Work has begun on determining potential alternatives to our current barrel machining operations. Options being discussed include FMS, transfer line and stand alone CNC equipment.

In order to analyze these options we plan to determine the most desired way to perform each cut and comparing this to the capabilities of each type of system. In doing this we hope to determine the best overall system to perform the barrel machining operations. Work to date includes the gathering of a data base on the cuts including the current machining data (feeds, speeds and cycle times) and calculating the information from the machining data handbook.

FLEXIBLE SMALL PARTS ASSEMBLY SYSTEM

Modified common trigger components in 15 M/1100 trigger plates successfully completed dry cycle testing April 2. The trigger plates, containing modified common trigger assemblies made on the small parts assembly cell, were run through 50,000 cycles without a related part failure. 12 more modified trigger assemblies are being shot in M/1100 12ga MAG shotguns to satisfy endurance criteria for transmittal. If successful, the modified components will then be shot in each gun utilizing the common trigger assembly. At the completion of the final phase of testing, transmittal of the design changes will take place.

A rigorous statistical test program has been designed to verify process sensitivity for M/700 trigger housings made on the assembly cell with an orbital riveter. The hybrid test will include both dry cycle and live firing of 32 M/700 ADL rifles, 16 being set up with purposely made "loose" trigger housings (experimental) and 16 serving as control. This test will also investigate the effects of loosely riveted trigger housings on engagement of sear and trigger, and the role that receivers play in altering preset engagement in a "loose" trigger housing.

Ilion personnel traveled to EDL late in March, 1986, for a small trial run of the second assembly cell and the breech bolt work station. Performance of the system was marginal (as expected at this stage of development), with overall utility for the trial run at 64%. In 3 hours the system attempted to manufacture 166 parts, with 57 being rejected and 109 good. Average cycle time was approximately 42 seconds.

EDL is continuing development work on the breech bolt work station. Current plans are to travel to EDL the week of April 21, 1986, for a final acceptance test.

Due to a discrepancy between gage and tool dimensions, a modeling change was required for the M/870 breech bolt. New models for the M/870 and M/1100 have been completed on the CV. A lot of the NC work on the M/870 can be saved but the subroutines will have to be recreated.

We have rechecked the locking block model dimensions and a new model was required. The part has been remodeled on the CV, and is now ready for NC programming.

Fixture testing has been delayed until a new NC program for the M/870 breech bolt is complete.

FORM-ROLLING

Results of our PM Lab analysis of the Rol-Flo samples indicate that as the parts were being formed, the rolled area was over stressed and then welded back to itself to appear solid. A complete report will be available soon.

Manca Inc. has proposed to provide us with up to 100 samples of swaged shotgun firing pins. They have also agreed to make these pins from several materials that we would provide. The materials we are considering are 8620, 6150 and a stainless steel - all of a cold forming quality. The order for this proposal will be processed soon.

SANDSTROM COATINGS

The US Custom Service has reiterated their desire for the maintenance free riot gun to the tune of a proposed 1400 quantity initial order.

Most of the functional problems demonstrated in our first 3-gun test were related to the inconsistency of coating thickness on mating parts.

It was decided to prove how controllable this coating application could be. A number of sample parts will be measured, coated and re-measured. If proven controllable a 20 gun test will be conducted.

We are writing a memo to P.E. & C. to prepare them for the eventual process commitment required to not only satisfy the custom service request, but from market indicators, the other sales potential in law enforcement.

GPM Automation

Cincinnati has performed the required robot run-off.

The cut-off machine should be ready by the end of the month.

The system should be ready for Trial & Pilot in May.

CV USERS GROUP

FMS MODELING

Modeling and detailing (model drawing and functional drawing) of the FMS 1100 & 870 receiver RH model are complete. The M/870 LH model and detailing are also complete. Modeling of the M/1100 LH is complete with the detailing 30% complete. Remodeling of the 1100 and 870 breech bolts is also complete.

FMS TOOL DRAWINGS

FMS tool drawings and tool assembly for the M/1100 and 870 receivers are complete, but require checking. The FMS cutter drawing are undergoing revision based on the checking done by the FMS group.

NBAR MODELING

NBAR drawing work is partially complete with some of the remaining work being to:

1. model and detail stock
2. detail stock assembly
3. fore end tip
4. barrel assembly complete
5. miscellaneous drawing revisions
6. other part revisions as the designers require them (i.e. magazine box design)

Steve Miller is continuing to work on the stock design for the NBAR.

NCS MODELING

Work is 85% complete on a M/1100 stock on the CV system. The comb cut is the only outstanding area that needs definition. This stock model is for developing a plastic mold for this stock or for manufacturing press form dies. Bob Sanzo has cut a preliminary model of this part. Minor work to reblend some of the surfaces for mold work will be done by 5/15.

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
DUPONT*PETERS*
DUPONTXc: E.O. Fini
F.E. Martin
R.S. Murphy

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

CONFIDENTIAL

Ilion, New York
April 4, 1986

TO: W.H. COLEMAN, II

FROM: J.W. BOWER
JWB

STAFF NOTES - NBAR LOCK TIME

Lock time is defined as the elapsed time between releasing the sear and firing the round. The shorter the lock time, the less time the shooter must remain motionless on the target, and, hence, the more accurate the rifle. One of the goals of the NBAR program has been to design a lock time that is less than that on the current Model 700 BDL, which the NBAR will replace.

The Research Test Lab has completed their lock time evaluation and it indicates that the design goal has been met. Five NBAR rifles and three Model 700 BDL's, all in 30-06 caliber, were fired five rounds each. The average lock time for the NBAR rifles was 2.665 m sec., versus 3.048 m sec. for the Model 700's. The NBAR's ranged from a low of 2.398 m sec. to a high of 2.834 m sec. For comparison, the range on the Model 700's was 2.906 m sec. to 3.251 m sec. Statistically, the difference is significant.

JWB:js

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.



PETERS

xc: R.S. Murphy
File

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

April 7, 1986

TO: J.W. Bower

FROM: F.H. Smith

Synthetic Stock Program

The following is an update of the program:

- o On March 27th, I received a letter from Harding Manufacturing, stating that he would not quote on this project and his reasons why (see attached.)
- o On April 3rd, Randy White, John Shimel and I went to Diemolding, where they ran Rynite SST in one of our N/66 molds. We got about 40 stocks to use as test pieces for such things as annealing, warp, deflection, etc. Diemolding also had approximate figures on piece price and tooling, \$9.50 piece price, \$147,000 tooling cost.
- o On March 31st, we met with C. Choate and J. Richardson in Little Rock, AK. The following items and actions were discussed and agreed upon:
 - o Material selection: Rynite SST 35 - color grey
 - o Stock to have cheekpiece
 - o Make mold with cheekpiece contour in
 - o add a 30 inch approx. radius on the surface of the cheekpiece
 - o use straight pull core in butt stock (collapsible core for butt stock to be back-up position.)
 - o Use "mold tech" pattern no. 973 for texture in mold, except cheekpiece surface which will be smooth

Synthetic Long Stock

Page 2

April 7, 1986

- o Stocks may need to be annealed
 - o J. Shimel to get information on temperature and time
 - o Remington may make an oven available to Choate.
 - o Annealing fixtures will need to be made
 - o Testing of N/66 stocks made of Rynite will help determine need for annealing.
- o Prototype stocks due by August 1, 1986
- o Piece price on stocks not to exceed \$30
- o Secondary bottom inletting operation (BDL)
 - o program to be written by Remington
 - o Remington to assist in building of fixtures.

FHS:sps

Attach.

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

NBAR MEETING

APRIL 7, 1986

o Magazine Boxes:

- current development testing is being done with BDL boxes.
- boxes to the new design will be in test 4/7.

o Bolt Lock:

- new springs are in test. Heavier springs may be required.
- the drawing needs to be changed to specify qualification of the bolt and bolt plug.

Upsetting has occurred where the bolt lock contacts the bolt plug. The diameter of the bolt plug will be increased.

o Trigger Block Safety:

- a drilling operation will be performed at sub-assembly to minimize the tolerance stackup.

o Extractor:

- no malfunctions or part breakage.
- a common extractor will be used with the M/7400.
- during the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.

o Trigger Pull Adjustment Screw:

- 5-40 nyloc screws are available for test. *screw test* The Model Shop will order and modify enough screws for the design verification test. *100 Turns made every 20*

o Magazine Follower.

- ~~special coated follower is in development rifles.~~ What is cost comparison with chrome plate?

o Stock Configuration:

- configuration determined except checkering pattern.
- basic configuration has been modelled on CV. Tool paths have started.
- need (without checkering, cheekpiece, etc.) by May 1. *Leave off*

o Accuracy on some development guns has deteriorated. *determined Not to be Problem*

Hand Work o Drop testing will be started during the week of April 7.

Hand Work o Blow up testing to be done at the end of the development test.

o Drawings have been supplied to the Model Shop for design verification testing rifles.

- receiver is critical path.
- mm triggers and sears will be in the design verification guns

o Design verification testing is scheduled to start on May 1, and be complete by June 15.

- 30 rifles total; 6 each of 30-06, 280, 270, 7mm Rem. mag. 300^{mag} calibers (calibers are listed in order that they will be tested).

*20- Std. Extr.
15- Mag. Extr.*

JWBower:js

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

NBAR MEETING

APRIL 7, 1986

o Magazine Boxes:

- current development testing is being done with BDL boxes.
- boxes to the new design will be in test 4/7.

o Bolt Lock:

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- the drawing needs to be changed to specify qualification of the bolt and bolt plug.

Upsetting has occurred where the bolt lock contacts the bolt plug. The diameter of the bolt plug will be increased.

o Trigger Block Safety:

- a drilling operation will be performed at sub-assembly to minimize the tolerance stackup.

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- no malfunctions or part breakage.
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 - configuration determined except checkering pattern.
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- o Drop testing will be started during the week of April 7.
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 - receiver is critical path.
 - mim triggers and sears will be in the design verification guns
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 - 30 rifles total; 6 each of 30-06, 280, 270, 7mm Rem., 300 mag calibers (calibers are listed in order that they will be tested).

JWBower:js

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.



PETERS



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Date: 07-Apr-1986 09:07

From: J. A. McClary *JA*

Dept: FPR

Phone: 2461-237

cc: J. W. Bower
C. E. Ritchie

To: D. S. Findlay
F. E. Martin
R. S. Murphy
E. R. Owens

Subj: NSAR Fire Control Design for Assembly Analysis

I have completed the preliminary DFA on the NSAR fire control. The resulting worksheet is shown as attachment I. The design efficiency is 48%, which relates the analyzed assembly to an assembly with the optimum number of parts and each part taking 3 seconds to assemble. I have also included the DFA worksheets for the trigger housing assembly as attachments III and IV.

The next step in the process is to get together and review these results. First, we should check my calculations and make sure we all agree with them. Second, we should begin to look at some alternative designs. If we can generate an alternative, I will then re-analyze the assembly to see if any additional savings can be generated.

As a matter of interest, I have included cost information on the current trigger assembly design in attachment II. The NSAR design seems already to offer a vast improvement from the assembly cost standpoint. Please remember that the costs shown are approximate and need to be verified.

I will schedule our next meeting shortly.

ATTACHMENT 1

DESIGN FOR MANUAL ASSEMBLY WORKSHEET

Assembly Name: NBAR fire control analysis

| Part ID No. | No. times repeated | Handling Code | Handling Time | Insert Code | Insert Time | Oper. Time | Oper. Cost | TMP | Part Name |
|----------------|-----------------------|------------------|------------------|----------------|----------------|---------------|---------------|------|------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 20.00 | 1.00 | 00 | 1.13 | 00 | 1.50 | 2.63 | 1.05 | 0.00 | trigger housing assembly |
| 19.00 | 1.00 | 03 | 1.69 | 20 | 5.50 | 7.19 | 2.88 | 1.00 | trigger spring |
| 18.00 | 1.00 | 07 | 2.65 | 00 | 1.50 | 4.15 | 1.66 | 1.00 | trigger plunger spring |
| 17.00 | 1.00 | 14 | 2.55 | 00 | 1.50 | 4.05 | 1.62 | 1.00 | trigger plunger |
| 16.00 | 1.00 | 30 | 1.95 | 02 | 2.50 | 4.45 | 1.78 | 1.00 | trigger |
| 15.00 | 1.00 | 02 | 1.88 | 31 | 5.00 | 6.88 | 2.75 | 1.00 | trigger pivot pin |
| 14.00 | 1.00 | 01 | 1.43 | 10 | 4.00 | 5.43 | 2.17 | 1.00 | sear spring |
| 13.00 | 1.00 | 30 | 1.95 | 16 | 5.50 | 7.45 | 2.98 | 1.00 | sear |
| 12.00 | 1.00 | 01 | 1.43 | 00 | 1.50 | 2.93 | 1.17 | 1.00 | front slave pin |
| 11.00 | 1.00 | 01 | 1.43 | 00 | 1.50 | 2.93 | 1.17 | 1.00 | rear slave pin |
| 10.00 | 1.00 | 07 | 2.65 | 00 | 1.50 | 4.15 | 1.66 | 1.00 | trigger block plunger spring |
| 9.00 | 1.00 | 14 | 2.55 | 02 | 2.50 | 5.05 | 2.02 | 1.00 | trigger block plunger |
| 8.00 | 1.00 | 30 | 1.95 | 02 | 6.50 | 8.45 | 3.38 | 1.00 | safety lever assembly |
| 7.00 | 1.00 | 33 | 2.51 | 06 | 5.50 | 8.01 | 3.20 | 1.00 | bolt stop release |
| 6.00 | 1.00 | 11 | 1.80 | 06 | 5.50 | 7.30 | 2.92 | 1.00 | safety assembly pivot pin |
| 5.00 | 1.00 | 02 | 1.88 | 06 | 5.50 | 7.38 | 2.95 | 1.00 | safety detent ball |
| 4.00 | 1.00 | 33 | 2.51 | 06 | 5.50 | 8.01 | 3.20 | 1.00 | safety detent spring |
| 3.00 | 1.00 | 23 | 2.36 | 34 | 6.00 | 8.36 | 3.34 | 1.00 | safety detent snap washer |
| 2.00 | 1.00 | 10 | 1.13 | 33 | 6.00 | 7.13 | 2.85 | 1.00 | trigger adjustment screw |

111.93

TM

44.77

CM

19.00

NM

0.48=design efficiency

ATTACHMENT II

COST STANDARD SUMMARY FOR M/700 TRIGGER ASSEMBLY

Part 26655, 32905, 26345, 32895.

Data from 7/15/55 Cost Standard Summary Expense, LSTCOST1.

| OP# | Std. Labor | OPERATION DESCRIPTION | Estimated Time |
|--------|------------|----------------------------------|----------------|
| 50 | 11.377 | Assemble Side Plates and Spacers | 25.762 |
| 145 | 0.992 | Clean Trigger Assembly | 2.249 |
| 151 | 13.392 | Assemble-Stage I | 30.372 |
| 154 | 31.328 | Assemble-Stage II | 71.039 |
| 155 | 16.591 | Adjust Assembly on Comparitor | 37.621 |
| 160 | 10.912 | Assemble-Stage III | 42.924 |
| 165 | 2.789 | Function Check | 6.324 |
| 170 | 1.658 | Mark Good | 3.760 |
| Total: | | | 220.032 sec |

Current M/700 Volume: 83000
 Cost per Gun (total): \$0.97
 Cost per Gun, less OP#50: \$0.86

0.441=labor rate
 cents/sec

ATTACHMENT III

DESIGN FOR MANUAL ASSEMBLY WORKSHEET

Assembly Name: M700 Trigger Housing, 26635

| Part ID No. | No. times repeat'd | Handling Code | Handling Time | Insert Code | Insert Time | Oper. Time | Oper. Cost | TMP | Part Name |
|----------------|-----------------------|------------------|------------------|----------------|----------------|---------------|---------------|------|-----------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 5.03 | 1.00 | 33 | 2.51 | 00 | 1.50 | 4.01 | 1.60 | 0.00 | soft side plate |
| 4.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 0.00 | front spacer |
| 3.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 0.00 | rear spacer |
| 2.00 | 1.00 | 33 | 2.51 | 00 | 1.50 | 4.01 | 1.60 | 1.00 | hard side plate |
| 1.00 | 4.00 | 13 | 2.06 | 30 | 2.00 | 16.24 | 6.50 | 0.00 | rivet |

31.15 12.46 1.00
 TM CM NM
 0.10=design efficiency

ATTACHMENT IV

DESIGN FOR MANUAL ASSEMBLY WORKSHEET

Assembly Name: Modified Trigger Housing, post DFA.

| Part ID No. | No. times repeat'd | Handling Code | Handling Time | Insert Code | Insert Time | Oper. Time | Oper. Cost | TMP | Part Name |
|----------------|-----------------------|------------------|------------------|----------------|----------------|---------------|---------------|------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 3.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 1.00 | soft side plate & spacers |
| 2.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 1.00 | hard side plate |

6.90 2.76 2.00
TM CM NM
0.87=design efficiency

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.



PETERS



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Date: 07-Apr-1986 09:07
From: J. A. McClary *AM*
Cost: FPR
Phone: 2461-237

cc: J. W. Bower
C. E. Ritchie

To: D. S. Findlay
F. E. Martin
R. S. Murphy
E. R. Owens

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The next step in the process is to get together and review these results. First, we should check my calculations and make sure we all agree with them. Second, we should begin to look at some alternative designs. If we can generate an alternative, I will then re-analyze the assembly to see if any additional savings can be generated.

As a matter of interest, I have included cost information on the current trigger assembly design in attachment II. The NEAR design seems already to offer a vast improvement from the assembly cost standpoint. Please remember that the costs shown are approximate and need to be verified.

I will schedule our next meeting shortly.

ATTACHMENT 1

DESIGN FOR MANUAL ASSEMBLY WORKSHEET

Assembly Name: NBAR fire control analysis

| Part ID No. | No. times repeated | Handling Code | Handling Time | Insert Code | Insert Time | Oper. Time | Oper. Cost | THP | Part Name |
|----------------|-----------------------|------------------|------------------|----------------|----------------|---------------|---------------|------|------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 23.00 | 1.00 | 00 | 1.13 | 00 | 1.50 | 2.63 | 1.05 | 0.00 | trigger housing assembly |
| 13.00 | 1.00 | 03 | 1.69 | 20 | 5.50 | 7.19 | 2.88 | 1.00 | trigger spring |
| 18.00 | 1.00 | 07 | 2.65 | 10 | 1.50 | 4.15 | 1.66 | 1.00 | trigger plunger spring |
| 17.00 | 1.00 | 14 | 2.55 | 00 | 1.50 | 4.05 | 1.62 | 1.00 | trigger plunger |
| 16.00 | 1.00 | 30 | 1.95 | 02 | 2.50 | 4.45 | 1.78 | 1.00 | trigger |
| 15.00 | 1.00 | 02 | 1.83 | 31 | 5.00 | 6.88 | 2.75 | 1.00 | trigger pivot pin |
| 14.00 | 1.00 | 01 | 1.43 | 10 | 4.00 | 5.43 | 2.17 | 1.00 | sear spring |
| 13.00 | 1.00 | 30 | 1.95 | 06 | 5.50 | 7.45 | 2.98 | 1.00 | sear |
| 12.00 | 1.00 | 01 | 1.43 | 00 | 1.50 | 2.93 | 1.17 | 1.00 | front slave pin |
| 11.00 | 1.00 | 01 | 1.43 | 00 | 1.50 | 2.93 | 1.17 | 1.00 | rear slave pin |
| 10.00 | 1.00 | 07 | 2.65 | 00 | 1.50 | 4.15 | 1.66 | 1.00 | trigger block plunger spring |
| 9.00 | 1.00 | 14 | 2.55 | 02 | 2.50 | 5.05 | 2.02 | 1.00 | trigger block plunger |
| 8.00 | 1.00 | 20 | 1.95 | 00 | 6.50 | 8.45 | 3.38 | 1.00 | safety lever assembly |
| 7.00 | 1.00 | 33 | 2.51 | 06 | 5.50 | 8.01 | 3.20 | 1.00 | bolt stop release |
| 6.00 | 1.00 | 11 | 1.80 | 06 | 5.50 | 7.30 | 2.92 | 1.00 | safety assembly pivot pin |
| 5.00 | 1.00 | 02 | 1.83 | 06 | 5.50 | 7.38 | 2.95 | 1.00 | safety detent ball |
| 4.00 | 1.00 | 33 | 2.51 | 06 | 5.50 | 8.01 | 3.20 | 1.00 | safety detent spring |
| 3.00 | 1.00 | 23 | 2.36 | 34 | 6.00 | 8.36 | 3.34 | 1.00 | safety detent snap washer |
| 2.00 | 1.00 | 10 | 1.13 | 33 | 6.00 | 7.13 | 2.85 | 1.00 | trigger adjustment screw |

111.93
TH

44.77
CH

18.00
NM

0.48=design efficiency

ATTACHMENT II

COST STANDARD SUMMARY FOR M/700 TRIGGER ASSEMBLY

Part 26655, 32903, 26345, 32895.

Data from 7/15/55 Cost Standard Summary Expense, LSTCOST1.

| OP# | Std. Labor | OPERATION DESCRIPTION | Estimated Time |
|--------|---------------|----------------------------------|----------------|
| 50 | 11.377 | Assemble Side Plates and Spacers | 25.722 |
| 145 | 0.992 | Clean Trigger Assembly | 2.249 |
| 151 | 13.392 | Assemble-Stage I | 30.372 |
| 154 | 31.328 | Assemble-Stage II | 71.039 |
| 155 | 16.591 | Adjust Assembly on Comparator | 37.621 |
| 160 | 18.912 | Assemble-Stage III | 42.924 |
| 165 | 2.789 | Function Check | 6.324 |
| 170 | 1.659 | Mark Good | 3.760 |
| Total: | 97.039%/100pc | | 220.032 sec |

Current M/700 Volume: 85000
 Cost per Gun (total): \$0.97
 Cost per Gun, less CP450: \$0.86

0.441 labor rate
 cents/sec

ATTACHED III

LIST 3. FOR MANUAL ASSEMBLY WORKSHEET

Assembly Name: M/700 Trigger Housing: 26635

| Part ID No. | No. times repeat'd | Handling Code | Handling Time | Insert Code | Insert Time | Oper. Time | Oper. Cost | TMP | Part Name |
|-------------|--------------------|---------------|---------------|-------------|-------------|------------|------------|------|-----------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 5.00 | 1.00 | 33 | 2.51 | 00 | 1.50 | 4.01 | 1.60 | 0.00 | soft side plate |
| 4.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 0.00 | front spacer |
| 3.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 0.00 | rear spacer |
| 2.00 | 1.00 | 33 | 2.51 | 00 | 1.50 | 4.01 | 1.60 | 1.00 | hard side plate |
| 1.00 | 4.00 | 13 | 2.06 | 30 | 2.00 | 16.24 | 6.50 | 0.00 | rivet |

31.13 12.46 1.00
TM CM NM
0.10=design efficiency

ATTACHMENT IV

DESIGN FOR MANUAL ASSEMBLY WORKSHEET

Assembly Name: Modified Trigger Housing, post (FA).

| Part ID No. | No. times repeated | Handling Code | Handling Time | Insert Code | Insert Time | Oper. Time | Oper. Cost | THP | Part Name |
|----------------|-----------------------|------------------|------------------|----------------|----------------|---------------|---------------|------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 3.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 1.00 | soft side plate & spacers |
| 2.00 | 1.00 | 30 | 1.95 | 00 | 1.50 | 3.45 | 1.38 | 1.00 | hard side plate |

6.90 2.76 2.00
TH CM NM
0.87=design efficiency

To Fred Martins

5.18.82

Subject: work load.

1. New bolt actions Rifle (m/7 ^{old} octagon)

Continue work to complete these models with the specifications we set up. Make sure we have a actions ready for Bob Emmon's to check. This work should be complete by Sept. 82.

2. Scope Mounts:

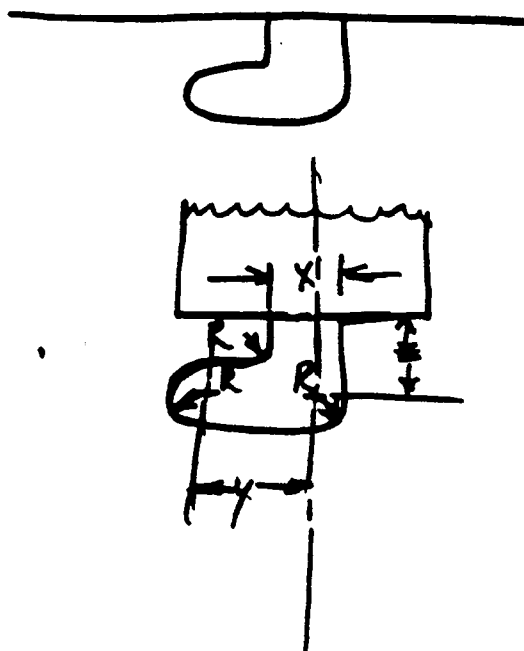
Scope Mounts should be complete and ~~referred~~ to the model shop with the type attachment we discussed. They also should retrofit on our new guns.

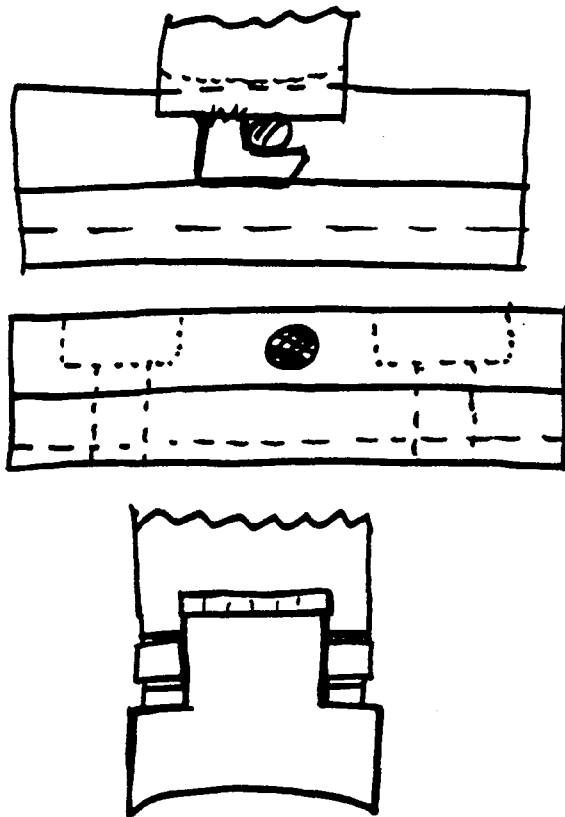
3. Fire Control. modifications

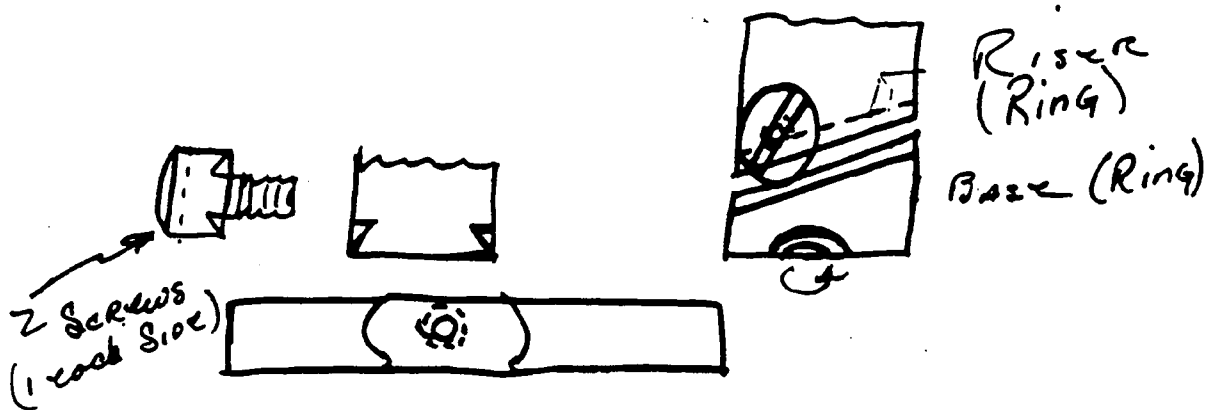
- Check test results and follow up with a report on how good the ~~the~~ trigger block/score block is. A.I. report needed on this program. including bolt lock.

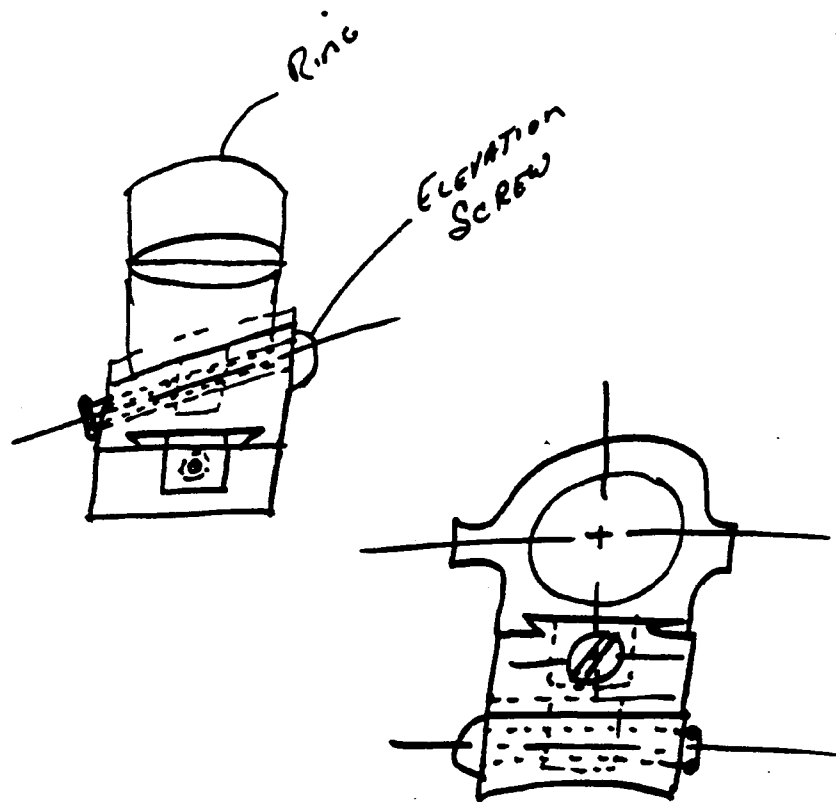
~~#~~ I think there is more work on the new bolt action rifle than you can handle alone. I will get with you after the operations Committee meeting and go over the schedules they have set up. Again they want the new gun. and we should proceed to give what we think is needed

Scope Mount - Front









Report No. 860981

RESEARCH TEST & MEASUREMENT LAB WORK REQUEST

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Developmental <input type="checkbox"/> Design Acceptance <input type="checkbox"/> Pre-Pilot <input type="checkbox"/> Pilot <input type="checkbox"/> Production Acceptance | <p align="center"><u>AREA OF TESTING</u></p> <input type="checkbox"/> Safety Related <input type="checkbox"/> Litigation <input type="checkbox"/> Competitive Evaluation <input type="checkbox"/> Warehouse Audit <input type="checkbox"/> New Design <input type="checkbox"/> Cost Reduction <input type="checkbox"/> Design Change <input type="checkbox"/> Stake _____ <input type="checkbox"/> Plant Assistance <input type="checkbox"/> Other _____ |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <p align="center"><u>FIREARM STATS.</u></p> MODEL: <u>N-BAR</u> CAL or GAGE: <u>30.06</u> BARREL TYPE: _____ PROOFED: YES _____ NO _____ | <p align="center"><u>REPORT REQ'D.</u></p> FORMAL _____ TEST RESULTS ONLY <input checked="" type="checkbox"/> | DATE REQUESTED: <u>4/8/84</u> DATE NEEDED BY: _____ REQUESTED BY: <u>MURPHY</u> WORK ORDER NO: <u>C-5504</u> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|

| | | | |
|----------------------------------------|---------------------------------------------|-----------------------------------------|--------------------------------------|
| <u>TEST TYPE</u> | | | |
| <input type="checkbox"/> Strength Test | <input type="checkbox"/> Ammunition Test | <input type="checkbox"/> Dry Cycle Test | <input type="checkbox"/> Photo/Video |
| <input type="checkbox"/> Function Test | <input type="checkbox"/> Environmental Test | <input type="checkbox"/> Measurements | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Accuracy Test | <input type="checkbox"/> Customer Complaint | <input type="checkbox"/> Endurance Test | _____ |

EXPLAIN IN DETAIL THE REASON FOR THIS TEST:

N-BAR

Drop Test 10 guns (Same guns used for 10' gun development)

High Pressure Testing

-GUNS REQUIRED:

NOTE: NO firearms or parts will be tested in the Labs unless they are accompanied by a Work Request, and both are delivered to the Labs by the designer or engineer. All Work Requests are to be filled out in detail. No Exceptions.

DATE COMPLETED: _____
 TEST COMPLETED BY: _____
 REPORT DATE: _____

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: RS MURPHY TESTER: STEPHENS/THOMAS DATE: 05/30/86
REPORT NO.: 860981 WORK ORDER NO.: C-5504

WRITTEN BY: LEL SUPRY

TEST TYPE: DROP TEST AND HIGH PRESSURE STRENGTH (NBAR)

FIREARM STAT'S : MODEL: NBAR CAL or GAUGE: 30.06
BARREL TYPE: PROOFED: YES X NO

REASON FOR TEST :

To drop test and compare the high pressure strength of the NBAR to previous experience with the Model 700.

Also included was one NBAR action with the feed ramp cut out of specification.

EQUIPMENT REQUIRED :

Four NBAR rifles for High Pressure Strength, one rifle for drop testing, high pressure measuring equipment, and personnel.

TEST PROCEDURE :

The drop test was conducted, by R. Howe. SAAMI specifications were exceeded for the drops. The High Pressure Strength was conducted on four rifles, three with 2000 previous rounds, and one with 0 rounds.

TEST RESULTS :

The NBAR rifles completed the drop test with no jar off within SAAMI specifications. Refer to summary sheet included for drop history.

The strength and mode of failure of the four test guns are consistent with past experience. Refer to summary sheets for individual results.

xc: J.W. Bower/File
J.R. Snedeker

"JAR OFF TEST"

FIREARM # XC-0428 (2)

REPORT # 860981

MODEL N-BAR

W.O. # C-5504-

TRIGGER PUL. LBS. 4.25 (AVG OF 3)

SAFE "OFF" POSITION

| J.O. = "JAR OFF" | SAAMI SPEC | | | | | | | | | | | |
|----------------------|------------|----|----|--|--|--|----------|----|----|--|--|--|
| | 12" DROP | | | | | | 18" DROP | | | | | |
| | #1 | 2 | 3 | | | | #1 | 2 | 3 | | | |
| VR. VERT MUZZLE UP | OK | OK | OK | | | | OK | OK | OK | | | |
| " " MUZZLE DOWN | " | " | " | | | | " | " | " | | | |
| VR. HORIZ. BOTTOM UP | " | " | " | | | | " | " | " | | | |
| " " BOTTOM DOWN | " | " | " | | | | " | " | " | | | |
| " " LEFT SIDE UP | " | " | " | | | | " | " | " | | | |
| " " RIGHT SIDE UP | " | " | " | | | | " | " | " | | | |

"DROP TEST"

SAFE "ON" POSITION

| | SAAMI SPEC. | | | | | | | | | | | |
|----------------------|-------------|----|----|--|--|--|----------|----|----|--|--|--|
| | 48" DROP | | | | | | 54" DROP | | | | | |
| | #1 | 2 | 3 | | | | #1 | 2 | 3 | | | |
| VR. VERT MUZZLE UP | OK | OK | OK | | | | OK | OK | OK | | | |
| " " MUZZLE DOWN | " | " | " | | | | " | " | " | | | |
| VR. HORIZ. BOTTOM UP | " | " | " | | | | " | " | " | | | |
| " " BOTTOM DOWN | " | " | " | | | | " | " | " | | | |
| " " LEFT SIDE UP | " | " | " | | | | " | " | " | | | |
| " " RIGHT SIDE UP | " | " | " | | | | " | " | " | | | |

"ROTATION TEST"

SAFE "ON" POSITION

| SAAMI SPEC. | RIGHT SIDE UP | | | LEFT SIDE UP | | |
|---------------------------|---------------|----|----|--------------|----|----|
| ALL DROPS ON 1" X 5 1/2" | #1 | 2 | 3 | #1 | 2 | 3 |
| DIAMETER (SHOAR A) RUBBER | OK | OK | OK | OK | OK | OK |
| NOT BACKED BY CONCRETE | | | | | | |

REMINGTON ARMS COMPANY, INC.
Illion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas C. Stephens

Date 5-29-86

FIREARM:

Make Remington Model NBAR
Grade _____ Gauge _____ Serial Number XCC426
Origin Research Model Shop
Test Number Assigned 860981
Comments _____

HISTORY:

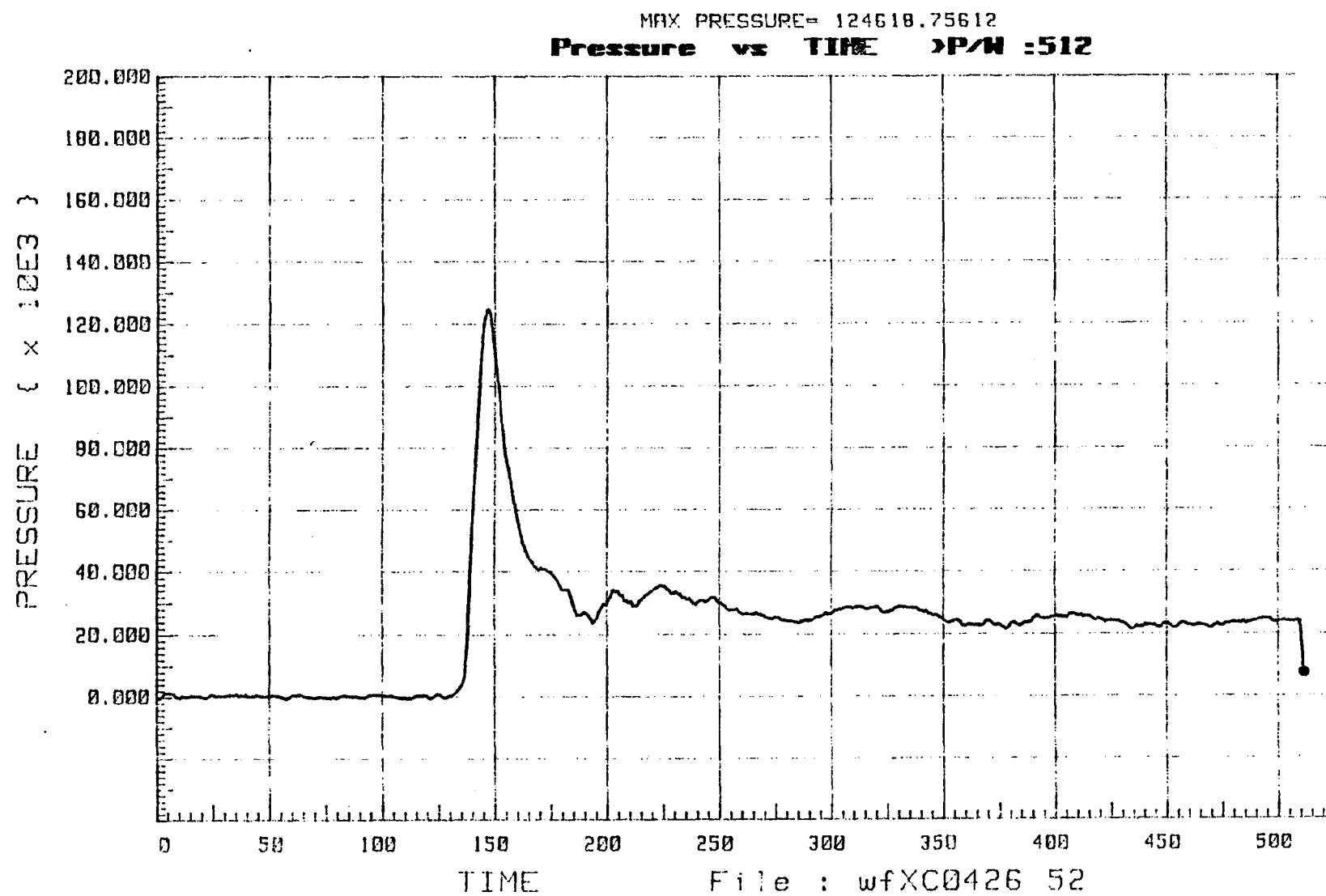
Condition _____
Previous Rounds Fired 2000
Headspace at Test Min + 003
Test Date 5-29-86

ABUSIVE
LOAD USED:

Powder Type 4198
Powder Weight 52gr.
Case Make and Type Rem Win Primer
Total Bullet Weight 220gr.
Total Shot Weight _____
Estimated Pressure 124 618

ADDITIONAL
COMMENTS:

Swelled case in chamber



REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas C. Stephens

Date 5-28-86

FIREARM:

Make Remington Model NRA
Grade _____ Gauge 20-06 Serial Number XC 0430
Origin Research Model Shop
Test Number Assigned 860981
Comments _____

HISTORY:

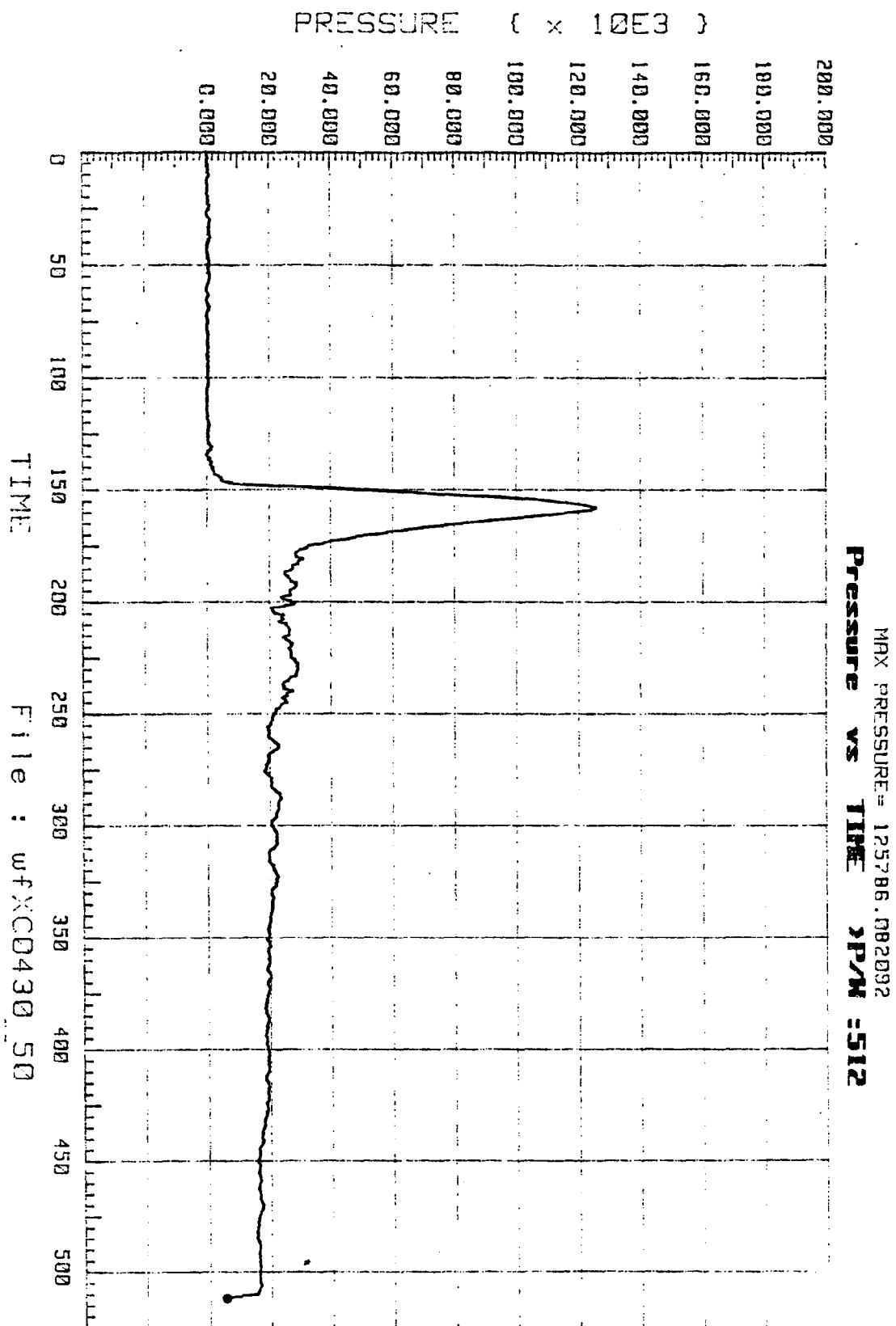
Condition _____
Previous Rounds Fired 2000
Headspace at Test _____
Test Date 5-28-86

ABUSIVE
LOAD USED:

Powder Type 4199
Powder Weight 50 gr.
Case Make and Type Rem. Win. Power
Total Bullet Weight 210 gr.
Total Shot Weight _____
Estimated Pressure 125,844

ADDITIONAL
COMMENTS:

Swelled case in chamber



REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D Thomas & C Stephens

Date 5/29/86

FIREARM:

Make Remington

Model N3AR

Grade _____

Gauge _____

Serial Number X00429

Origin Research Model Shop

Test Number Assigned 860781

Comments _____

HISTORY:

Condition _____

Previous Rounds Fired 2000

Headspace at Test _____

Test Date 5/25/86

ABUSIVE
LOAD USED:

Powder Type 4198

Powder Weight .52 gm

Case Make and Type Rem (win Primer)

Total Bullet Weight 220 gm SP

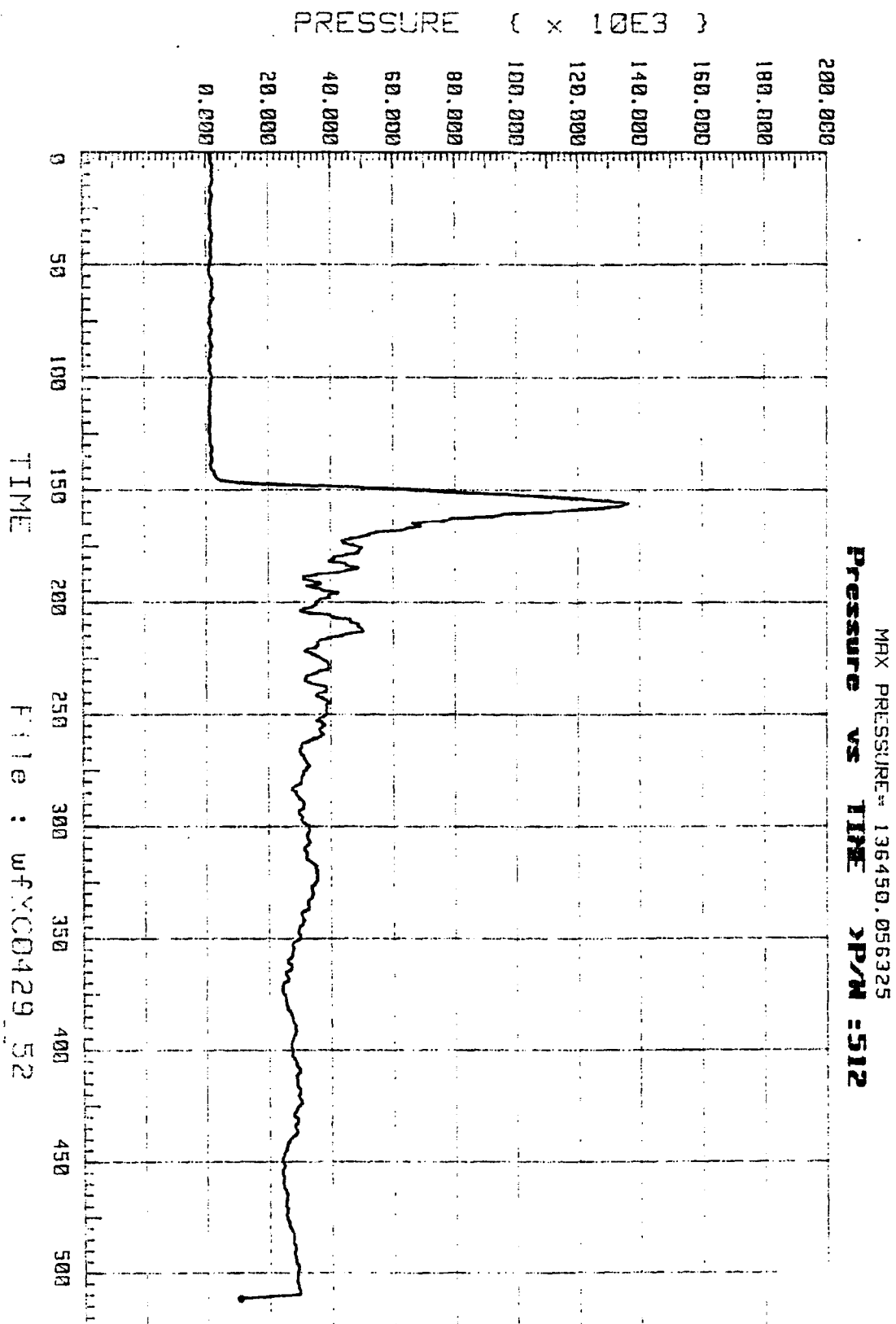
Total Shot Weight _____

Estimated Pressure 136,000 PSI (strain gage)

ADDITIONAL
COMMENTS:

Swelled Case in Chamber

broke Floor Plate off



REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas & C. Stephens

Date 5/29/86

FIREARM:

Make Remington Model NBAR

Grade _____ Gauge 30/06 Serial Number XCC464

Origin Research Model Shop

Test Number Assigned 860881

Comments Feed Ramp C.T. off

HISTORY:

Condition New

Previous Rounds Fired 0

Headspace at Test Min 7.002

Test Date 5/29/86

ABUSIVE
LOAD USED:

Powder Type 4198

Powder Weight 50gr

Case Make and Type Rem

Total Bullet Weight 220gr

Total Shot Weight _____

Estimated Pressure 152000 PSI (Strain Meas)

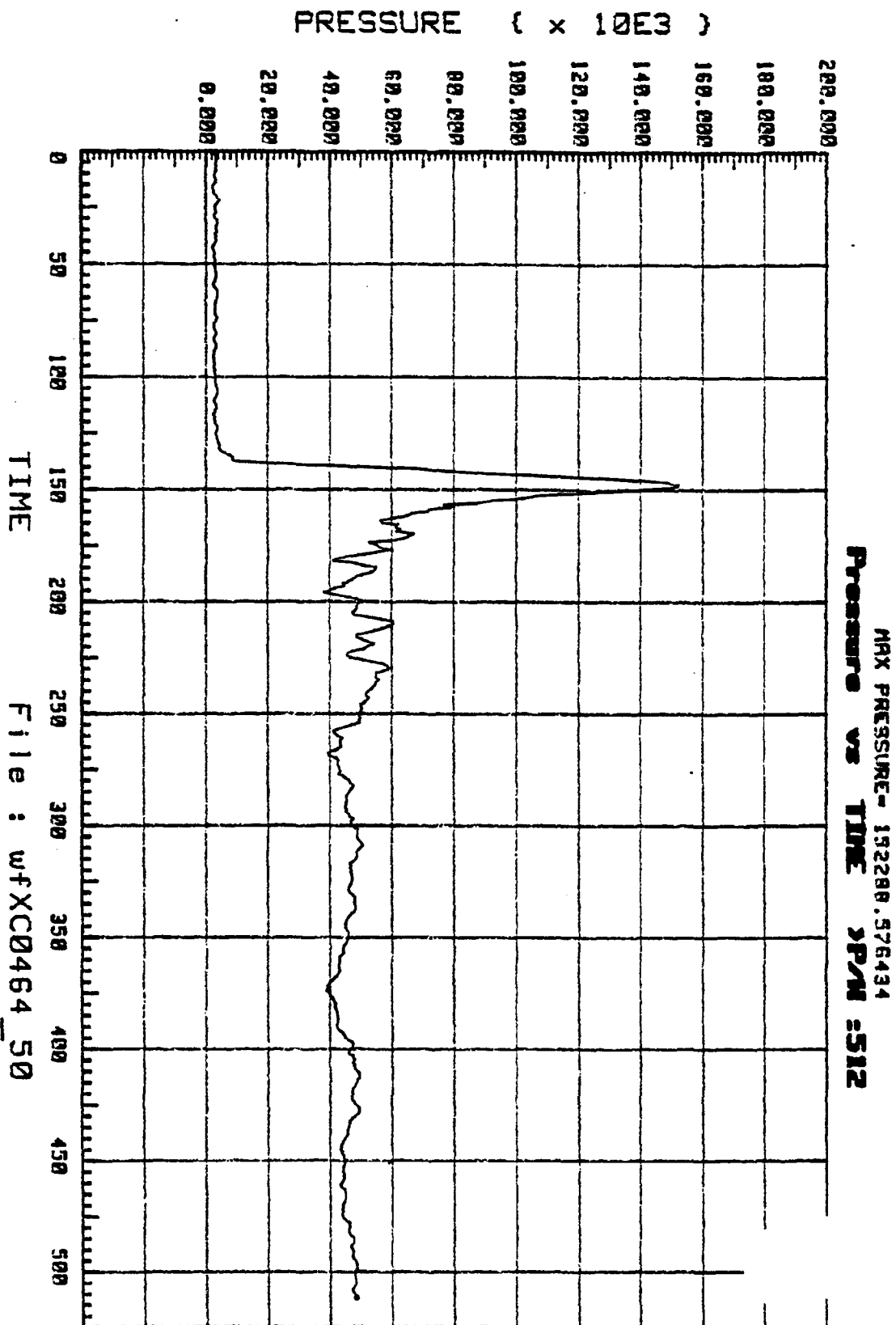
ADDITIONAL
COMMENTS:

Stock Split

Shelled Case (blew out at extractor)

blew out extractor

Cracked ball behind extractor



entire ✓

Report No. 96C985

RESEARCH TEST & MEASUREMENT LAB WORK REQUEST

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Developmental <input type="checkbox"/> Design Acceptance <input type="checkbox"/> Pre-Pilot <input type="checkbox"/> Pilot <input type="checkbox"/> Production Acceptance | AREA OF TESTING <input checked="" type="checkbox"/> Safety Related <input type="checkbox"/> Competitive Evaluation <input type="checkbox"/> New Design <input type="checkbox"/> Design Change <input type="checkbox"/> Plant Assistance <input type="checkbox"/> Litigation <input type="checkbox"/> Warehouse Audit <input type="checkbox"/> Cost Reduction <input type="checkbox"/> Stake <input type="checkbox"/> Other | |
| FIREARM STAT'S. MODEL: <u>700</u> CAL. or GAGE: <u>7mm Rem-3260</u> BARREL TYPE: _____ PROOFED: YES _____ NO <input checked="" type="checkbox"/> | REPORT REQ'D. FORMAL _____ TEST RESULTS ONLY <input checked="" type="checkbox"/> | DATE REQUESTED: <u>4-8-96</u> DATE NEEDED BY: <u>4-30-96</u> REQUESTED BY: <u>K-11, R-1</u> WORK ORDER NO: <u>CSC-4-34</u> |

| | | | |
|---------------------------------------------------|---------------------------------------------|-----------------------------------------|--------------------------------------|
| TEST TYPE | | | |
| <input checked="" type="checkbox"/> Strength Test | <input type="checkbox"/> Ammunition Test | <input type="checkbox"/> Dry Cycle Test | <input type="checkbox"/> Photo/Video |
| <input type="checkbox"/> Function Test | <input type="checkbox"/> Environmental Test | <input type="checkbox"/> Measurements | <input type="checkbox"/> Other _____ |
| <input checked="" type="checkbox"/> Accuracy Test | <input type="checkbox"/> Customer Complaint | <input type="checkbox"/> Endurance Test | _____ |

EXPLAIN IN DETAIL THE REASON FOR THIS TEST:

Due to the nature of the work, the Rem-700
action for the 7mm Rem-3260. Please chat
a standard accuracy test on the Rem-700
action and then as it has been found to be
able to do so.

GUNS REQUIRED:

NOTE: NO firearms or parts will be tested in the Labs unless they are accompanied by a Work Request, and both are delivered to the Labs by the designer or engineer. All Work Requests are to be filled out in detail. No Exceptions.

DATE COMPLETED: _____
TEST COMPLETED BY: _____
REPORT DATE: _____

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: R. Murphy
REPORT NO.: 860985
WRITTEN BY: C. Stephens
TEST TYPE: _____

TESTER: Thomas Stephens DATE: 7/18/86
WORK ORDER NO.: C-5004

FIREARM STAT'S : MODEL: 700 CAL or GAUGE: 300 W.V. Mag
BARREL TYPE: NBAR Mag. PROOFED: YES X NO

REASON FOR TEST :

To test the M/700 contour for use with the NBAR Magnum rifles.

EQUIPMENT REQUIRED : 5 M/700 in 7MM RM & 5 M/700 in 300 Win. Mag.
Target Scope, 200 yd. Range, P & U Range, Strain gages, Textronix Scope, Amplifier, Oehler System, Iron Lung.

TEST PROCEDURE : Five guns for each caliber were shot for accuracy shooting 3 five shot groups for each gun. After accuracy shooting was completed, two guns for each caliber were selected for high pressure strength test. Loads were worked up for each and the guns shot at high pressure.

TEST RESULTS : The accuracy results show one 7MM RM shooting out of spec. All others in both calibers were within Remington Spec. The high pressure strength test indicates that the guns will withstand the high pressures in the manner of a standard M/700. Data sheets for the accuracy and high pressure strength test are included at the back of the report.

REMINGTON ARMS COMPANY, INC.
Illion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By C Stephens, D. Thomas

Date 18 July 86

FIREARM:

Make Remington Model 700
Grade _____ Gauge 7MM RM Serial Number A6892242
Origin _____
Test Number Assigned 860985
Comments Contour for NBAR Magnums

HISTORY:

Condition _____
Previous Rounds Fired 20
Headspace at Test _____
Test Date 16 July 86

ABUSIVE
LOAD USED:

Powder Type 4198
Powder Weight 65gr
Case Make and Type Rem
Total Bullet Weight 175 PSP
Total Shot Weight _____
Estimated Pressure 205K

ADDITIONAL
COMMENTS:

Bolt locked up no other visible damage.

REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By C. Stephens, D. Thomas

Date 18 July 86

FIREARM:

Make Remington Model 700

Grade _____ Gauge 7MM RM Serial Number B6325136

Origin _____

Test Number Assigned 860985

Comments Contour for NBAR Magnums

HISTORY:

Condition -

Previous Rounds Fired 20

Headspace at Test -

Test Date 16 July 86

ABUSIVE

LOAD USED:

Powder Type 4198

Powder Weight 65gr.

Case Make and Type Rem

Total Bullet Weight 175gr. PSP

Total Shot Weight _____

Estimated Pressure 209K

ADDITIONAL

COMMENTS:

Bolt locked up, no other visible damage.

REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas, C. Stephens

Date 18 July 86

FIREARM:

Make Remington Model 700

Grade _____ Gauge 300 Win Mag Serial Number B6659609

Origin _____

Test Number Assigned 860985

Comments Contour for NBAR Magnums

HISTORY:

Condition —

Previous Rounds Fired 20

Headspace at Test —

Test Date 17 July 86

ABUSIVE

LOAD USED:

Powder Type 4198

Powder Weight 70gr.

Case Make and Type Rem

Total Bullet Weight 220gr. PSP

Total Shot Weight _____

Estimated Pressure 214K

ADDITIONAL
COMMENTS:

Bolt locked up

REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas, C. Stephens

Date 18 July 86

FIREARM:

Make Remington Model 700

Grade _____ Gauge 300 Win. Mag Serial Number B6658500

Origin _____

Test Number Assigned 860985

Comments Contour for NBAR Magnums

HISTORY:

Condition -

Previous Rounds Fired 20

Headspace at Test -

Test Date 18 July 86

ABUSIVE

LOAD USED:

Powder Type 4198

Powder Weight 70 gr.

Case Make and Type Rem.

Total Bullet Weight 220 gr. PSP

Total Shot Weight _____

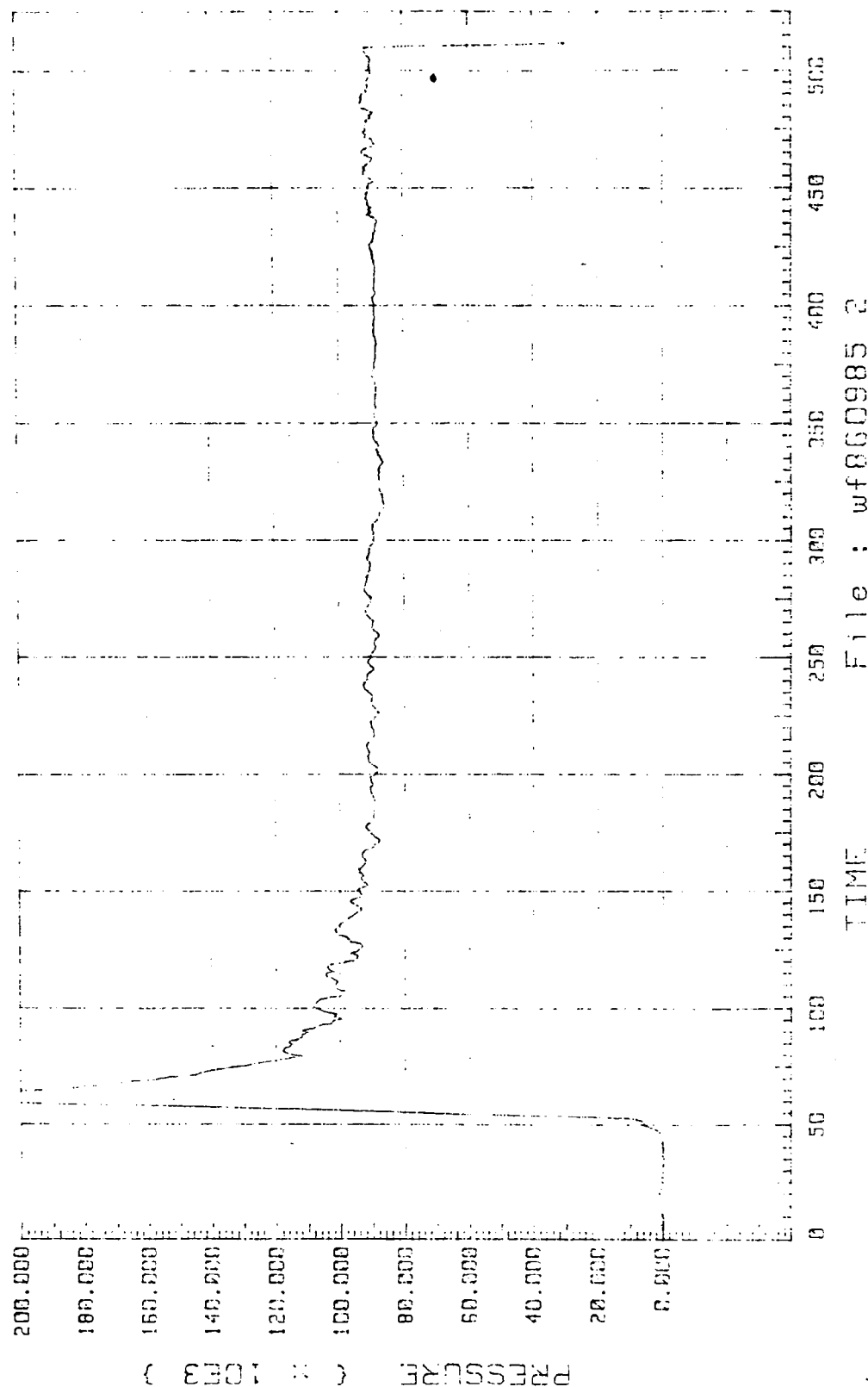
Estimated Pressure 229 K.

ADDITIONAL

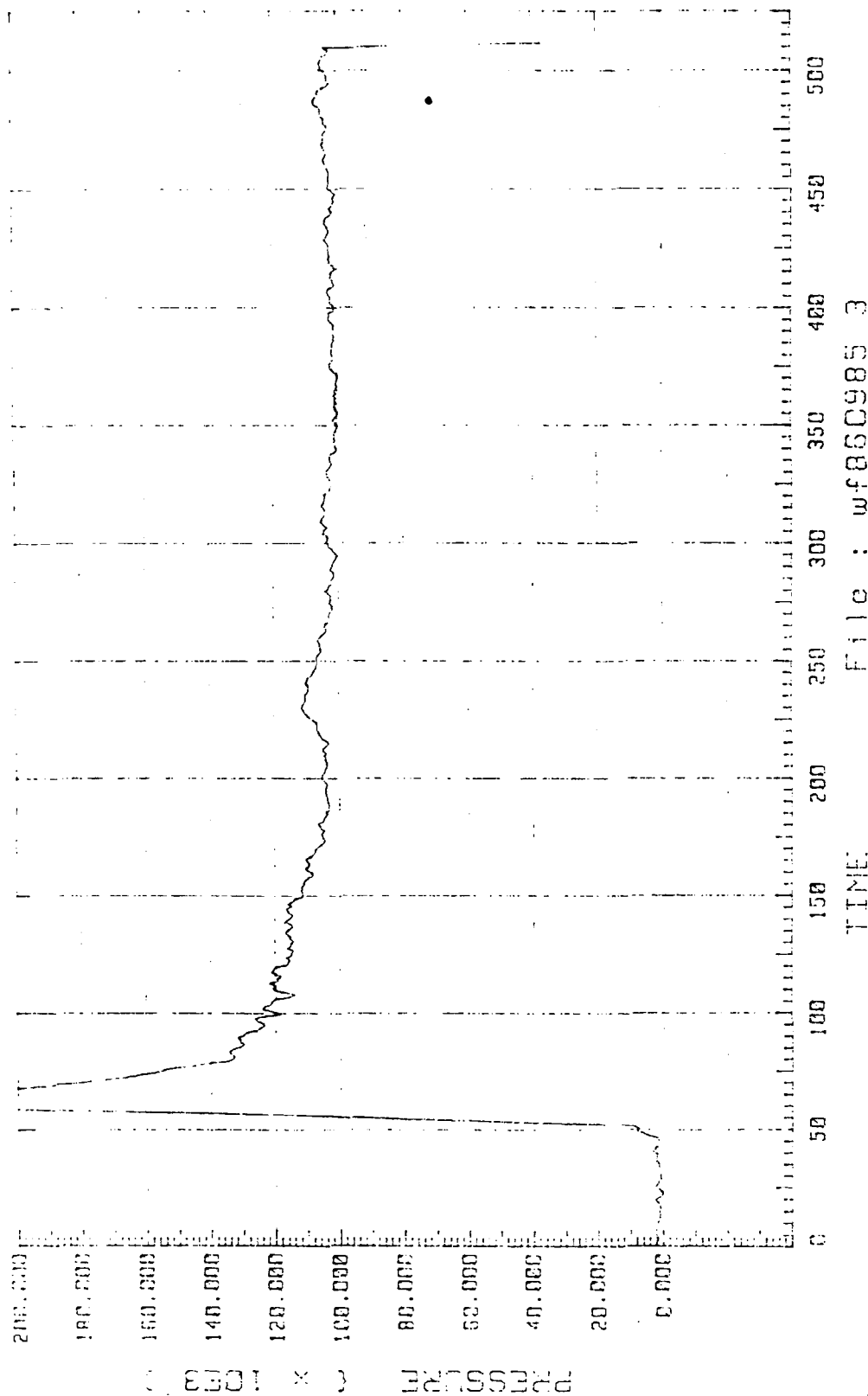
COMMENTS:

Locked Bolt up.

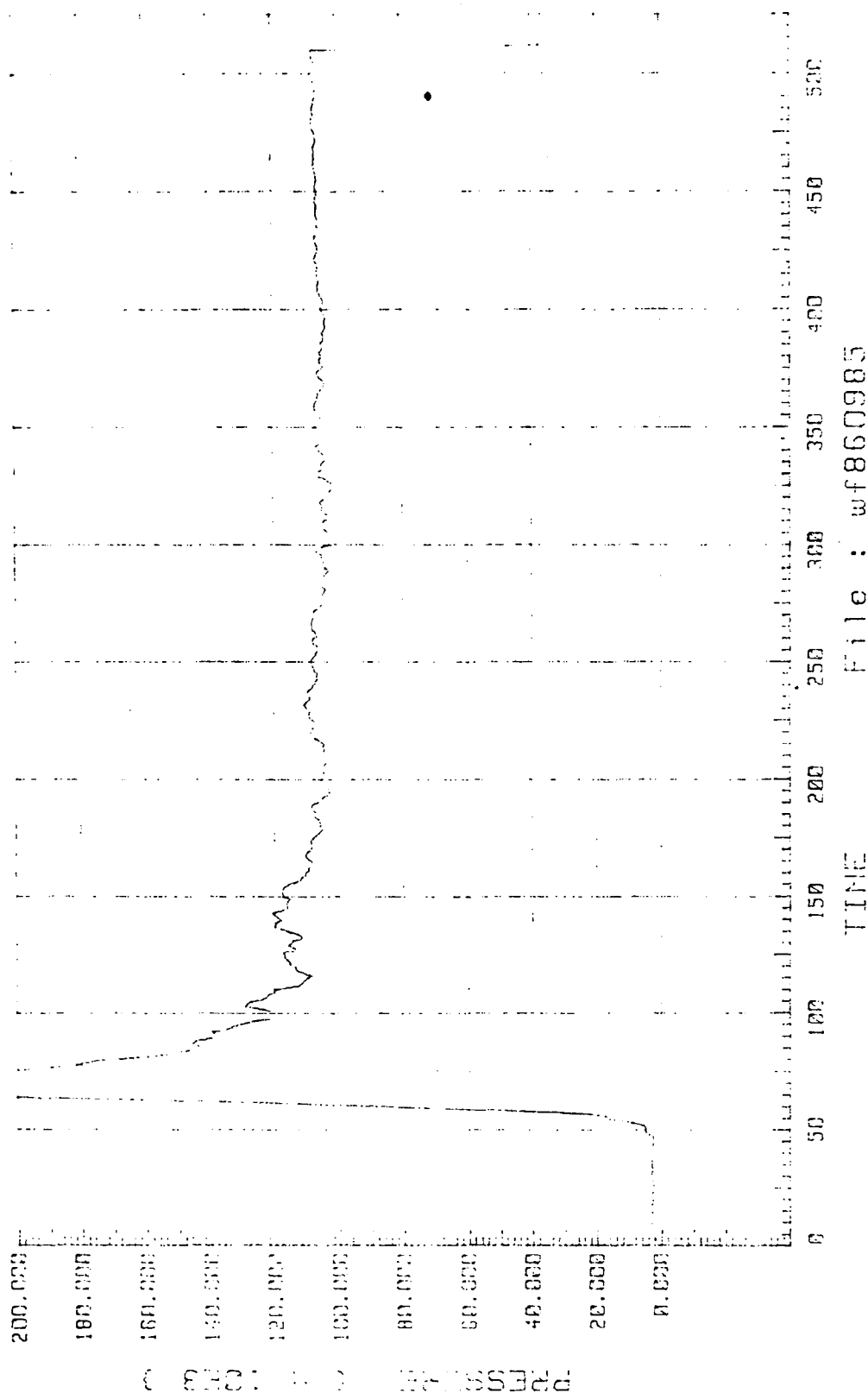
MAX PRESSURE: 214023.504498
Pressure vs TIME P/H : 512



Pressure vs TIME XPM :512
 MAX PRESSURE= 229578

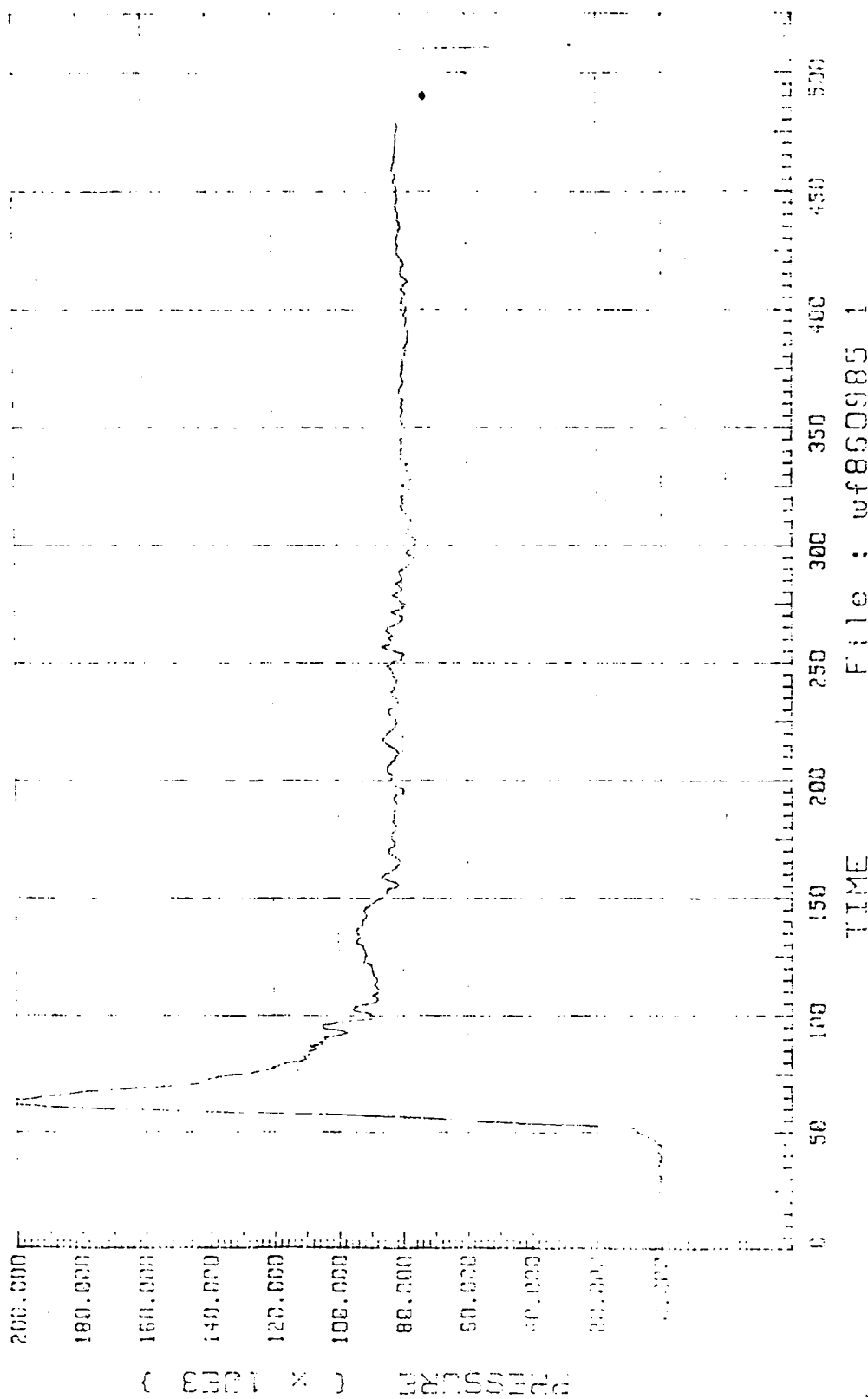


PRESSURE vs TIME
 PRESSURE: 209624.611006
 P/A: 512



File : wf860985

MAX PRESSURE: 205304.251311
Pressure vs TIME P.W: 512



File : wf860985.1

300 Win. Mag.

360984
10 Jan. 36
C. Stearns

| Serial No. | Horizontal | Vertical | Group Size |
|-------------|-------------------------|-------------------------|-------------------------|
| 40779B | .911 1.437 1.790 | 1.913 1.221 .990 | 1.975 1.886 2.010 |
| Avg. | 1.378 | 1.374 | 1.957 |
| 9609 | 1.169 1.527 1.922 | 1.545 1.652 2.516 | 1.701 1.846 2.887 |
| Avg. | 1.539 | 1.904 | 2.144 |
| 8500 | 1.320 1.626 1.065 | .755 1.213 1.103 | 1.431 2.089 1.533 |
| Avg. | 1.337 | 1.032 | 1.664 |
| 7852 | 1.333 1.884 1.173 | 1.117 1.058 1.679 | 1.472 2.059 1.806 |
| Avg. | 1.468 | 1.284 | 1.779 |
| 9765 | 1.092 1.244 1.947 | .983 1.316 1.167 | 1.469 1.574 1.952 |
| Avg. | 1.427 | 1.155 | 1.665 |
| 9807 | 2.014 1.693 1.412 | .856 1.094 1.461 | 2.142 2.016 1.776 |
| Avg. | 1.706 | 1.137 | 1.978 |
| Per. Specs. | 3.5 in. | | |

860985
10 June 86
C. Stephens

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER
KINZER V. REMINGTON

R2540088

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: F.H. SMITH TESTER: R. HOWE DATE: 04/10/86
 REPORT NO.: 860975 WORK ORDER NO.: C-0604-000
 WRITTEN BY: F.L. SUPRY

TEST TYPE: PROOF & 100 ROUND ENDURANCE ON RYNITE BEDDING BLOCK

FIREARM STAT'S : MODEL: 700 CAL or GAUGE: 7mm Exp
 BARREL TYPE: STD. PROOFED: YES X NO

REASON FOR TEST :

To see if the bedding block would withstand the recoil forces of jack shooting 100 rounds of ammunition.

EQUIPMENT REQUIRED :

A Model 700 (7mm Exp) action assembled with a Rynite bedding block, one 7mm Exp Proof round, 100 rounds of 7mm Exp ammunition, one scrap stock, two clamps, a shooting jack, and a lanyard.

TEST PROCEDURE :

The scrap stock was cut to allow the Rynite bedding block to fit and clamped to the block. Then the gun was placed in the shooting jack. All the firing, Proof and Endurance, was done using a lanyard.

TEST RESULTS :

There was no affect of the shooting noticed on the Rynite bedding block. The gun was disassembled and the barrel with the Rynite bedding block was returned to F.H. Smith.

K31

RESEARCH TEST & MEASUREMENT LAB WORK REQUEST

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Developmental <input type="checkbox"/> Design Acceptance <input type="checkbox"/> Pre-Pilot <input type="checkbox"/> Pilot <input type="checkbox"/> Production Acceptance | AREA OF TESTING <input type="checkbox"/> Safety Related <input type="checkbox"/> Litigation <input type="checkbox"/> Competitive Evaluation <input type="checkbox"/> Warehouse Audit <input checked="" type="checkbox"/> New Design <input type="checkbox"/> Cost Reduction <input type="checkbox"/> Design Change <input type="checkbox"/> Stake _____ <input type="checkbox"/> Plant Assistance <input type="checkbox"/> Other _____ | |
| FIREARM STAT'S MODEL: <u>700</u> CAL or GAGE: <u>7mm Rem</u> BARREL TYPE: <u>RDL</u> PROOFED: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> | REPORT REQ'D. FORMAL <input type="checkbox"/> TEST RESULTS ONLY <input checked="" type="checkbox"/> | DATE REQUESTED: <u>4-8-86</u> DATE NEEDED BY: <u>4-25-86</u> REQUESTED BY: <u>F.W. Smith</u> WORK ORDER NO: <u>C-0604-313</u> |

| | | | |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| TEST TYPE | | | |
| <input type="checkbox"/> Strength Test <input type="checkbox"/> Function Test <input type="checkbox"/> Accuracy Test | <input type="checkbox"/> Ammunition Test <input type="checkbox"/> Environmental Test <input type="checkbox"/> Customer Complaint | <input type="checkbox"/> Dry Cycle Test <input type="checkbox"/> Measurements <input type="checkbox"/> Endurance Test | <input type="checkbox"/> Photo/Video <input checked="" type="checkbox"/> Other _____ |

EXPLAIN IN DETAIL THE REASON FOR THIS TEST:

FIRE -100-Ros. In M/700, With RYNITE BEDDING BLOCK, TO SEE IF THE BEDDING BLOCK WILL WITHSTAND RECOIL FORCES.

Clamp in Iron lung - fire with lanyard

TOOLS REQUIRED: -1 M/700 & BEDDING BLOCK Supplied

NOTE: NO firearms or parts will be tested in the Labs unless they are accompanied by a Work Request, and both are delivered to the Labs by the designer or engineer. All Work Requests are to be filled out in detail. No Exceptions.

DATE COMPLETED: 4/10/86
 TEST COMPLETED BY: RH
 REPORT DATE: 4/10/86

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
R.J. Sanzo
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

CONFIDENTIAL

**NBAR MEETING
APRIL 14, 1986**

0 Magazine Boxes:

- Spray mold for magazine bottom has been started.
- Vendor supplied boxes will be in the verification test rifles.

0 Bolt Lock:

- A heavier spring is required.
- The drawing has been changed to specify qualification of the bolt and bolt plug.
- Upsetting has occurred where the bolt lock contacts the bolt plug. The diameter of the bolt plug has been increased.

0 Extractor:

- No malfunctions or part breakage.
- A common extractor will be used with the M/7400.
- During the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.

0 Trigger Pull Adjustment Screw:

- Screws with a sprayed on nylon patch are not acceptable. Alternatives are being investigated.

O Critical Path Components:

- Receivers
 - 10 will be complete, ready for Heat Treat by 4/18. Following Heat Treat, barrels and bolts will be assembled in the Custom Shop, then to polish and color.
 - 10 Actions should be ready for test by 4/10.
 - The next 25 blanks will be delivered to the Model Shop by 4/23.
- Stock
 - The Master will be ready for the Model Shop by 4/21.
 - The initial six stocks, without cheekpiece, will be ready for actions by 4/30.
- Magazine Components
- Trigger Guard

O MIM Parts

- Sear
- Trigger
- Magazine Latch

O Lubrication test will begin 4/16.

O Drop testing will be started at the completion of the lubrication test.

O Blow up testing to be done at the completion of the drop testing.

O Design verification testing is scheduled to start on May 1, and be complete by June 15.

- 30 rifles total; 6 each of 30-06, 280, 270, 7mm Rem., 300 mag. calibers (calibers are listed in order that they will be tested).

JWB:js

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
R.J. Sanzo
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

CONFIDENTIAL

NBAR MEETING
APRIL 14, 1986

● Magazine Boxes:

- Spray mold for magazine bottom has been started.
- Vendor supplied boxes will be in the verification test rifles.

● Bolt Lock:

- See Design*
- A heavier spring is required. *done & To Model Shop.*
 - ~~The drawing has been changed to specify qualification of the bolt and bolt plug.~~
 - ~~Upsetting has occurred where the bolt lock contacts the bolt plug. The diameter of the bolt plug has been increased.~~

● Extractor: *PLAN Pull Test - Future*

- No malfunctions or part breakage.
- A common extractor will be used with the M/7400.
- During the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.

● Trigger Pull Adjustment Screw:

- Screws with a sprayed on nylon patch are not acceptable. Alternatives are being investigated.

* Bolt Stop

0 Critical Path Components:

- Receivers

- 10 will be complete, ready for Heat Treat by 4/18. Following Heat Treat, barrels and bolts will be assembled in the Custom Shop, then to polish and color.
- 10 Actions should be ready for test by ~~4/22~~ 4/30
- The next 25 blanks will be delivered to the Model Shop by ~~4/24~~ 4/24 Complete By 5/1

- Stock

- The Master will be ready for the Model Shop by ~~4/21~~ 4/23
- The initial six stocks, without cheekpiece, will be ready for actions by 4/30. ELKRS - BDC

- Magazine Components

- Trigger Guard

0 MIM Parts

- Sear - 2 Tool Room
- Trigger - 2 "
- Magazine Latch 1.21 Model To BART

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0 Blow up testing to be done at the completion of the drop testing.

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JWB:js

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



xc: J.W. Bower ✓

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

TO: C.E. Ritchie

file

April 15, 1986

FROM: D.S. Findlay

Monthly Report - April - 1986

CV Users Group

FMS Modeling

Modeling and detailing (model drawing and functional drawing) of the FMS 1100 & 870 receiver RH model are complete. The M/870 LH model and detailing are also complete. Modeling of the M/1100 LH is complete with the detailing 30% complete. Remodeling of the 1100 and 870 breech bolts is also complete.

FMS Tool Drawings

FMS tool drawings and tool assembly for the M/1100 and 870 receivers are complete, but require checking. The FMS cutter drawing are undergoing revision based on the checking done by the FMS group.

NBAR Modeling

NBAR drawing work is partially complete with some of the remaining work being to:

1. model and detail stock
2. detail stock assembly
3. fore end tip
4. barrel assembly complete
5. miscellaneous drawing revisions
6. other part revisions as the designers require them (i.e. magazine box design)

Steve Miller is continuing to work on the stock design for the NBAR.

CE RITCHIE
Page 2
April 15, 1986

NCS Modeling

Work is 85% complete on a M/1100 stock on the CV system. The comb cut is the only outstanding area that needs definition. This stock model is for developing a plastic mold for this stock or for manufacturing press form dies. Bob Sanzo has cut a preliminary model of this part. Minor work to reblend some of the surfaces for mold work will be done by 5/15.

DSF:cmp

File

To: JWB
From: RSM

4-17-86

Subject: Timely Monthly Report - April

NBAR

RS Murphy FE Martin FI Smith

This rifle is in the final stages of developmental testing and parts are being fabricated for a comprehensive design acceptance test. The design, model shop and test lab sections are meeting weekly to coordinate the final stages of development. Several components have been identified as critical path items and are being monitored closely to avoid any delays.

H/700 kit Gun

RS Murphy FE Martin

The concept of a centerline kit gun was accepted at the April Business Team meeting and the transmittal of this package is expected by May 1. Four calibers will be introduced in the first year (.243, .308, .270, 30-06). The special instructions necessary to finish and assemble a long stock have been outlined and a preliminary draft will be available for review in mid-May.

Synthetic Longsack

Flt Smith

Prototype tooling to produce a Remington "First in the Field" high technology rifle stock is progressing. The electrode to burn the "checkpiece side" of the mold is expected in two weeks. The right side electrode and accessories molds (grip cap, butt pad, etc) will follow. The mold builder still expects to have completed stocks for test sometime in August.

An oven to anneal stocks after molding has been identified and was scheduled to be crated and shipped by 4-17-86. The oven has been unplugged and is waiting to travel.

The Matsura 500 CNC mill has been delivered to Choate and in-house training on its use was to be done this week. Fixture building for this machine to be done at Remington is on hold due to other priorities.

Once again a Remington centerfire rifle is paving the way to a brighter tomorrow.

Parker

R S Murphy J S Martin

A prototype Parker, modernized to meet Remington's safety requirements has been developed and tentatively accepted by Remington's Firearms Business Team.

In the next week this prototype will be returned to Kolar for refinement of the hammers and automatic safety. Approximately two weeks later it will be

returned to Remington for an extensive battery of testing. A test³ procedure will be available for review on May 2.

Pending the successful completion of this developmental phase of testing the contract will be let for a six gun sample that will serve as a modified Trial and Pilot.

A strategy to coordinate the efforts of Remington, Kolar, Fajen, Delgado, etc has been circulated and has met little resistance. A meeting should be held as soon as possible to detail responsibilities so that realistic quotes can be assembled.

3200 Improvement

R S Murphy

A contract has been let to Kolar Arms to build two shotguns based on the 3200 concept. A diverse range of improvements should be included in an attempt to demonstrate what is possible in an over and under shotgun. Delivery to Remington is expected on or about September 1.

File

To: JWB
From: RSM

4-17-96

Subject: Timely Monthly Report - April

NBAR

RS Murphy FE Martin FH Smith

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M/700 Kit Gun

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Synthetic Longstock

Flt Smith

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REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



Xc: C.E. Ritchie
J.R. Snedeker
T.C. Douglas
R.S. Murphy
K.C. Rowlands

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

CONFIDENTIAL

Ilion, New York
April 21, 1986

TO: W.H. COLEMAN, II

FROM: *John* G.W. BOWER

MONTHLY REPORT - NEW PRODUCTS RESEARCH - APRIL

SHOTGUN DEVELOPMENT

Model 11-87

Pistons and seals with the plant heat treatment, along with plant brazed barrels will be tested starting the week of April 21.

Associated Spring visited Ilion on April 15 to discuss their fabrication problems with the pressure relief springs. Drawings are being altered to facilitate vendor fabrication.

Production is on schedule with trial and pilot. Guns should be available for test June 15.

Choke Tubes - 20 Ga.

Formal transmittal of the 20 Ga. Choke Tube package took place on March 17. This design may not fit guns already in the field due to a potential fore-end interference.

SHOTGUN DEVELOPMENT - Contd.

Model 1100 - 20 Ga. Improvements

Due to low production volumes, and, hence, expected poor economics, Research has decided not to pursue a "PC" - type gas system for the 20 Ga. Orifice diameters on the current gun will be experimented with for optimum performance. As part of the cosmetic changes to be made to the 20 Ga. in 1988, stainless steel magazine tubes and the 20 Ga. Special Field type magazine detent system will be tested.

Parker

Kolar Arms has delivered the first prototype frame assembly. Testing should begin in June.

Kolar has been sent a request for quote for fabrication of metal parts for the next six prototypes and the first year's production of fifty guns. Likewise, Del Grego has been asked to quote on wood and assembly.

New Concept Shotgun

PDS has completed the design and detailing of a fire control with a rotary solenoid actuated hammer block (interposer). Parts will be fabricated in the model shop and furnished to PDS for assembly and preliminary testing.

A common M/870 and M/1100 synthetic stock is being investigated. The stocks will have identical profiles but with tenon cuts at slightly different angles to compensate for the different heel and comb drops. This will allow the stocks to be molded in the same tooling, with a simple tenon insert change. The grip area will have a rough textured surface, with the remainder being smooth textured. Marketing has requested that the color be light grey.

Five Rynite trigger plate assemblies have been sent to the Test Lab for endurance testing.

A new energy absorbing material that might have potential use as a recoil pad is being evaluated. In initial jack testing with 2 3/4" magnum loads, it reduced the peak recoil force by 43%. The current recoil pad gives a peak force reduction of 13%. This material might also be useful as a replacement for the shooting jack rubber foam, which does an unsatisfactory job of simulating shoulder shooting.

RIFLE DEVELOPMENT

NBAR

This rifle is in the final stages of development testing and parts are being fabricated for a comprehension design development test. The Design, Model Shop, and Test Lab groups are meeting weekly to coordinate the final stages of development. Several components have been identified as critical path items and are being monitored closely.

Model 7400

Production and Research have completed testing 30-06 rifles with thicker extractors and short-caliber magazine boxes. Results were satisfactory and production of this model has resumed.

Salient results from the testing showed that:

- o bolt modifications to ease assembly of the extractor and prevent burr formation in the extractor groove worked very well. The DX malfunction rate with the current extractor was significantly improved by this modification.
- o a .005 in. thicker extractor had 3 DX malfunctions in 15,900 rounds (.02%) versus 17 DX in 9,225 rounds (.18%) with the current extractor.
- o the rivetless extractor made from the riveted design was unacceptable due to assembly and functional problems.
- o short action magazine boxes with long action followers performed slightly (statistically insignificant) better than standard 30-06 boxes.
- o test guns with the thicker extractor and hybrid magazine box had an overall malfunction rate of 1.2% versus a standard gun malfunction rate of 2.8%.

Formal transmittal of the bolt modifications, thicker extractor, and magazine box (30-06 only) took place on April 7.

Model 700 Kit Gun

The concept of a centerfire kit gun was accepted at the April Business Team meeting. Transmittal is expected by May 1. Four calibers will be introduced in the first year (.243, .308, .270, 30-06). Special instructions necessary to finish and assemble a long stock have been outlined and a preliminary draft will be available for review in mid-May.

RIFLE DEVELOPMENT

Synthetic Long Stock

Prototype tooling is progressing on schedule. The electrode to burn the cheekpiece side of the mold is expected by May 2. The right side electrode and accessory molds (grip cap, butt pad, etc.) will follow. The mold builder still expects to have completed stocks by the first of August.

An oven to anneal stocks has been located in surplus storage in Ilion. It will be loaned to Choate for at least the first year of his two-year contract.

Model 700 in 338 Win. Mag.

Formal transmittal of the .338 BDL version for 1988 took place on April 1.

XP-100 in 223 Caliber

Eight guns were selected randomly from the warehouse for trial and pilot testing. Visual inspection, accuracy, and function testing was performed on April 17, and production has been notified that the sample was satisfactory.

JWBower:js

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
R.J. Sanzo
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

CONFIDENTIAL

**NBAR MEETING
APRIL 21, 1986**

- 0 Magazine Boxes:
 - Spray mold for magazine bottom has been started.
 - Vendor supplied boxes will be in the verification test rifles.
- 0 Bolt Lock:
 - A heavier spring has been redesigned. The plunger has also been modified.
- 0 Extractor:
 - A common extractor will be used with the M/7400.
 - 2 sample magnum extractors have been tested. It has been redesigned and is in the Model Shop for build.
 - During the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.
- 0 Trigger Pull Adjustment Screw:
 - Long-Lock, Inc. has been sent threaded blocks for application review. They will make their recommendation by 4/25.
- 0 Critical Path Components:
 - Receivers
 - 10 will be complete, ready for Heat Treat by 4/21. Following Heat Treat, barrels and bolts will be assembled in the Custom Shop, then to polish and color.
 - 10 Actions should be ready for test by 4/30.
 - The next 25 blanks will be delivered to the Model Shop starting on 4/24 and complete by May 6.

- o Cricitcal Path Components - Contd.
 - Stock
 - The Master will be ready for the Model Shop by 4/23.
 - The initial six stocks, without cheekpiece, will be ready for actions by 4/30.
 - Blanks from Production will be available by 4/22.
 - Magazine Components are on schedule.
 - An average blank has been supplied to MIM.
 - Trigger Guard
 - 6 are at the 2nd N/C operation. Will be given to M/S by 4/24.
 - Sears and triggers will be made from bar stock.
- o Lubrication tests have begun. This is now a critical path item.
- o Drop testing will be started at the completion of the lubrication test.
- o Blow up testing to be done at the completion of the drop testing.
- o Design verification testing is scheduled to start on May 1, and be complete by June 15.
 - 30 rifles total; 6 each of 30-06, 280, 270, 7mm Rem., 300 mag. calibers (calibers are listed in order that they will be tested).

JWB:js

Xc: R.S. Murphy

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington*PETERS***"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____**Ilion, New York
April 24, 1986**TO: E.O. FINI**
FROM: J.W. BOWER**NBAR SCOPE MOUNTS**

As you know, we will be making the scope rings by the Injectalloy process. One of the nice things about this process is that we can add any lettering or figurative design to the part without any appreciable increase in piece price.

I expect that Production will be ordering the Injectalloy mold around August or September, so we'll need to know what, if any, design you want on the rings. Please give this some thought and let me know. Otherwise the rings will be plain.

JWB:js

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
R.J. Sanzo
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

CONFIDENTIAL

NBAR MEETING
APRIL 28, 1986

O Magazine Boxes:

- Six boxes are ready for design verification testing.
- Magazine bottoms have been sent to H&P.
- H&P is scheduled to supply additional boxes the week of May 5.

O Bolt Lock:

- Heavier springs and redesigned plungers are complete.

O Extractor:

- A common extractor will be used with the M/7400.
- Additional modifications to the magnum extractor are under review.
- During the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.

O Trigger Pull Adjustment Screw:

- Long-Lock, Inc. has been sent threaded blocks for application review. They will make their recommendation by 4/25.

O Critical Path Components:

- Receivers

- 9 have been heat treated and are in the Custom Shop for assembly to barrels.
- The next 25 blanks will be delivered to the Model Shop starting on 4/28 and complete by May 6.

O Critical Path Components - Contd.

- Stock

- An error has been found in the model which has been transferred to the Master Stock. After the first six stocks are complete, the master will be modified for the balance of the test guns.

- The first six stocks are now expected to be complete, ready for actions, by May 7. This is now the critical path.

- Blanks are available from Production.

- Magazine Components are on schedule.

- Magazine latches have been molded.

- Trigger Guard

- 6 are in the Model Shop. They should be complete by May 2.

- Sears should be complete by 4/29. Triggers may need to be made in the Tool Room due to scheduling conflicts with the WBDM.

O Lubrication tests have begun. They are expected to be complete by 5/2.

O Drop testing will be started at the completion of the lubrication test.

O Blow up testing to be done at the completion of the drop testing.

O Design verification testing is scheduled to start on May 8 and be complete by June 15.

- 30 rifles total: 6 each of 30-06, 280, 270, 7mm Rem., 300 mag. calibers (calibers are listed in order that they will be tested).

NOTE: The next meeting will be on May 5 at 2:30.

JWB:js

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: HUTTON/MARTIN TESTER: RH/FS DATE: 05/01/86
REPORT NO.: 860984 WORK ORDER NO.: C-5504
WRITTEN BY: F SUPRY
TEST TYPE: LUBRICATION TEST (HEAT-COOL-TRY)

FIREARM STAT'S : MODEL: N-BAR

REASON FOR TEST :

To accelerate the breaking down of lubrication, to compare reactions in standard, skeletonized, and relieved side plate trigger plate assemblies.

EQUIPMENT REQUIRED :

An oven, five samples of skeletonized and relieved side plate trigger plate assemblies, ten samples (five to be used with no additional lubrication added) of standard trigger plate assemblies, twenty receivers and bolt assemblies, and the following lubricants:

LPS#1 HOPPES 3'N'1 REM OIL WD-40 (LINSEED OIL)

TEST PROCEDURE :

The trigger plate assemblies were cleaned and assembled into receivers, then one of each style was lubricated with each lubricant. The parts were fired down and placed in the oven (120-130 degrees F.) for varied lengths of time (3, 16 and 67 hours). When removed from the oven, the parts were allowed to cool and then, cocked and fired. The results were recorded, the parts relubricated and replaced in the oven. After eight days without being able to leave any residue, the test was changed. In place of lubricant, linseed oil was added to each part. After a weekend in the oven every part was gummed up so badly that none would function properly. At this point all the residue was removed from the parts and the test restarted. Two three hour, one sixteen hour, and one twenty four hour samples were taken.

TEST RESULTS :

All parts functioned properly after both three hour samples.

Two Relieved Side Plate, and Three skeletonized samples followed down after sixteen hours.

All five Relieved Side Plate, all five Skeletonized, and four of the Standard samples followed down after twenty four hours.

xc: J.W. Bower/File
R.W. Murphy

Report No.

F60984

RESEARCH TEST & MEASUREMENT LAB WORK REQUEST

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>AREA OF TESTING</u></p> <p> <input type="checkbox"/> Developmental <input type="checkbox"/> Safety Related <input type="checkbox"/> Litigation <input type="checkbox"/> Design Acceptance <input type="checkbox"/> Competitive Evaluation <input type="checkbox"/> Warehouse Audit <input type="checkbox"/> Pre-Pilot <input type="checkbox"/> New Design <input type="checkbox"/> Cost Reduction <input type="checkbox"/> Pilot <input type="checkbox"/> Design Change <input type="checkbox"/> Stake _____ <input type="checkbox"/> Production Acceptance <input type="checkbox"/> Plant Assistance <input type="checkbox"/> Other _____ </p> | | |
| <p><u>FIREARM STAT'S.</u></p> <p>MODEL: _____</p> <p>CAL or GAGE: _____</p> <p>BARREL TYPE: _____</p> <p>PROOFED: YES _____ NO _____</p> | <p><u>REPORT REQ'D.</u></p> <p>FORMAL _____</p> <p>TEST RESULTS ONLY <input checked="" type="checkbox"/></p> | <p>DATE REQUESTED: <u>4/8/86</u></p> <p>DATE NEEDED BY: _____</p> <p>REQUESTED BY: <u>Hutton</u></p> <p>WORK ORDER NO: <u>C-5504</u></p> |

| | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| <p><u>TEST TYPE</u></p> <p> <input type="checkbox"/> Strength Test <input type="checkbox"/> Ammunition Test <input type="checkbox"/> Dry Cycle Test <input type="checkbox"/> Photo/Video <input checked="" type="checkbox"/> Function Test <input type="checkbox"/> Environmental Test <input type="checkbox"/> Measurements <input type="checkbox"/> Other _____ <input type="checkbox"/> Accuracy Test <input type="checkbox"/> Customer Complaint <input type="checkbox"/> Endurance Test _____ </p> | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|

EXPLAIN IN DETAIL THE REASON FOR THIS TEST:

N-Bar Fire Control Lubrication Test
 15 Fire Controls 5 different Lubricants
 - Heat, cool - Try

- GUNS REQUIRED:

NOTE: NO firearms or parts will be tested in the Labs unless they are accompanied by a Work Request, and both are delivered to the Labs by the designer or engineer. All Work Requests are to be filled out in detail. No Exceptions.

DATE COMPLETED: 5/1/86
 TEST COMPLETED BY: RH/FS
 REPORT DATE: 5/1/86

Lyndal Test II

4/28/86 - 3 hrs - all ok + 3 hrs all ok

4/30/86 -

| | | |
|------------|----------------|------------------------|
| <u>SSP</u> | <u>Skatlon</u> | } follow down 16 hours |
| A-4 | B-1 | |
| A-2 | B-2 | |
| | B-5 | |

5/1/86 - 24 hrs

| <u>SSP</u> | <u>Skatlon</u> | <u>SPD-N</u> | <u>CC</u> |
|------------|----------------|--------------|-----------|
| A-1 | B-1 | D-1 | C-4 |
| A-2 | B-2 | | |
| A-3 | B-3 | D-3 | |
| A-4 | B-4 | | |
| A-5 | B-5 | D-5 | |

| | <u>A</u> Solid side Note | <u>B</u> Skeleton | <u>C</u> Current OBL | <u>D</u> Cant D |
|------------|--------------------------------|----------------------|----------------------------|-----------------------|
| LASMA 1 | XXXXX X X | XXXXX X X X | XXXXX X X X | XXXXX No oil |
| Hoppes 2 | XXXXX X X X | XXXXX X X X | XXXXX X X X | XXXXX No oil |
| 3 'N' 1 3 | XXXXX X X X | XXXXX X X X | XXXXX X X X | XXXXX No oil |
| Remort 4 | XXXXX X X X | XXXXX X X X | XXXXX X X X | XXXXX No oil |
| WD-40 5 | XXXXX X X X | XXXXX X X X | XXXXX X X X | XXXXX No oil |
| no oil | | | | |
| comp 1250F | | | | |

Inspect start at

#2 - 3 hrs, #3 - 3 hrs 4/16/86

#4 - 16 hrs, #5 - 3 hrs, #6 - 3 hrs 4/17/86

#7 - 16 hrs, #8 - 3 hrs, #9 - 3 hrs 4/18/86

#10 - 16 hrs, #11 - 3 hrs 4/21/86

#12 - 16 hrs, #13 - 3 hrs, #14 - 3 hrs 4.22.86

on Bank

Date

Hours

4/24/86 #15 16 hrs ~~3:15~~ ~~3:15~~ ; #16 ~~3:15~~ - 3 hrs ; #17 3 hrs,
4/24/86 #18 = 16 hrs —, #19 3 hrs

1

4/24/86

X

START LINSEED OIL TEST

4/24/86

4/24/86

7:30 AM

Come out 7:30 AM 4/24/86 (87 hrs)

X

IL120 03642

N. BAR

N. Bar magnams intst 5/26



540 nylox screws

Third 540 block -

Force spring scale on
end of allen wrench

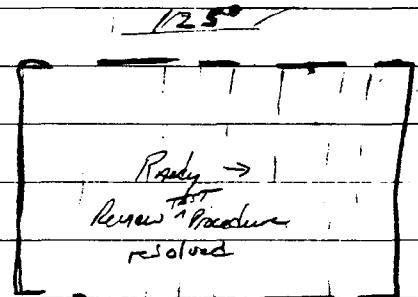
100 Times

ok every 20

Lubrication Test - then

NOW!!

Drop TEST



(4) - Donstain

5- barman ↔

Remoil

Hoppes

CP51

WD-40

** 3 & 1

Leatherton points

- Sear Safety can fire
intention of trigger assembly,
through inspection hole

Duration of ray 1 sec.

LUBRICATION TEST

N-BAR

FIRE CONGRUOUS

A S current BDL

B S skeleton's

C S- relieve solid side plates

D S- STD - unaltered FC, No Lubs

| | A | B | C | D |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |

Lubrication Build-up over Time

S Types - 3 & 1 oil

- Remoil

- Hoppe's

- Teflon spray (^{dry} ~~wet~~) LPS #1

- WD-40

- Common Lubrication procedure -

spray duration 1 sec
on both sides of gun
safety can.

1) Dry cycle ⁵⁰⁰ ~~1000~~ cycles

- Test in Lock Time fixture

- oven @ 125° F for 24 hours

in Bagwood button

End for placement
in oven

Dry cycles -

AT

LUB

AT

500 DRY CYCLES

AT

- OVEN 24 hrs

AT

after cool ambient

LUB

cock action

oven 24 hrs

AT

after

Repeat for one week

Lub. Test
 Linseed oil -

87 hrs 150°-160°

4/28/86

OK Follow-up

A 1
 2
 3
 4
 5

X
 X
 X
 X
 X

B 1
 2
 3
 4
 5

X
 X
 X
 X

X

Skeleton (up 40)

C
 DUST
 ADDED
 TO
 THESE

1
 2
 3
 4
 5

X
 X

X

X
 X

STD FC (Hopper)
 STD FC (3' in '1)

D 1
 2
 3
 4
 5

X
 X
 X
 X
 X

3 long Action 700
11 model 7's

3/14/96

Douglas on BBL Test + Additions

N-BAR FC Lubrication Test

Chubby after break on look-time

- Receivers — Frederick

- 10 altered
- 10 standard

- 3500
- 4900

82 Honda Civic
4 dr Deluxe w/abs (premium interest)
SSpd 24,000 4500
AM/FM Radio

83 2dr Honda Civic
SSpd 40,000
AM/FM

4555 (DX)

9:00 meeting

- 10:00 Sanction

- 11:00 N-Bar
Bowers office

82 = 26 - 3325)

83 = 31 - 3900

CONFIDENTIAL

Xc: W.M. Curry
F.E. Martin
R.S. Murphy
R.J. Sanzo
J.E. Selan
J.R. Snedeker
J.W. Bower
File: NBAR

**NBAR MEETING
MAY 5, 1986**

0 Magazine Boxes:

- Six boxes are ready for design verification testing.
- Magazine bottoms have been sent to H&P.
- H&P is scheduled to supply additional boxes the week of May 5.

0 Bolt Lock:

- Heavier springs and redesigned plungers are complete.

0 Extractor:

- Additional modifications to the magnum extractor are under review.
- During the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.
- Standard extractors need to be heat treated.

0 Trigger Pull Adjustment Screw:

- Long-Lock, Inc. has been sent threaded blocks for application review. They will make their recommendation by 4/25.

0 Critical Path Components:

- Receivers
 - 9 have been heat treated and are in the Custom Shop for assembly to barrels.
 - The next 25 blanks will be delivered to the Model Shop starting on 5/7 and complete by May 6.

o Critical Path Components -Contd.

- Stock

- An error has been found in the model which has been transferred to the Master Stock. After the first twelve stocks are complete, the master will be modified for the balance of the test guns.
- The first six stocks are now expected to be complete, ready for actions, by May 9.

- Magazine Components are on schedule.

- Magazine latches should be complete by 5/7.

- Trigger Guard

- 13 are complete.
- Sears are at plate. Eleven triggers are complete.

o Lubrication tests are complete.

o Drop testing should be started 5/7.

o Blow up testing to be done at the completion of drop testing.

o Design verification testing is scheduled to start on May 12 and be complete by June 15. A debris test will be designed.

- 30 rifles total: 6 each of 30-06, 280, 270, 7mm Rem., 300 Mag. calibers (calibers are listed in order that they will be tested).

NOTE: The next meeting will be on May 12 - 9:00 AM.

JWB:js

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



cc: J. W. Bower
W. H. Coleman, II-
C. E. Ritchie

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

May 5, 1986

*File -
new Bolt
Action Rifle*

To: D. S. Findlay
F. E. Martin
R. S. Murphy
E. R. Owens

From: J. A. McClary *JAM*

NBAR/DFA RESULTS REVIEW

We met on April 17, 1986, to review the results of the DFA analysis on the proposed NBAR trigger assembly. During our meeting, we agreed with the data used in the analysis and the results of the analysis. This confirmed an assembly cost savings already inherent in the NBAR trigger assembly design over the current M/700 trigger assembly.

Because of the nature of the trigger assembly design, it was found that all components were essential components and that further reduction in the number of parts in the assembly would not be possible without re-design to a large degree. However, we did agree that some further reduction in assembly cost may be possible via spring and pin modifications, but that manufacturing cost would have to be carefully considered before any changes were made. Fred Martin agreed to investigate these changes.

We found that there may be additional savings in assembly cost via re-design of the trigger housing. If the trigger housing were a two piece assembly, rather than the present 8 piece assembly, a further cost reduction could be realized, assuming that manufacturing costs could be held. Further DFA work will be done to investigate the effects of this change quantitatively.

We also concluded that the DFA process would be a useful tool for reviewing other sub-assemblies of the NBAR. We will pursue analysis on an ongoing basis.

jam/3.36

Remington



REMINGTON ARMS COMPANY, INC.

SPORTING ARMS-AMMUNITION-TARGETS-TRAPS

ILION, NEW YORK 13357

TELEPHONE (315) 894-9961

May 6, 1986

Lundquist Tool & Mfg. Co.
677 Cambridge St.
Worcester, MA 01610

Dear Sirs:

Please supply an engineering estimate for the enclosed drawings:

- | | | |
|----|-----------------|------------------------------------|
| 1) | Sear safety cam | D-93658 |
| | Material | C-1020 |
| | Heat treat | MicroCarb .70C .010/.020 Case |
| | Hardness | R ₁₅ N 88/92 |
| | Surface finish | Hard chrome plate .0001-.0003 Thk. |
| 2) | Trigger | D-93650 |
| | Material | C-1020 |
| | Heat treat | MicroCarb .80C |
| | Hardness | R ₁₅ 50 Min |
| | Surface finish | Black oxide |

Please quote in quantities of 20K, 50K, and 75K. Reply to:

Fred E. Martin
Remington Arms Company
New Products Research
14 Hoefler Ave.
Ilion, NY 13357

Thank you.

Sincerely,

Fred E. Martin

FEM:sps

Encs.

Remington



REMINGTON ARMS COMPANY, INC.

SPORTING ARMS-AMMUNITION-TARGETS-TRAPS

ILION, NEW YORK 13357

TELEPHONE (315) 894-9961

May 6, 1986

Fineblanking Company of America
1085 Grant St.
Fenton, MI 48430

Dear Sirs:

Please supply an engineering estimate for the enclosed drawings:

- | | | |
|----|-----------------|------------------------------------|
| 1) | Sear safety cam | D-93658 |
| | Material | C-1020 |
| | Heat treat | MicroCarb .70C .010/.020 Case |
| | Hardness | R ₁₅ N 88/92 |
| | Surface finish | Hard chrome plate .0001-.0003 Thk. |
| 2) | Trigger | D-93650 |
| | Material | C-1020 |
| | Heat treat | MicroCarb .80C |
| | Hardness | R ₅ 50 Min |
| | Surface finish | Black oxide |

Please quote in quantities of 20K, 50K, and 75K. Reply to:

Fred E. Martin
Remington Arms Company
New Products Research
14 Hoefler Ave.
Ilion, NY 13357

Thank you.

Sincerely,

Fred E. Martin

FEM:sps

Encs.

Remington



REMINGTON ARMS COMPANY, INC.

SPORTING ARMS-AMMUNITION-TARGETS-TRAPS

ILION, NEW YORK 13357

TELEPHONE (315) 894-9961

May 6, 1986

Rathbone Corportation
Palmer, MA 01069

ATTN: Mike Dimauro

Dear Sirs:

Please supply an engineering estimate for the enclosed drawings:

- | | |
|--------------------|------------------------------------|
| 1) Sear safety cam | D-93658 |
| Material | C-1020 |
| Heat treat | MicroCarb .70C .010/.020 Case |
| Hardness | R ₁₅ N 88/92 |
| Surface finish | Hard chrome plate .0001-.0003 Thk. |
| 2) Trigger | D-93650 |
| Material | C-1020 |
| Heat treat | MicroCarb .80C |
| Hardness | R 50 Min |
| Surface finish | Black oxide |

Please quote in quantities of 20K, 50K, and 75K. Reply to:

Fred E. Martin
Remington Arms Company
New Products Research
14 Hoefler Ave.
Ilion, NY 13357

Thank you.

Sincerely,

Fred E. Martin

Fred E. Martin

FEM:sps

Encs.

*Quote
7-30-86
Trigger "Yes" But!
Sear "Yes" But!*

Remington



REMINGTON ARMS COMPANY, INC.

SPORTING ARMS-AMMUNITION-TARGETS-TRAPS

ILION, NEW YORK 13357

TELEPHONE (315) 894-9961

May 6, 1986

Associated Spring Corp.
18 Main St.
Bristol, CT 06010

Dear Sirs:

Please supply an engineering estimate for the enclosed drawings:

- | | | |
|----|-----------------|------------------------------------|
| 1) | Sear safety cam | D-93658 |
| | Material | C-1020 |
| | Heat treat | MicroCarb .70C .010/.020 Case |
| | Hardness | R ₁₅ N 88/92 |
| | Surface finish | Hard chrome plate .0001-.0003 Thk. |
| 2) | Trigger | D-93650 |
| | Material | C-1020 |
| | Heat treat | MicroCarb .80C |
| | Hardness | R _c 50 Min |
| | Surface finish | Black oxide |

Please quote in quantities of 20K, 50K, and 75K. Reply to:

Fred E. Martin
Remington Arms Company
New Products Research
14 Hoefler Ave.
Ilion, NY 13357

Thank you.

Sincerely,

Fred E. Martin

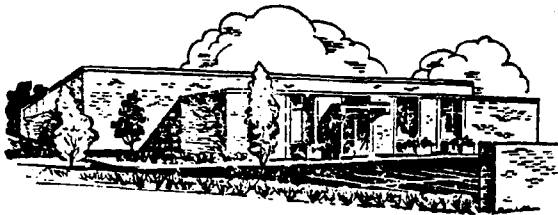
Fred E. Martin

FEM:sps

Encs.

No Quote
5-14-86
JM

QUOTATION



216-671-8000

THE **H & P** **DIE & STAMPING COMPANY**
DIV. OF UNITED SCREW AND BOLT CORP.

Engineering • Development • Tools • Dies • Stampings

Sub-Assemblies • Bus Supplies

4650 Tiedeman Road • Cleveland, Ohio 44144

To **Remington Arms Co., Inc.**
Ilion, NY 13357

Att: **J. Simpson and R. Murphy**

Date **5-8-86**

Terms 1% 10 days-30 days NET

F.O.B. Our Plant—Cleveland, Ohio

Replying to your inquiry of.....we take pleasure in quoting as follows:

| Quantity | Description | Price |
|----------|-------------------------------------------------------|-------------------|
| | EXP-1405 Magazine Alt. 4 (except as below) | |
| | Add new rear end latching tab | |
| | Add interlock lock tabs coining | |
| | Alter front end latching tab | |
| | Omit window | |
| | Omit rear end obsolete tab | |
| | Clean out and mill chamfer in bases for magazine tabs | |
| | Machine and clear bases for best possible fit. | |
| | Total | \$2,590.00 |
| | Delivery - 24/28 pieces week 5-12 | |

The above Quotation is subject to acceptance within 30 days from date hereof; thereafter, prices are subject to change without notice, according to fluctuation of market prices of material, over which we have no control. We are not responsible for delays in deliveries due to strikes and conditions beyond our control.

Very truly yours,

H & P DIE & STAMPING CO.

By.....



DIE & STAMPING COMPANY

DIV. OF UNITED SCREW AND BOLT CORP.

Engineering · Tools · Dies · Stampings
Sub-Assemblies · Bus Supplies

4650 TIEDEMAN ROAD
CLEVELAND, OHIO 44144

216 671-8000

December 23, 1985

Randy Murphy
Remington Arms Co., Inc.
Hoefer Avenue
Ilion, NY 13357

Dear Randy:

Enclosed find eight (8) pieces of magazine Part No. EXP-1405.

Should you require more samples, you will need to send
us additional bases.

Cordially yours,

Ronald B. Stevens

THE H & P DIE & STAMPING CO.
Div. of United Screw & Bolt Corp.
4650 Tiedeman Road
Cleveland, Ohio 44144-2395



Randy Murphy
Remington Arms Co., Inc.
Hoefler Avenue
Ilion, NY 13357



The H. & P. Die & Stamping Company

Div. of United Screw and Bolt Corp.

TOOLS — DIES — STAMPINGS — BUS SUPPLIES

4650 TIEDEMAN ROAD

CLEVELAND, OHIO 44144

Your Order No.

Our Order No.

TO Randy Murphy

Remington Arms Co., Inc.

Hoefler Avenue


Ilion, NY 13357

CONTENTS: MERCHANDISE — FOURTH CLASS MAIL

POSTMASTER: This parcel may be opened for postal inspection if necessary.
Return postage guaranteed. If not delivered in 15 days return to sender.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER
KINZER V. REMINGTON

R2540132

| | | | | | |
|---------------------------------------------------------------------------------|--|--------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | | PURCHASE ORDER NO. _____ | | ALT NO. _____ | |
| SITE NO. _____ | | TAX CODE _____ | | LOCATION CODE _____ | |
| DATE OF ORDER _____ | | ISSUED BY _____ | | BUYER CODE _____ | |
| TERMS OF PAYMENT _____ | | REQUIRED SHIP DATE _____ | | PROMISED SHIP DATE _____ | |
| FREIGHT TERMS _____ | | PREPAID _____ | | OTHER (SEE BELOW) _____ | |
| DEST. (DEL'D) _____ | | PREPAID ADDED _____ | | COLLECT* _____ | |
| SHIP PT. _____ | | FREIGHT TERMS _____ | | * IF COLLECT, Mail Freight Bill To: _____ | |
| VENDOR CODE _____ | | FREIGHT TERMS _____ | | FMIS 501 WMA WILMINGTON, DE 19899 | |
| PAYEE CODE _____ | | FREIGHT TERMS _____ | | INSTRUCTIONS TO VENDOR | |
| E. I. DU PONT DE NEMOURS & COMPANY | | ORDER NO. _____ | | PLEASE ENTER OUR ORDER AS SPECIFIED BELOW SUBJECT TO CONDITIONS AND INSTRUCTIONS LISTED ON BOTH THE FACE AND REVERSE SIDE OF THIS PURCHASE ORDER. | |
| SHIP VIA: _____ | | BY: _____ | | DATE: _____ | |
| REQUISITIONED BY _____ | | EXTENSION _____ | | REQUISITION APPROVED BY _____ | |
| DATE _____ | | AUTH. LEVEL _____ | | DATE DELIVERY REQ'D _____ | |
| ESTIMATED WEIGHT _____ | | ESTIMATED COST _____ | | REASON VENDOR SELECTED _____ | |
| GENERAL LEDGER ACCOUNT/SUB ACCOUNTS _____ | | DETAIL ACCOUNTING _____ | | AMOUNT _____ | |
| LOWEST PRICE _____ | | ONLY KNOWN SOURCE _____ | | CONTRACT/P.A. _____ | |
| BETTER QUALITY _____ | | REQUIRED DESIGN _____ | | ORDER APPROVED BY _____ | |
| ORDER EXECUTED BY _____ | | S137328 | | REQUISITION NO. _____ | |
| COPY 2 - _____ | | WILM. ACCT'S. PAY. _____ | | LOCAL ACCT. SECT. _____ | |



DIE & STAMPING COMPANY

DIV. OF UNITED SCREW AND BOLT CORP.

Engineering Tools Dies Stampings

Sub-Assemblies Bar Supplies

216 671-8000

4650 TIEDEMAN ROAD
CLEVELAND, OHIO 44144

May 9, 1986

John Simpson
Remington Arms Co., Inc.
Ilion, NY 13357

Dear John:

We are enclosing 24 samples your EXP-1405 magazine.

Sincerely,

Frank Ambrose
Frank Ambrose



DIE & STAMPING COMPANY

DIV. OF UNITED SCREW AND BOLT CORP.

Engineering Tools Dies Stampings
Sub-Assemblies Bur Supplies

4650 TIEDEMAN ROAD
CLEVELAND, OHIO 44144

216 671-8000

August 27, 1985

Remington Arms Co., Inc.
Ilion, NY 13357

Attention: Randy Murphy
Research & Development

Dear Randy:

Enclosed please find 1 marked print for the EXP-1405 Magazine.
We are proceeding along the lines indicated on the marked print.

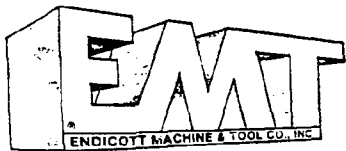
If you are not in accord with these suggested alterations, please
advise us immediately.

Yours sincerely,

Frank Ambrose
Frank Ambrose

rn

encl.



101 Delaware Avenue Endicott, New York 13760 (607) 754-7111

June 26, 1985

Remington Arms Co., Inc.
Ilion, New York 13357

Attn: John Simpson

Attached is our quotation on your magazine assembly EXP 1436 on Inquiry JMS-116.

Your Inquiry asked for temporary tooling to produce 50 prototypes. I have not responded to this because I don't believe this is the economical way to make the magazine.

Rather than spending many thousands of dollars on temporary tooling and then have to tool up later, I would suggest that a tooling order be issued for production dies. However, the dies and section of dies can be made piece meal so that 50 prototypes can be made with inserts that later can be used for the production dies.

Attached are several brochures describing our company and our firearm magazine capability.

J. Marconi
President

JM:r
Enc.

cc: R.Murphy. Eng. Dept.

COPY

QUOTATION



INQUIRY NO. JMS-116

APPROVED &
SUBMITTED BY

Masson

DATE 6-26-85

101 DELAWARE AVE. • ENDICOTT, N.Y. 13760-6198
PHONE AREA 607-754-7111

Remington Arms Co., Inc.
• Ilion, NY 13357

ATTN: JOHN SIMPSON

OUR SPECIALTIES

PRECISION SHEET METAL FABRICATING
PRECISION PRODUCTION MACHINING
COMPLEX WIRE FABRICATIONS

| TOOL UP CHARGE - \$39,600.00 | PRICE PER PIECE IN QUANTITIES STATED BELOW | | | | | |
|------------------------------|--------------------------------------------|------------------|------------------|--|--|--|
| | 10,000 24,999 | 25,000 49,999 | 50,000 & over | | | |
| PT. NO. EXP-1436 | | | | | | |
| E.C. NO. NONE | \$1.43 | \$1.31 | \$1.29 | | | |
| PT. NAME MAGAZINE | | | | | | |

| | | | | | | |
|--------------------------------------------|-------------------------|----------------------------------------------------------|---------------------------------------------|----------------------------------------------------|-------------------------------------------|-------------------------------------|
| DELIVERY WHEN ORDERED WITHIN 2 WEEKS | PARTS WILL BE SUPPLIED: | COMPLETE TO PRINT <input checked="" type="checkbox"/> | LESS HEAT TREAT <input type="checkbox"/> | LESS FINISH <input checked="" type="checkbox"/> | LESS MARKINGS <input type="checkbox"/> | OUT CUT <input type="checkbox"/> |
|--------------------------------------------|-------------------------|----------------------------------------------------------|---------------------------------------------|----------------------------------------------------|-------------------------------------------|-------------------------------------|

NOTE: 1) The above pricing is for producing your magazine assembly complete to print with Remington supplying the Delrin magazine bottom and doing the black oxide.

The tooling includes all dies required to produce the magazine.

In the event we are selected to produce this magazine we would want to meet with your Engineering Dept. to finalize the drawing which is incomplete in some areas. We know the functional intent of your design and would gladly give you the benefit of our design experience to make the magazine with quality reliability at the lowest cost. Also, we would want to exchange our thoughts with your Quality Engineers to arrive at gaging method & design so that we both inspect without technique variables.

TERMS & CONDITIONS OF QUOTATION

1. Terms: Net 30, F.O.B. our plant, Endicott, New York. 2. VALIDITY: This quotation void after 30 days—Steno errors correctable. 3. TOOL UP CHARGE: When tooling is stated above, it is owned by the customer & stored at our plant at their risk. Tooling is non-withdrawable because Tool Up price quoted is only a portion of our cost of setting up our plant to produce and reproduce your part to your exact specification which includes Tool Engineering, Tool Design, Methods Engineering, Permanent Files and Tool Storage, in addition to the actual toolmaking cost. 4. CONFIDENTIAL INFORMATION: All tool designs, mfg. methods, any other technical process or document and all other job records are considered confidential and proprietary to Endicott Machine & Tool Co., Inc. 5. QUANTITY: Prices quoted are based upon your accepting overruns or underruns within 10% of quantity ordered. 6. SAMPLES: Extra charges will be made for preproduction samples. 7. DELIVERY: Dates we give are approximate. Pricing is based on our shipping the full order quantity at one time or per our production schedule. Extra charge will be made for your requested split deliveries. 8. PACKING: Bulk packaged unless we specify otherwise. 9. QUALITY: Parts will be made to 25 AQL unless otherwise specified. We consider our part acceptable unless we receive your rejection notice within 30 days from our shipping date. Material must not be returned unless we give authorization. 10. IN CASE OF CANCELLATION: We will give a reasonable charge without cost breakdown. 11. PATENT & PRODUCT LIABILITY CLAIMS: Unless we hear from you otherwise in writing within ten days, we assume you agree that our sole responsibility shall be to manufacture and deliver the items in accordance with your prints and specifications. Your use of the items shall conclusively establish your inspection and acceptance of the items. You will indemnify and hold us harmless against any expense and loss (including court costs and reasonable attorneys' fees) arising out of or related to this order, including, but not limited to, patent infringement claims, product liability claims or any other claims for personal injury, death or property damage. 12. CONSIGNED ITEMS: When customer will supply consigned items to the above part, we must receive the full order quantity at one time or else an extra charge will be computed for the order.

EMT 1000 032985

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER
KINZER V. REMINGTON

R2540137

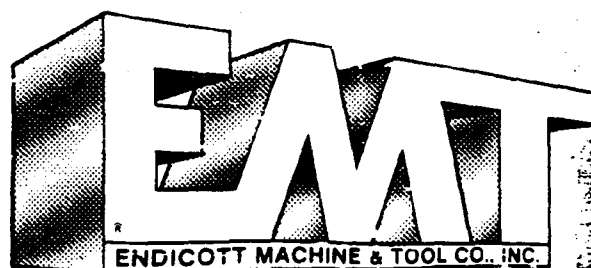
FIREARMS MAGAZINES

MADE FROM:

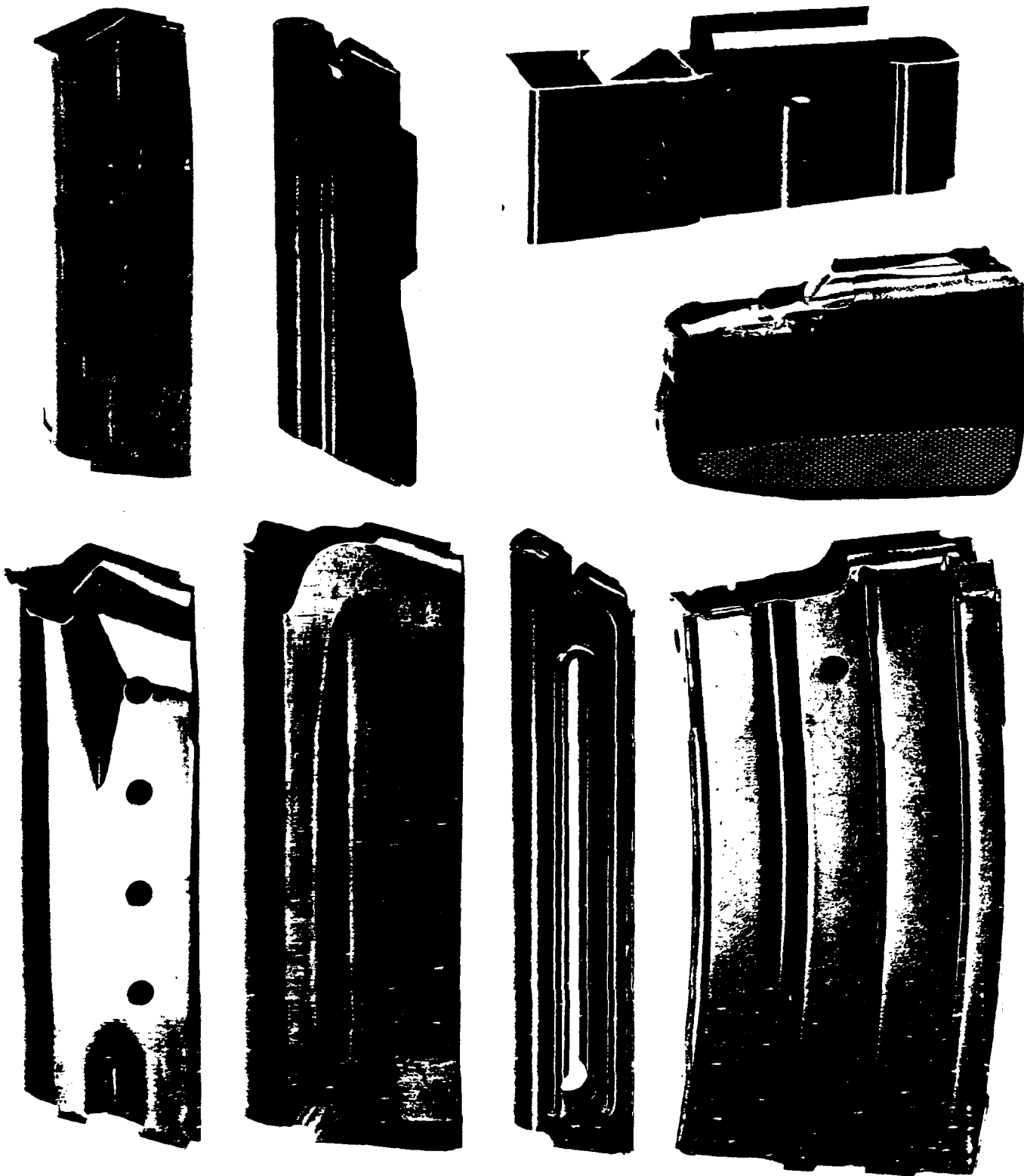
- **STAINLESS STEEL**
- **ALLOY STEEL**
- **CARBON STEEL**

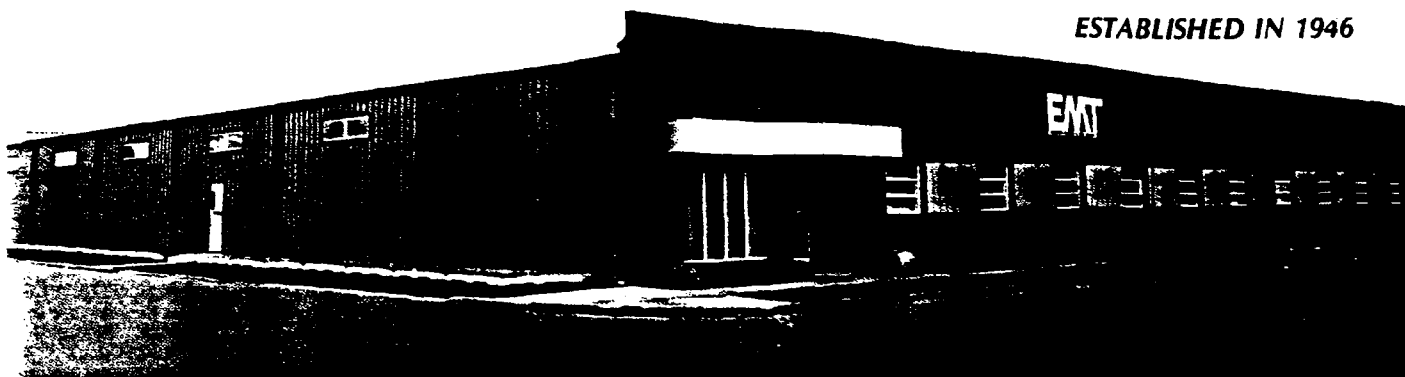
MADE COMPLETE:

- **WELDING**
- **HEAT TREATING**
- **SURFACE FINISHING**
- **ASSEMBLY**



Some Magazines Made By EMT





ESTABLISHED IN 1946

A Top Notch Manufacturing Company

EMT is not just another stamping company that makes magazines. EMT has *unusual and diversified Engineering and Manufacturing capabilities* that include: PRODUCTION MACHINING DEPT., SHEET METAL STAMPING AND FABRICATING DEPT., COMPLETE TOOL AND DIEMAKING DEPT., and a fully staffed ENGINEERING DEPT.

With such a broad scope of Engineering and Manufacturing knowledge, EMT can assist their customers in the design of magazines or other gun parts with experience and knowledge rarely found anywhere else.

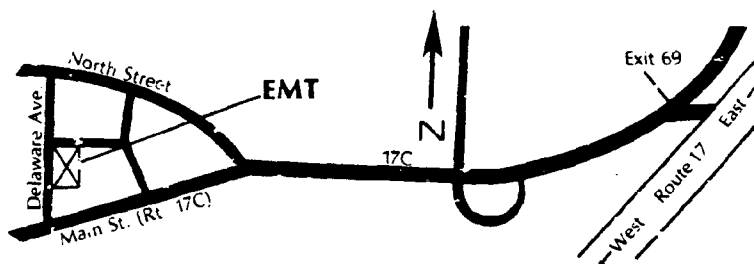


- No other stamper has our extensive experience in *Welding, Heat Treating, Sizing after H.T. and Metal Finishing* magazines.
- No other stamper has our extensive experience in fabricating all types of metals including: *Stainless Steels, Alloy Steels, High Carbon Steels, Titanium Aluminum, etc.*
- EMT offers over 24 years experience in engineering and producing magazines for some of the world's most respected firearms manufacturers.
- EMT's Quality Control procedures conform to MIL-Q-9858A.
- ASSURANCE OF CONFIDENTIALITY—Because of our manufacturing procedure and tight security systems, you can be assured that information about your magazines will be held in strict confidence.

For more information about EMT, send for our regular brochure.



101 Delaware Ave.
Endicott, N.Y. 13760
Phone 607/754-7111



Xc: W.M. Curry
F.E. Martin
R.S. Murphy
R.J. Sanzo
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

**NBAR MEETING
MAY 12, 1986**

0 Magazine Boxes:

- H&P is scheduled to supply additional boxes the week of May 5,

0 Extractor:

- Additional modifications to the maximum extractor have been dry cycled. Live firing is next.
- During the blow-up phase of development testing, purposely break through the wall of the bolt head to determine consequence.

0 Trigger Pull Adjustment Screw:

- Long-Lock, Inc. has made recommendations. Similar type screws will be in the design verification test.

0 Critical Path Components:

- Receivers are flowing to the Model Shop.
- Stocks are now available for test.
- Six magazine latches are available for test. Additional are being supplied by MIM.

- 0 Blow up testing has started.
- 0 Design verification testing is scheduled to start on May 13 and be complete by June 20. A debris test will be designed.
 - 30 rifles total: 6 each of 30-06, 280, 270, 7mm Rem., 300 Mag. calibers (calibers are listed in order that they will be tested).

NOTE: The next meeting will be on May 19 - 9:00 AM.

JWB:js

Associated Spring
Barnes Group Inc.

18 Main Street
Bristol, CT 06010
Tel. (203) 582-9581



DATE: 5/16/86

Remington Arms Company, Inc.
New Products Research
14 Hoefer Avenue
Ilion, NY 13357

RFQ NO: _____

Att: Fred E. Martin

Thank you for your inquiry requesting price and delivery for
Part Number(s) D-93658 and D-93650.

We have reviewed your drawing and specifications covering the
above part(s) and are sorry to advise that we are not in a
position to serve you at the present time because of the follow-
ing reason:

1. We are not equipped.

We regret our inability to accommodate you at this time, but
do look forward to receiving further inquiries from you.

Sincerely,

ASSOCIATED SPRING
BARNES GROUP INC.

Keith J. Magyar/mmw.

Keith J. Magyar
Customer Service Representative

KJM/mmw

cc: A. Marsh

WB83

File -
Monthly Reports

May 19, 86

To: JWB
From: RSH

Subject: May Monthly Report

NBAR

On May 15, six 30-06 new bolt action rifles began the design acceptance testing phase of development. After a very limited amount of field function testing the test was stopped due to the number and variety of magazine box malfunctions. The rifles have been returned to the design section and we are investigating the causes for their poor performance.

The solution to the feeding problems seems to be straightforward however the dropped magazine box malfunction solution thus far is not. A dimensional study and high speed movies are planned to better understand what exactly is happening.

The impact on product introduction will be determined when the rifles have resumed design acceptance testing.

Synthetic Longstock

This program is progressing smoothly towards the testing of prototype stocks in August. Material, design, and fixturing needs are being met as they arise. Skip is in Arkansas today to monitor Charles' progress to ensure that our schedule will be met.

Porter

The request for quote is finally on its way to Don Mainland and Kolor Arms. I expect to have quotes (or engineering estimates) in place in June.

The prototype Porter is back in Racine to be completed and is expected here for an engineering evaluation very shortly. Following this evaluation and the receipt of quotations, a design acceptance test lot of six guns can be started.

3200 Improvement

The "concept shotgun" contract is also finally on its way to Kolor and upon its arrival he will officially begin the development of two prototypes. The delivery of these guns to Remington is expected in September.

Xc: W.H. Coleman, II
W.M. Curry
F.E. Martin
R.S. Murphy
R.J. Sanzo
J.E. Selan
J.R. Snedeker
J.W. Bower (2)
File: NBAR

CONFIDENTIAL

**NBAR MEETING
MAY 19, 1986**

The design verification test was stopped immediately after starting because of problems with several components:

o Magazine Assembly

- the magazine box falls out during shooting
 - are the parts dimensionally correct?
 - do the latest drawings agree with the concept layout?
 - rifles will be built with magazine assemblies to correct dimensions and reshot. High speed movies will be made.
 - design of the magazine latch will be reviewed towards better balancing the part.
 - is the wire-form taking a set?
- cartridge loading may be a problem
 - front of the magazine follower tips down, causing rear of cartridges already in the box to come up.
 - is feeding belted cartridges a problem?
- tabs will be added to the front of the box to prevent the front of the follower from coming out of the box.
- does the spacing the magazine lips change during use?

o Receiver

- the feed ramp cut on 21 of the receivers is out of position.
 - run strength and feeding tests to determine effect of miscut.
 - additional receivers have been started as replacements. Estimated turnaround time is 3 weeks.
- nine receivers to the correct dimension are available to start testing as soon as the magazine box problems are resolved.

- o Stock
 - with the delay in the start of the design verification test, the stocks with questionable inletting cuts will be replaced.
- o Trigger Pull
 - heavier than specifications.
 - springs have been measured and are lighter than the springs previously tested.
 - adjustment screws are on order from Long-lok.
- o Bolt Lock
 - will not remain in the detented position during shooting.
 - the detent slot has been deepened and is ready for test.
- o Bolt Stop
 - was not functioning on one gun. Cause needs to be determined.
- o General
 - a log will be set up on each gun and all changes or gunsmithing will be recorded.
 - what will be Production's long-lead items? We should give them preliminary drawings so as to not jeopardize 1988 introduction.
 - extractors with thin bolt-head walls are available for destructive testing.

The next meeting will be Friday, May 23, at 2:00

JWB:js

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Xc: T.C. Douglas
R.S. Murphy
C.E. Ritchie
K.C. Rowlands
J.R. Snedeker

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Ilion, New York
May 20, 1986

TO: W.H. COLEMAN, II

FROM: *Job* W. BOWER

NEW PRODUCT RESEARCH - MONTHLY REPORT - MAY, 1986

SHOTGUN DEVELOPMENT

MODEL 11-87

Production requested testing of process changes for heat treating pistons and seals, and brazing valve seats. That 4,000 round endurance test has now been completed.

The plant brazed valve seats were satisfactory - no valve seats came out during the test. Plant heat treated pistons and piston seals performed at least as well as the transmitted heat treat. The drawings will be changed accordingly.

Model 1100 - 20, 28, and 410 Gauges

A twelve-gun test has been designed to test the addition of a stainless steel magazine tube to the LT-20. This test will also include orifice changes in the magnum gun for enhanced performance of the 2 3/4" magnum lead and steel loads. The 20 ga. Special Field detent system will also be tested, as a cost reduction item. The test is scheduled for July, in conjunction with the 20 ga. choke tube trial and pilot.

If the stainless steel magazine tube and detent system tests successfully in the LT-20 magnum, it will be implemented in the 28 and 410 gauges without testing.

SHOTGUN DEVELOPMENT - Contd.

New Concept Shotgun

Hardware for assembling a simulated synthetic Model 870 Stock to Model 870 and Model 1100 receivers is being fabricated. This will allow determination of the feasibility of a common stock between the models. A project will be started shortly to purchase production tooling to injection mold short stocks and fore-ends. A 1988 introduction is planned on the Model 870.

Five Rynite® trigger plates have each completed a 4,000 round endurance test. Test results are being evaluated.

The Model Shop has completed some parts for the PDS - designed fire control. These are being sent to PDS, who will make the remaining parts, assemble and test.

A computer model for shotgun barrels is complete except for pressure/displacement data for high pressure loads, which the Test Lab will furnish.

Prints have been sent to the Model Shop to modify a Model 1100 to accept a box magazine. A suitable latching system still needs to be developed.

A patented recoil reduction system, submitted by a private inventor, is being evaluated for possible NCS use.

Parker

The initial prototype should be returned to Ilion for evaluation by the end of May.

RIFLE DEVELOPMENT

NBAR

On May 15, six 30-06 rifles began design acceptance testing. After a very limited amount of field function testing, the test was stopped due to the number and variety of magazine box malfunctions. The rifles have been returned to the design section for investigation.

Synthetic Long Stocks

The program is progressing smoothly towards prototype testing in August. An Ilion designer is traveling to Arkansas at least once a month to resolve any problems, and keep the program moving on schedule.

AFLE DEVELOPMENT - Contd.

Model 7400 Improvements

A 12-gun development test of the PBF extractor is in progress. This test includes two different material extractors, maximum taper chambers, and single lip magazine boxes.

Model 700 Kit Gun

The Kit Gun has been transmitted to Production.

JWB:js

REMINGTON ARMS COMPANY, INC.

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J.R. Snedeker
J.W. Bower (2)
File: NBAR

CONFIDENTIAL

**NBAR MEETING
MAY 23, 1986**

The design verification test was stopped immediately after starting because of problems with several components:

o Magazine Assembly

- the magazine box falls out during recoil
 - investigate tolerance stackup.
 - redesign to bias box forward.
 - is selective assembly feasible?
- cartridge loading is not a problem.
- tabs will be added to the front of the box to prevent the front of the follower from coming out of the box.
- does the spacing of the magazine lips change during use?

o Receiver

- the feed ramp cut on 21 of the receivers is out of position.
 - Six replacements will be in the Model Shop by 5/23 with six additional every three days.
- nine receivers to the correct dimension are available to start testing as soon as the magazine box problems are resolved.

- o Stock
 - with the delay in the start of the design verification test, the stocks with questionable inletting cuts will be replaced. New stocks will be started 5/27.
- o Trigger Pull
 - heavier than specifications.
 - the counterbore for the adjusting screw was shallow, and the plunger drill point was out of position.
- o Bolt Lock
 - will not remain in the detented position during shooting.
 - balancing the parts will be investigated
 - a cricket spring will be tried
- o Bolt Stop
 - was not functioning on one gun. Cause needs to be determined.
- o General
 - a log will be set up on each gun and all changes or gunsmithing will be recorded.
 - the stock will be production's long-lead items? Advance drawing will be provided.
 - extractors with thin bolt-head walls are available for destructive testing.

The next meeting will be Friday, May 30, at 2:00 PM.

JWB:js

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.



PETERS



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

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NBAR MEETING
 MAY 23, 1986

The design verification test was stopped immediately after starting because of problems with several components:

o Magazine Assembly

- the magazine box falls out during recoil
 - investigate tolerance stackup.
 - redesign to bias box forward.
 - is selective assembly feasible?
- ~~Cartridge dropping is not a problem.~~
- ~~tabs will be added to the front of the box to prevent the front of the follower from coming out of the box.~~
- does the spacing of the magazine lips change during use?

o Receiver

- the feed ramp cut on 21 of the receivers is out of position.
 - Six replacements will be in the Model Shop by 5/23 with six additional every three days.
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- o Stock
 - with the delay in the start of the design verification test, the stocks with questionable inletting cuts will be replaced. New stocks will be started 5/27.
- o ~~Trigger pull~~
 - ~~heavier than specifications~~
 - ~~the counterbore for the adjusting screw was shallow, and the plunger drill point was out of position.~~
- o Bolt Lock
 - will not remain in the detented position during shooting.
 - balancing the parts will be investigated
 - a cricket spring will be tried
- o ~~Bolt Stop~~
 - ~~was not functioning on one gun. Cause needs to be determined.~~
- o General
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JWB:js

*call Long-Lock - Murphy rec'd. call T. Rowley - Long-Lock to ship
6-7-86*

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington.



PETERS



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NBAR MEETING
 MAY 23, 1986

The design verification test was stopped immediately after starting because of problems with several components:

o Magazine Assembly

- the magazine box falls out during recoil
 - investigate tolerance stackup.
 - redesign to bias box forward.
 - is selective assembly feasible?
- cartridge loading is not a problem. *from rec, in owners manual*
- tabs will be added to the front of the box to prevent the front of the follower from coming out of the box.
- does the spacing of the magazine lips change during use?

o Receiver

- the feed ramp cut on 21 of the receivers is out of position.
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Bolt Action Strategy

5-26-80

New BDL

- The gun has to look different.
- How do we make integral receiver
poists.
- marketing wants octagonal top.
- bottom should be flat - recoil lug. Ring
and integral with receiver.
- Scope mounts
 - Redfield systems - "look me" mod-one -
 - elevation and windage mod. 2?
 -
- Anti Bind Bolt - Log on BDL - get smooth
action.
- Short and long actions.

Continued
+

- New lock stop - & return - - look at outside

Safety : ?

m/700 - marketing no problem.

m/788 - production looks better (John Smith)

- trigger should have 4 pull adjustment

• adjustment should be fail safe - down to
ground and half - ← settle on 3rd lower
limit

• Sec - Change material - ? Powder metal
- to - ? Low stock.

- external adjustment.

• instructions folder. should be so that
an uniform customer how to adjust.

3

Continued Bolt detent line - BDC -

Safety :

For Control -

- saw - light maybe $2\frac{1}{2}$ " pull
- external adjustments
- new design - 788 - or different -
- Cocking indicator

Bolt lock ? -

Independent bolt lock

Barrel :

Have High Gloss Hammer marks.

4

GUNS I HATE GUNS

BARREL: Hammer Forge -

Feed System:

- Rotary magazine big deal -

marketing would like this would help
also give shot total standard ammo.

ammunition - may cut out sound less.

Bolt -

Stock: Cal Chukering 2000
full Pattern fore-end -
trans fore-end -

? Dickmeyer Record Sting Series

Stock Emmons - Schuhl - tip -

Emmons. Bolt section - will

medium glass -

Slings

no speers.

30-4000

7-4000

Cal.

22-250

7mm-4000

1. Steel floor plate - #6 guard

2. Finish.

7mm 4000

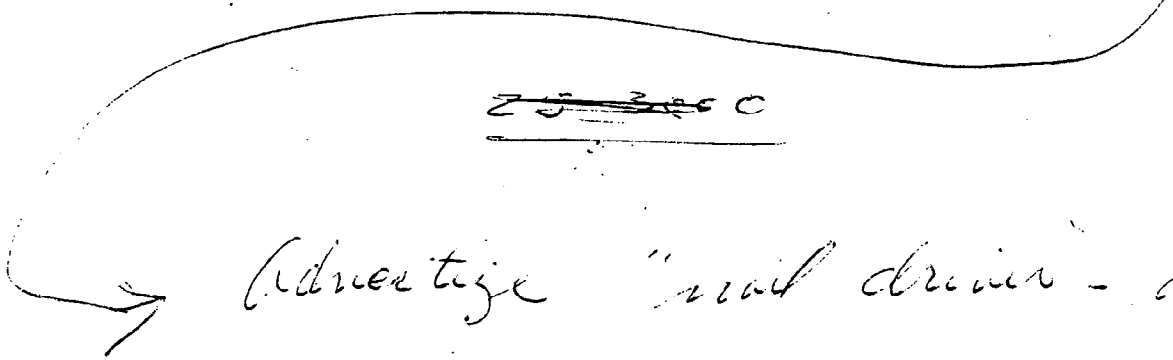
new caliber

7mm-4000

250-3000

6mm-5000

~~25-3000~~



Advertise "rail driver" - accuracy

show driving a nail at 100 yds -

5 shots -

ADL

ADL m/700 - How?

Jim Martin

I choose -

Stock : Classic ?

- Walnut (Birch - cost)
- RKW Finish
- Grip Cap - BDL ?
- Bolt Plate - old style Plain m/4
- ~~String Swivels~~
- Cut Checker - small Pattern
- white line spacers thin -

Actions : m/700

- ~~the~~ Floor Plate -
- iron sights Present Line
- no bird "Stamped" Follower ?
- no Bolt Lock
- ~~cleaned~~ Bolt - Polish . Bolt
- improved metal Finish
- m/700 bolt handle w/o checkering
- Standard Finish

Accessories :

- Scope mount rings
- Slugg. Swivels

BDL

BDL m/700 How - ?

Stock Bob Emmott's "Style"

- Grip Cap - m/4
- Sling Swivel Studs
- Full Pattern Checkering 20 lines in
- Medium Gloss Finish
- ~~Present BDL Butt Plate~~ Classic Style.
- Figured Walnut - "B" Grade
- No White Line Spacers

Actions :

- m/700 with steel trigger guard & ^{Box Type} ~~Blow Plate~~
- No iron sights - clean
- no blind cast milled mag. follower
- no bolt lock
- Jeweled Bolt.
- m/700 bolt handle w/o checkering
- improved metal finish on all parts
- scope mount rings.

Assn :

new sights -

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: RS MURPHY TESTER: STEPHENS/THOMAS DATE: 05/30/86
REPORT NO.: 860981 WORK ORDER NO.: C-5504

WRITTEN BY: FL SUPRY

TEST TYPE: DROP TEST AND HIGH PRESSURE STRENGTH (NBAR)

FIREARM STAT'S : MODEL: NBAR CAL or GAUGE: 30.06
BARREL TYPE: PROOFED: YES X NO

REASON FOR TEST :

To drop test and compare the high pressure strength of the NBAR to previous experience with the Model 700.

Also included was one NBAR action with the feed ramp cut out of specification.

EQUIPMENT REQUIRED :

Four NBAR rifles for High Pressure Strength, one rifle for drop testing, high pressure measuring equipment, and personnel.

TEST PROCEDURE :

The drop test was conducted, by R. Howe. SAAMI specifications were exceeded for the drops. The High Pressure Strength was conducted on four rifles, three with 2000 previous rounds, and one with 0 rounds.

TEST RESULTS :

The NBAR rifles completed the drop test with no jar off within SAAMI specifications. Refer to summary sheet included for drop history.

The strength and mode of failure of the four test guns are consistent with past experience. Refer to summary sheets for individual results.

xc: J.W. Bower/File
J.R. Snedeker

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: RS MURPHY TESTER: STEPHENS/THOMAS DATE: 05/30/86
REPORT NO.: 860981 WORK ORDER NO.: C-5504

WRITTEN BY: FL SUPRY

TEST TYPE: DROP TEST AND HIGH PRESSURE STRENGTH (NBAR)

FIREARM STAT'S : MODEL: NBAR CAL or GAUGE: 30.06
BARREL TYPE: _____ PROOFED: YES X NO _____

REASON FOR TEST :

To drop test and compare the high pressure strength of the NBAR to previous experience with the Model 700.

Also included was one NBAR action with the feed ramp cut out of specification.

EQUIPMENT REQUIRED :

Four NBAR rifles for High Pressure Strength, one rifle for drop testing, high pressure measuring equipment, and personnel.

TEST PROCEDURE :

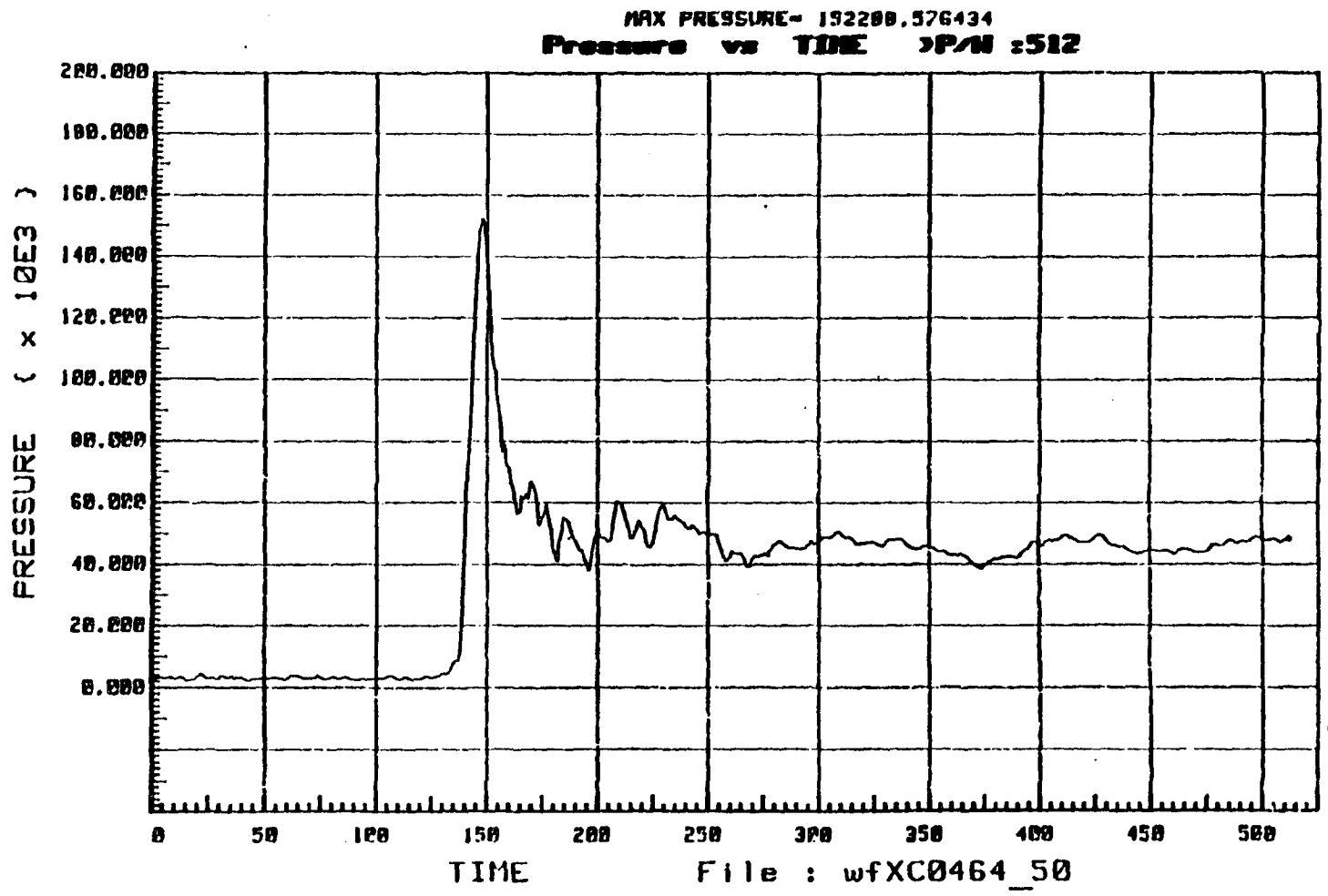
The drop test was conducted, by R. Howe. SAAMI specifications were exceeded for the drops. The High Pressure Strength was conducted on four rifles, three with 2000 previous rounds, and one with 0 rounds.

TEST RESULTS :

The NBAR rifles completed the drop test with no jar off within SAAMI specifications. Refer to summary sheet included for drop history.

The strength and mode of failure of the four test guns are consistent with past experience. Refer to summary sheets for individual results.

xc: J.W. Bower/File
J.R. Snedeker



REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas & C. Stealy

Date 5/29/86

FIREARM:

Make Remington Model N2AR
Grade _____ Gauge 30/06 Serial Number XC-434
Origin Research Model Shop
Test Number Assigned SC-221
Comments Feed Remo C.T. off

HISTORY:

Condition New
Previous Rounds Fired 0
Headspace at Test Min. 7.02
Test Date 5/29/86

ABUSIVE
LOAD USED:

Powder Type 4198
Powder Weight 50g
Case Make and Type Rem
Total Bullet Weight 220g
Total Shot Weight _____
Estimated Pressure 152000 PSI (Strain Meas)

ADDITIONAL
COMMENTS:

Stock split
Swelled Case (blow out at extractor)
blow out extractor
Cracked bolt behind extractor

"JAR OFF TEST"

FIREARM # XC-0428 ②

REPORT # 860981

MODEL N-BAR

W.O. # C-5504-

TRIGGER PULL LBS. 4.25 (AVG OF 3)

SAFE "OFF" POSITION

| J.O. = "JAR OFF" | SAAMI SPEC | | | | 18" DROP | | | | 24" DROP | | |
|----------------------|------------|----|----|--|----------|----|----|--|----------|----|----|
| | 12" DROP | | | | #1 | 2 | 3 | | #1 | 2 | 3 |
| OR. VERT MUZZLE UP | OK | OK | OK | | OK | OK | OK | | OK | OK | OK |
| " " MUZZLE DOWN | " | " | " | | " | " | " | | " | " | " |
| OR. HORIZ. BOTTOM UP | " | " | " | | " | " | " | | OK | JO | JO |
| " " BOTTOM DOWN | " | " | " | | " | " | " | | JO | OK | JO |
| " " LEFT SIDE UP | " | " | " | | " | " | " | | OK | OK | OK |
| " " RIGHT SIDE UP | " | " | " | | " | " | " | | OK | JO | OK |

"DROP TEST"

SAFE "ON" POSITION

| | SAAMI SPEC. | | | | 54" DROP | | | | | | |
|---------------------|-------------|----|----|--|----------|----|----|--|--|--|--|
| | 48" DROP | | | | 54" DROP | | | | | | |
| | #1 | 2 | 3 | | #1 | 2 | 3 | | | | |
| OR. VERT MUZZLE UP | OK | OK | OK | | OK | OK | OK | | | | |
| " MUZZLE DOWN | " | " | " | | " | " | " | | | | |
| OR HORIZ. BOTTOM UP | " | " | " | | " | " | " | | | | |
| " BOTTOM DOWN | " | " | " | | " | " | " | | | | |
| " LEFT SIDE UP | " | " | " | | " | " | " | | | | |
| " RIGHT SIDE UP | " | " | " | | " | " | " | | | | |

"ROTATION TEST"

SAFE "ON" POSITION

| SAAMI SPEC. | RIGHT SIDE UP | | | LEFT SIDE UP | | |
|------------------------------|---------------|----|----|--------------|----|----|
| ALL DROPS ON 1" X 5 1/2" | #1 | 2 | 3 | #1 | 2 | 3 |
| DIAMETER (SHOULDER A) RUBBER | OK | OK | OK | OK | OK | OK |
| NOT BACKED BY CONCRETE | | | | | | |

REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By Thomas C. Stephens

Date 5-29-86

FIREARM:

Make Remington

Model NBAR

Grade _____

Gauge _____

Serial Number XC0426

Origin Kennelworth Model Shop

Test Number Assigned FL0981

Comments _____

HISTORY:

Condition _____

Previous Rounds Fired 2000

Headspace at Test Min T 003

Test Date 5-29-86

ABUSIVE

LOAD USED:

Powder Type 4199

Powder Weight 52gr

Case Make and Type Rem Win Power

Total Bullet Weight 220gr

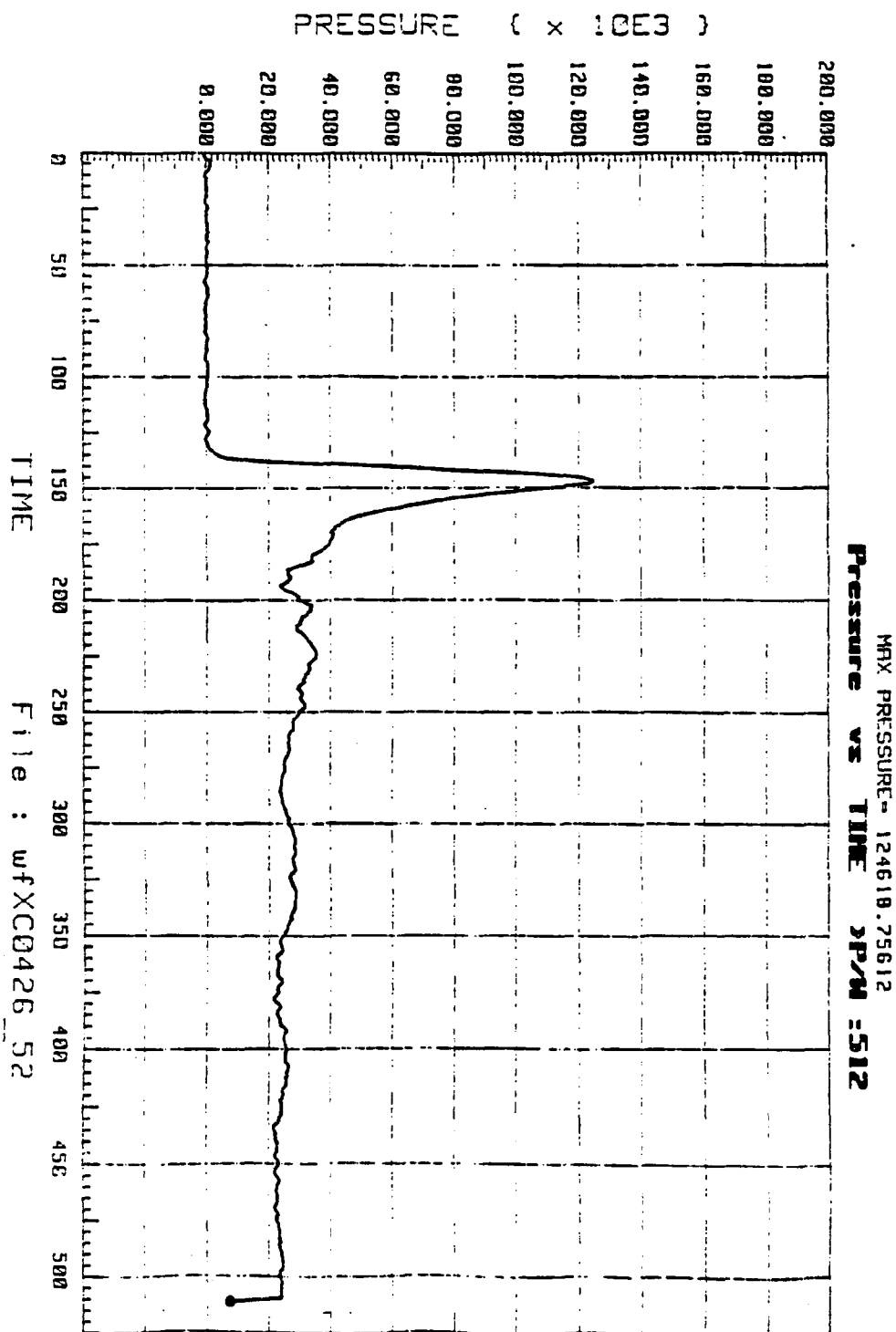
Total Shot Weight _____

Estimated Pressure 136 L18

ADDITIONAL

COMMENTS:

Swelled case in chamber.



REMINGTON ARMS COMPANY, INC.
Illion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

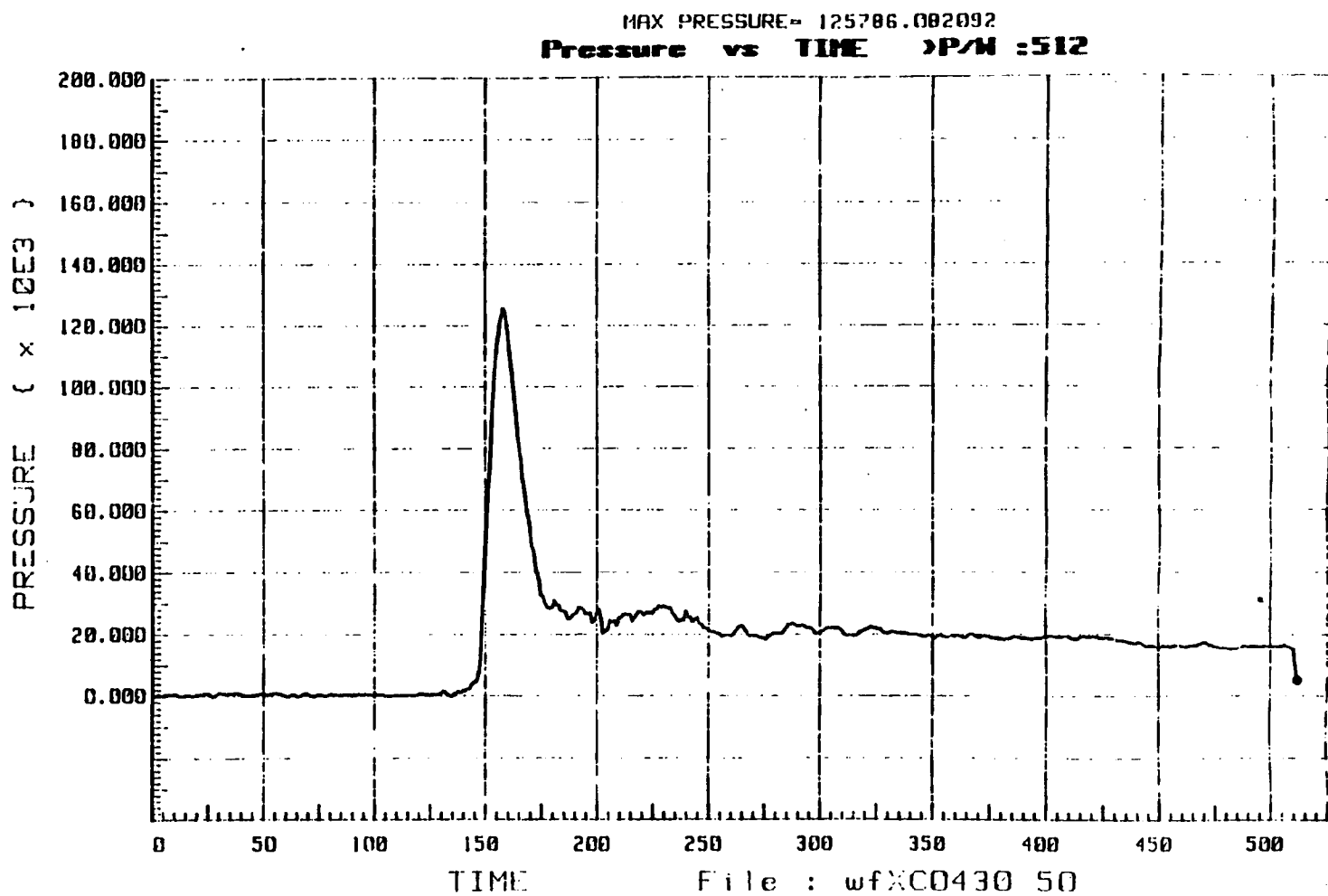
By D. Thomas C. Stephens
Date 5-25-86

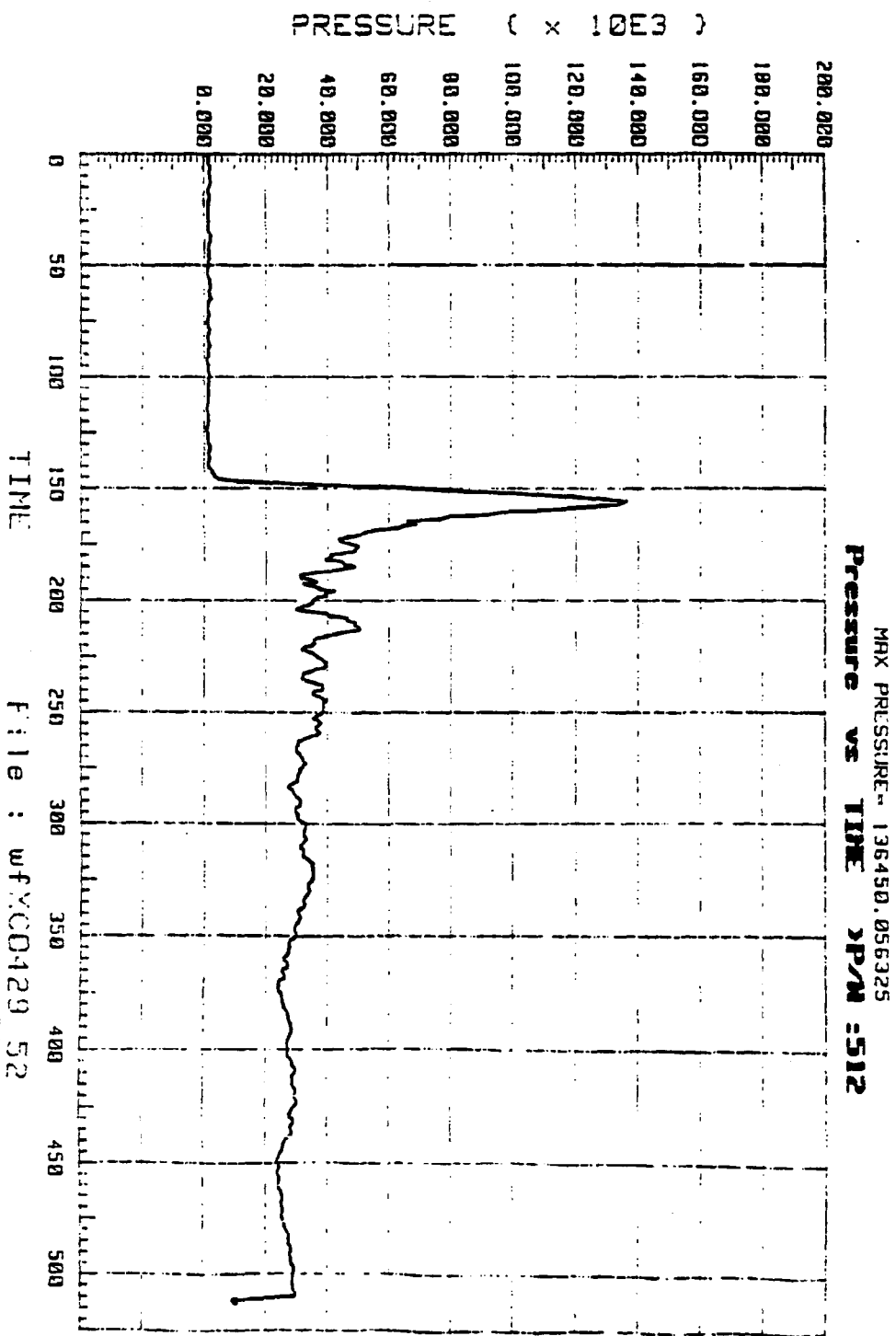
FAIRM: Make Remington Model NRAR
Grade _____ Gauge 20-06 Serial Number XC0430
Origin Research Model Shop
Test Number Assigned RA0951
Comments _____

TORY: Condition _____
Previous Rounds Fired 2000
Headspace at Test _____
Test Date 5-25-86

SIVE Powder Type 4199
D USED: Powder Weight 50 gr.
Case Make and Type Rem Win Primer
Total Bullet Weight 22 gr.
Total Shot Weight _____
Estimated Pressure 125,000

DITIONAL
MENTS: Swelled case in chamber





REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas & C. Shea

Date 5/29/86

FIREARM:

Make Remington Model NBAR

Grade _____ Gauge 30/06 Serial Number XCR-464

Origin Research Muhl Shop

Test Number Assigned 86-281

Comments Fred Ramo C.T. .44

HISTORY:

Condition New

Previous Rounds Fired 0

Headspace at Test Min. T. 0.2

Test Date 5/29/86

ABUSIVE
LOAD USED:

Powder Type 4198

Powder Weight 50gr

Case Make and Type Rem

Total Bullet Weight 220gr

Total Shot Weight _____

Estimated Pressure 152 000 PSI (Strain Meas)

ADDITIONAL
COMMENTS:

Stock Split

Shelled Case (blow out at extractor)

blow out extractor

Cracked bolt behind extractor

Report No. R60981

RESEARCH TEST & MEASUREMENT LAB WORK REQUEST

| | | | | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------|-------------------------------------------------|------------------------------------------|-------------------------------------|-----------------------------------------|----------------------------------------|----------------------------|-------------------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> Developmental <input type="checkbox"/> Design Assistance <input type="checkbox"/> Pre-Pilot <input type="checkbox"/> Pilot <input type="checkbox"/> Production Assistance | <p align="center"><u>AREA OF TESTING</u></p> <table> <tr> <td><input type="checkbox"/> Safety Related</td> <td><input type="checkbox"/> Litigation</td> </tr> <tr> <td><input type="checkbox"/> Competitive Evaluation</td> <td><input type="checkbox"/> Warehouse Audit</td> </tr> <tr> <td><input type="checkbox"/> New Design</td> <td><input type="checkbox"/> Cost Reduction</td> </tr> <tr> <td><input type="checkbox"/> Design Change</td> <td>Scale <input type="text"/></td> </tr> <tr> <td><input type="checkbox"/> Plant Assistance</td> <td><input type="checkbox"/> Other</td> </tr> </table> | | <input type="checkbox"/> Safety Related | <input type="checkbox"/> Litigation | <input type="checkbox"/> Competitive Evaluation | <input type="checkbox"/> Warehouse Audit | <input type="checkbox"/> New Design | <input type="checkbox"/> Cost Reduction | <input type="checkbox"/> Design Change | Scale <input type="text"/> | <input type="checkbox"/> Plant Assistance | <input type="checkbox"/> Other |
| <input type="checkbox"/> Safety Related | <input type="checkbox"/> Litigation | | | | | | | | | | | |
| <input type="checkbox"/> Competitive Evaluation | <input type="checkbox"/> Warehouse Audit | | | | | | | | | | | |
| <input type="checkbox"/> New Design | <input type="checkbox"/> Cost Reduction | | | | | | | | | | | |
| <input type="checkbox"/> Design Change | Scale <input type="text"/> | | | | | | | | | | | |
| <input type="checkbox"/> Plant Assistance | <input type="checkbox"/> Other | | | | | | | | | | | |
| <p align="center"><u>FIREARM STATS</u></p> MODEL: <u>N-BAR</u> CAL. or GAGE: <u>38.06</u> BARREL TYPE: <u> </u> PROOFED: YES <input type="checkbox"/> NO <input type="checkbox"/> | <p align="center"><u>REPORT REQ'D.</u></p> FORMAL <input type="checkbox"/> TEST RESULTS ONLY <input checked="" type="checkbox"/> | DATE REQUESTED: <u>4/9/84</u> DATE NEEDED BY: <u> </u> REQUESTED BY: <u>murray</u> WORK ORDER NO: <u>C-5504</u> | | | | | | | | | | |

| | | | |
|----------------------------------------|---------------------------------------------|-----------------------------------------|--------------------------------------------------|
| <p align="center"><u>TEST TYPE</u></p> | | | |
| <input type="checkbox"/> Strength Test | <input type="checkbox"/> Ammunition Test | <input type="checkbox"/> Dry Cycle Test | <input type="checkbox"/> Photo/Video |
| <input type="checkbox"/> Function Test | <input type="checkbox"/> Environmental Test | <input type="checkbox"/> Measurements | <input type="checkbox"/> Other <u> </u> |
| <input type="checkbox"/> Accuracy Test | <input type="checkbox"/> Customer Complaint | <input type="checkbox"/> Endurance Test | <u> </u> |

EXPLAIN IN DETAIL THE REASON FOR THIS TEST:

N-BAR

Drop Test 10 guns (Same guns used for 10 gun development)
 High Pressure Testing

- GUNS REQUIRED:

NOTE: NO firearms or parts will be tested in the Labs unless they are accompanied by a Work Request, and both are delivered to the Labs by the designer or engineer. All Work Requests are to be filled out in detail. No Exceptions.

DATE COMPLETED:
 TEST COMPLETED BY:
 REPORT DATE:

TEST AND MEASUREMENT LAB TEST RESULTS

REQUESTER: RS MURPHY TESTER: STEPHENS/THOMAS DATE: 05/30/86
REPORT NO.: 860981 WORK ORDER NO.: C-5504

WRITTEN BY: FL SUPRY

TEST TYPE: DROP TEST AND HIGH PRESSURE STRENGTH (NBAR)

FIREARM STAT'S : MODEL: NBAR CAL or GAUGE: 30.06
BARREL TYPE: PROOFED: YES X NO

REASON FOR TEST :

To drop test and compare the high pressure strength of the NBAR to previous experience with the Model 700.

Also included was one NBAR action with the feed ramp cut out of specification.

EQUIPMENT REQUIRED :

Four NBAR rifles for High Pressure Strength, one rifle for drop testing, high pressure measuring equipment, and personnel.

TEST PROCEDURE :

The drop test was conducted, by R. Howe. SAAMI specifications were exceeded for the drops. The High Pressure Strength was conducted on four rifles, three with 2000 previous rounds, and one with 0 rounds.

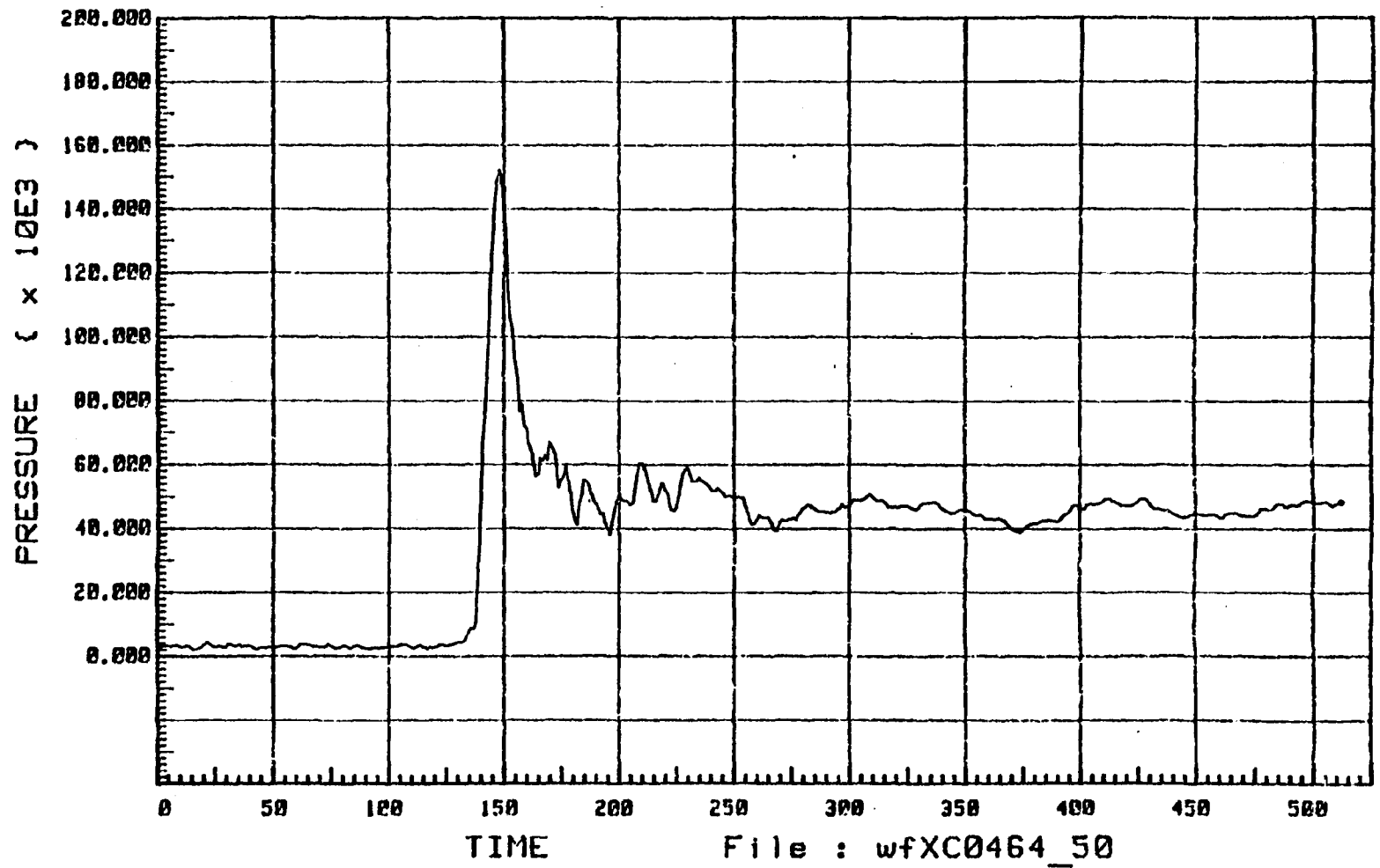
TEST RESULTS :

The NBAR rifles completed the drop test with no jar off within SAAMI specifications. Refer to summary sheet included for drop history.

The strength and mode of failure of the four test guns are consistent with past experience. Refer to summary sheets for individual results.

xc: J.W. Bower/File
J.R. Snedeker

MAX PRESSURE= 152288.576434
Pressure vs TIME P/N :512



CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER

KINZER V. REMINGTON

R2540177

REMINGTON ARMS COMPANY, INC.
Illion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas & C. Stebbins

Date 5/29/86

FIREARM:

Make Remington Model NBAR

Grade _____ Gauge 30/06 Serial Number X00464

Origin Research Model Shop

Test Number Assigned 560381

Comments Feed Ramp C.T. off

HISTORY:

Condition New

Previous Rounds Fired 0

Headspace at Test Min. 7.002

Test Date 5/29/86

ABUSIVE
LOAD USED:

Powder Type 4198

Powder Weight 50gr

Case Make and Type Rem

Total Bullet Weight 220gr

Total Shot Weight _____

Estimated Pressure 152000 PSI (Strain Meas)

ADDITIONAL
COMMENTS:

STock Split

Swelled Case (blew C.T. at extractor)

blew out extractor

cracked bolt behind extractor

"JAR OFF TEST"

FIREARM # XC-0428 ②

REPORT # 860981

MODEL N-BAR

(WIRE AND KDS. TO 30)

W.O. # C-5504-

TRIGGER PULL LBS. 4.25 (AVG OF 3)

SAFE "OFF" POSITION

| J.O. = "JAR OFF" | SAAMI SPEC | | | | | | | | | | | |
|----------------------|------------|----|----|----------|----|----|----------|----|----|--|--|--|
| | 12" DROP | | | 18" DROP | | | 24" DROP | | | | | |
| | #1 | 2 | 3 | #1 | 2 | 3 | #1 | 2 | 3 | | | |
| HR. VERT. MUZZLE UP | OK | OK | OK | OK | OK | OK | OK | OK | OK | | | |
| " " MUZZLE DOWN | " | " | " | " | " | " | " | " | " | | | |
| HR. HORIZ. BOTTOM UP | " | " | " | " | " | " | OK | JO | JO | | | |
| " " BOTTOM DOWN | " | " | " | " | " | " | JO | OK | JO | | | |
| " " LEFT SIDE UP | " | " | " | " | " | " | OK | OK | OK | | | |
| " " RIGHT SIDE UP | " | " | " | " | " | " | OK | JO | OK | | | |

"DROP TEST"

SAFE "ON" POSITION

| | SAAMI SPEC. | | | | | | | | | | | |
|----------------------|-------------|----|----|----------|----|----|--|--|--|--|--|--|
| | 48" DROP | | | 54" DROP | | | | | | | | |
| | #1 | 2 | 3 | #1 | 2 | 3 | | | | | | |
| HR. VERT. MUZZLE UP | OK | OK | OK | OK | OK | OK | | | | | | |
| " " MUZZLE DOWN | " | " | " | " | " | " | | | | | | |
| HR. HORIZ. BOTTOM UP | " | " | " | " | " | " | | | | | | |
| " " BOTTOM DOWN | " | " | " | " | " | " | | | | | | |
| " " LEFT SIDE UP | " | " | " | " | " | " | | | | | | |
| " " RIGHT SIDE UP | " | " | " | " | " | " | | | | | | |

"ROTATION TEST"

SAFE "ON" POSITION

| SAAMI SPEC. | RIGHT SIDE UP | | | LEFT SIDE UP | | |
|------------------------------|---------------|----|----|--------------|----|----|
| ALL DROPS ON 1" X 5 1/5" | #1 | 2 | 3 | #1 | 2 | 3 |
| DIAMETER (SHOULDER A) PUNTER | OK | OK | OK | OK | OK | OK |
| NOT BACKED BY CONCRETE | | | | | | |

REMINGTON ARMS COMPANY, INC.
Illion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By Thomas C. Stephens

Date 5-29-86

FIREARM:

Make Remington

Model NBAR

Grade _____

Gauge _____

Serial Number XC0436

Origin Research Model Shop

Test Number Assigned 860981

Comments _____

HISTORY:

Condition _____

Previous Rounds Fired 2000

Headspace at Test MIN + 003

Test Date 5-29-86

ABUSIVE

LOAD USED:

Powder Type 4198

Powder Weight 52gr.

Case Make and Type Rem Win Primer

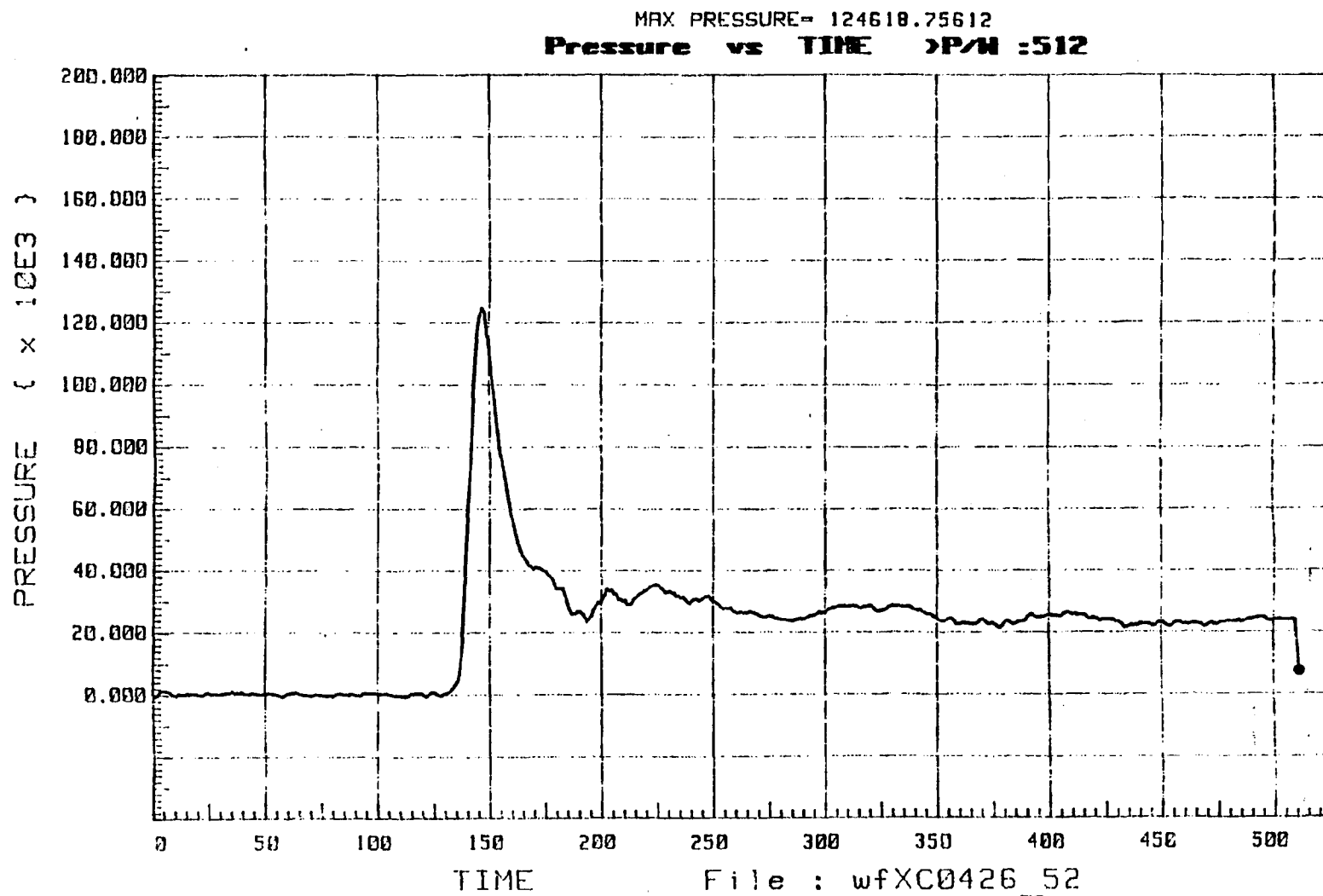
Total Bullet Weight 230gr.

Total Shot Weight _____

Estimated Pressure 134 LBS

ADDITIONAL
COMMENTS:

Swelled case in chamber.



REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas C. Stephens

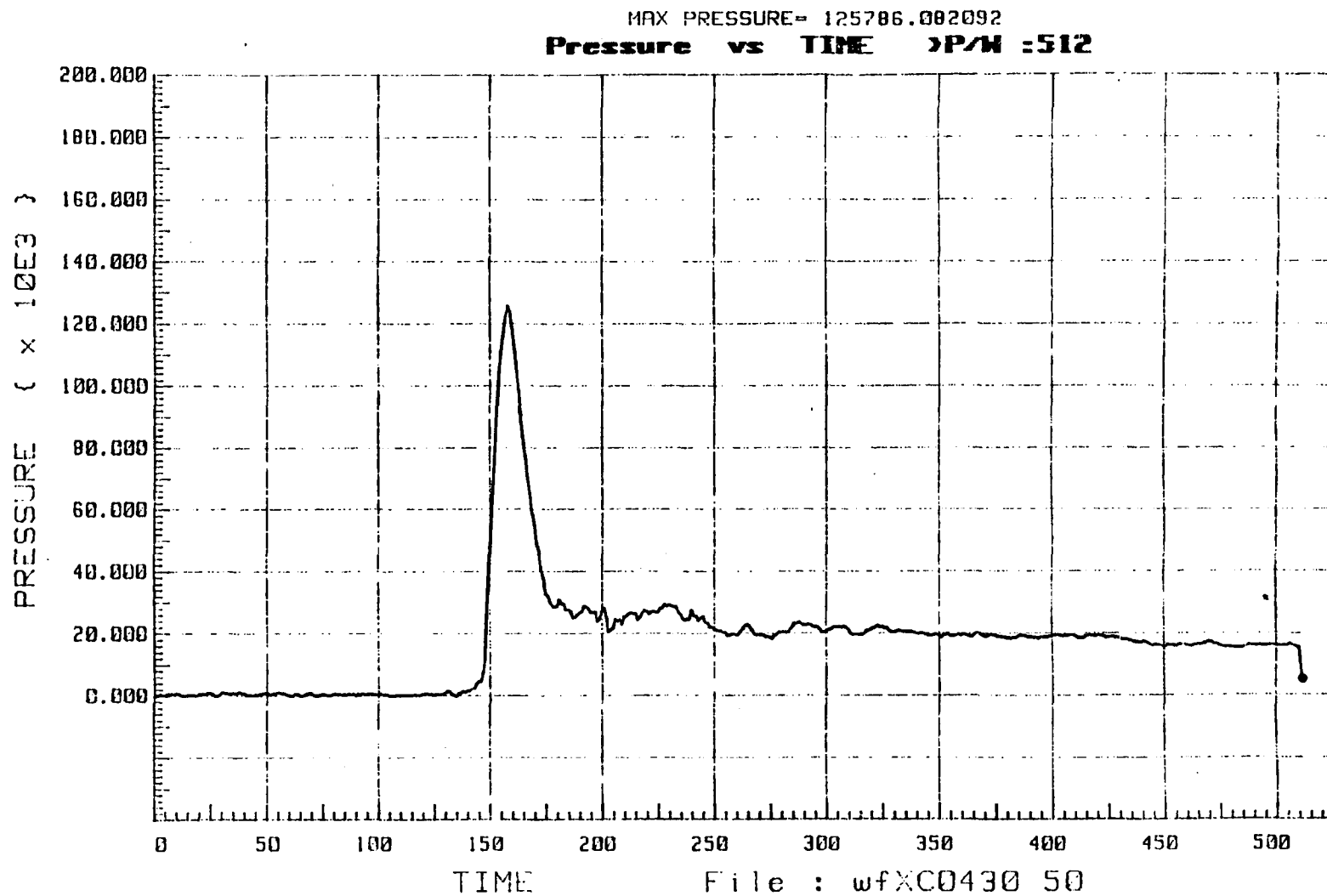
Date 5-28-86

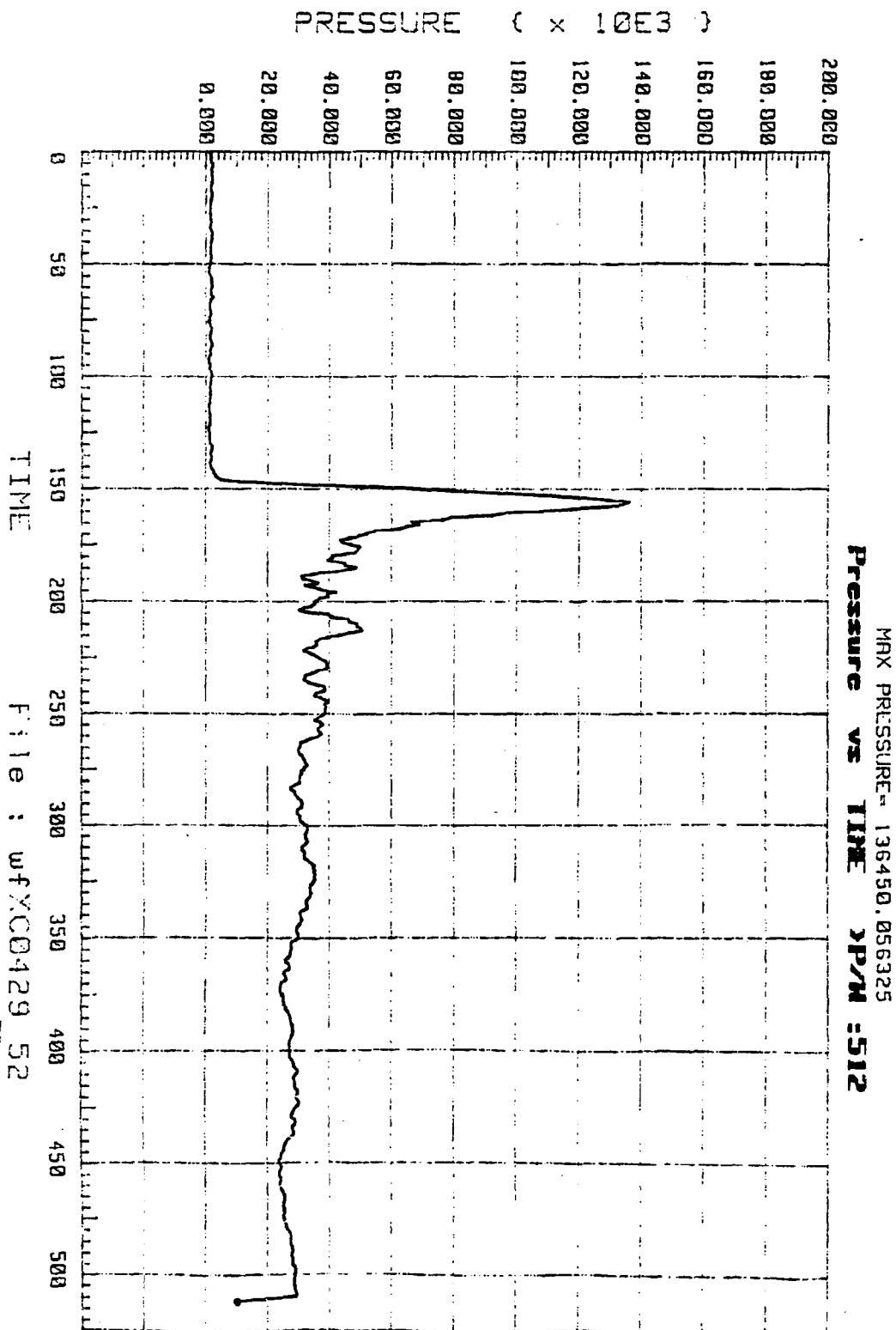
WEAPON: Make Remington Model NRAR
Grade _____ Gauge 20-06 Serial Number XC0430
Origin Research Model Shop
Test Number Assigned 840981
Comments _____

TEST HISTORY: Condition _____
Previous Rounds Fired 2000
Headspace at Test _____
Test Date 5-28-86

TEST DATA USED: Powder Type 4198
Powder Weight 50 gr.
Case Make and Type Rem. Win. Primer
Total Bullet Weight 230 gr.
Total Shot Weight _____
Estimated Pressure 135,844

ADDITIONAL COMMENTS: Swelled case in chamber





REMINGTON ARMS COMPANY, INC.
Ilion Research Division

SUMMARY OF INTENTIONAL GUN ABUSE TEST

DATA

By D. Thomas & C. Shea

Date 5/29/86

FIREARM:

Make Remington

Model NBAR

Grade _____ Gauge 30/06 Serial Number XCC464

Origin Research Model Shop

Test Number Assigned 860881

Comments Feed Ramp C.T. off

HISTORY:

Condition New

Previous Rounds Fired 0

Headspace at Test Min 7.002

Test Date 5/29/86

ABUSIVE
LOAD USED:

Powder Type 4198

Powder Weight 50gr

Case Make and Type Rem

Total Bullet Weight 220gr

Total Shot Weight _____

Estimated Pressure 152 000 PSI (Strain Meas)

ADDITIONAL
COMMENTS:

STock Split

Swelled Case (blew out extractor)

blew out extractor

Cracked bolt behind extractor

enter

Report No. 860981

RESEARCH TEST & MEASUREMENT LAB WORK REQUEST

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Developmental <input type="checkbox"/> Design Acceptance <input type="checkbox"/> Pre-Pilot <input type="checkbox"/> Pilot <input type="checkbox"/> Production Acceptance | <u>AREA OF TESTING</u> <input type="checkbox"/> Safety Related <input type="checkbox"/> Litigation <input type="checkbox"/> Competitive Evaluation <input type="checkbox"/> Warehouse Audit <input type="checkbox"/> New Design <input type="checkbox"/> Cost Reduction <input type="checkbox"/> Design Change <input type="checkbox"/> Stake _____ <input type="checkbox"/> Plant Assistance <input type="checkbox"/> Other _____ | |
| <u>FIREARM STAT'S</u> MODEL: <u>N-BAR</u> CAL or GAGE: <u>30.06</u> BARREL TYPE: _____ PROOFED: YES _____ NO _____ | <u>REPORT REQ'D.</u> FORMAL _____ TEST RESULTS ONLY <input checked="" type="checkbox"/> | DATE REQUESTED: <u>4/9/84</u> DATE NEEDED BY: _____ REQUESTED BY: <u>MURPHY</u> WORK ORDER NO: <u>C-5504</u> |

| | | | |
|----------------------------------------|---------------------------------------------|-----------------------------------------|--------------------------------------|
| <u>TEST TYPE</u> | | | |
| <input type="checkbox"/> Strength Test | <input type="checkbox"/> Ammunition Test | <input type="checkbox"/> Dry Cycle Test | <input type="checkbox"/> Photo/Video |
| <input type="checkbox"/> Function Test | <input type="checkbox"/> Environmental Test | <input type="checkbox"/> Measurements | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Accuracy Test | <input type="checkbox"/> Customer Complaint | <input type="checkbox"/> Endurance Test | _____ |

EXPLAIN IN DETAIL THE REASON FOR THIS TEST:

N-BAR

Drop Test 10 guns (Same guns used for 10 gun development)
High Pressure Testing

- GUNS REQUIRED:

NOTE: NO firearms or parts will be tested in the Labs unless they are accompanied by a Work Request, and both are delivered to the Labs by the designer or engineer. All Work Requests are to be filled out in detail. No Exceptions.

DATE COMPLETED: _____
TEST COMPLETED BY: _____
REPORT DATE: _____

REMINGTON ARMS COMPANY, INC.
FIREARMS PROCESS RESEARCH DIVISION
MONTHLY REPORT
MAY 1986

RECEIVER FLEXIBLE MANUFACTURING SYSTEM

Eight M/870 and six M/1100 receivers produced from the T-10 machine at EDL last month were assembled into finished guns and field tested. All guns operated extremely smooth compared to regular production and functioned well. Measurements of the receivers indicated tolerances were to model drawing, also the machined surface finish appear much improved. Three hundred and twenty additional M/870 receivers are now being machined using four different tool kits. Thirty of these will be selected at random for endurance testing beginning May 27th. M/1187 receivers are currently scheduled for endurance testing by July 8th. If blanks are available sooner, these tests can be moved up to an earlier date.

Testing of the Cimdrylic coolant is continuing at EDL. Since its use, several problems involving rust and sludge build up have occurred resulting in machine downtime. Daily monitoring using a refractometer and lab samples monitored at Cincinnati Milacron indicate their recommended solution concentration ratios are being maintained. Milacron has now suggested that a richer solution to be used to stop the rusting problem. Additional analysis and testing is required before releasing this coolant for FMS use.

Three different manufacturing processes involving the FMS for producing NBAR receivers were outlined and reviewed with EDL. Basic differences are the blank preparation operations and whether they are done on or off the FMS which effects fixturing concepts. High spot economics will be generated to assist selecting one of these options.

RECEIVER FMS - PHASE II

A task force was formed to develop a plan for clearing Building 60 of 97% of the machinery located there to allow for the renovation of the building to house Phase II of the FMS project.

The following guidelines were used to develop the plan;

1. Bldg 60 must be empty by January 1, 1987 to allow renovations to begin if the current Phase II startup date is to be maintained.
2. Production must be maintained in all areas that are effected by the machine relocations.
3. Machinery that is not being replaced by any phase of the FMS project should be relocated to their permanent location.
4. Relocation costs should be kept as low as possible while maintaining as smooth a process flow as possible.

Using the above guidelines, a plan was developed that requires the relocation of 260 machines at a cost of \$316M. An additional cost of \$90M will be required to cover overtime, night bonus, and off standard time turned in by operators effected by the relocations.

In order to meet the January 1st timeline, this plan assumes that relocation of the machinery can begin in mid May of this year.

All layouts and equipment lists have been completed so that once approval of the necessary funds is given the plan can be put into action with little delay.

SHOTGUN BARREL AUTOMATION

A meeting was held with Dr's. Lynn Fergusson and Howard Kuhn of Deformation Control Technology to discuss progress to date on their forging analysis. The analysis of our current GFM process indicated that some improvements can be made, however, a no turn - no ream finish is not considered possible. It was decided to change directions and have them concentrate analysis for the remainder of the contract period on the Pilger/Rockrite and Extrusion processes. DCT recommended a variation on the extrusion process that we are currently investigating with Erie Press Systems. The variation calls for feeding the mandrel in the direction of material flow during the extrusion, thus, virtually eliminating the effect of friction. This ironing technique is not normally employed by most commercial forging equipment manufacturers, but may increase our chances of obtaining a no turn - no ream finish.

Common length shotgun barrels - P.E.&C. has indicated that random testing of shotgun barrels has been completed. No problems were encountered as a result of cutting off these barrels toward the end of the process. P.E. & C. will present their results at the May Steering Committee Meeting. Industrial Engineering now has to complete final economics for this project before it can proceed. Once that is finished a project must be written to obtain the necessary capital (\$41M) required for this project.

SMALL PARTS FLEXIBLE MANUFACTURING SYSTEM

New CV models for the breech bolt M/870 and M/1100 are complete. Initial NC programs for the breech bolt M/870 "A" and "B" loads are complete. The breech bolt programs will be tested at EDL by the end of May.

A new locking block CV model is complete. Locking block NC programs will be developed next. The initial programs should be complete by mid June.

Breech bolt fixture testing has been delayed until new NC programs for the M/870 breech bolt are complete.

CUT CHECKERING

The Co.Re.Ma. is ready for Trial & Pilot on the 11-87 fore-end. P.E. &C. has finally assumed most responsibility for this machine.

P.E. &C. is still having problems with the 11-87 fixture design for the Bostomatic (Stock Machine). The stock program is ready for Trial & Pilot when the fixtures are.

FORM-ROLLING

Our PM Lab has prepared a report on their analysis of the warm form-rolled firing pin produced by Rol-Flo Inc.

Purchase requisition for the Manca swaged pin test has been released to Purchasing. Blank material (8620) is here but needs to be turned down before we can send it to them. We have also ordered 304 stainless as a possible substitute formed material.

Delta Import, the American representative for ESSEBI of Pero, Italy has indicated that they have no doubt that they can form-roll our firing pin. They are in the process of making a proposal for a system similar to our former proposals.

SANDSTROM COATINGS

The Powder Coating group of P.E. &C. is now working with us in the investigation of the Sandstrom coating application to our products. We have ordered some of Sandstroms products in aerosol cans for application tests here.

Last week we visited Anoplate Corp. of Syracuse and are waiting for their cost estimate for coating 50 parts each of our 870 fire control components.

Acton Metal Processing Corp. of Waltham, Mass., has offered to coat 50 lbs. of parts in their Dip-Spin Machine free of charge.

GFM AUTOMATION

Installation service and start-up of the American Induction Heater is starting today (May 13, 1986).

All equipment is in place except for the cooling carousel. The carousel is being relocated to better its access to the flow of the robot motions. The system should be ready for teaching/programming by the last week in May.

CV Users Group

FMS Modeling

Modeling and detailing of the M/1100 LH is complete.

FMS Tool Drawings

Tool assembly drawings for the M/1100 and 870 receivers are complete, but require checking. The FMS cutter drawing are undergoing revision based on the checking done by the FMS group.

NBAR Modeling

NBAR drawing work is partially complete with some of the remaining work being to:

1. model and detail stock
2. detail stock assembly
3. fore end tip
4. barrel assembly complete
5. miscellaneous drawing revisions
6. other part revisions as the designers require them (i.e. magazine box design)

Steve Miller is continuing to work on the stock design for the NBAR.

With FMS Phase I work and the NBAR stock nearly complete, more effort will be put on NBAR to finish this project's drawing work.

NCS Modeling

Work to layout the M/1100 gas system on the CV with a larger BBL to Mag. Tube Centerline is complete and a layout of this was given to E. Seppala for his concept work. Alternations to the modified inertia sleeve for this design are also complete and will be detailed by 5/21/86.

Work is 85% complete on a M/1100 stock on the CV system. The comb cut is the only outstanding area that needs definition. This stock model is for developing a plastic mold for this stock or for manufacturing press form dies. Major work to reblend some of the surfaces for mold work will be done by 7/15.

☐ FOR ENCLOSURE

DATE 3/20

TO: Jim

FROM: Joyce (S/C)

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

Joyce -
File as is.
do not distribute

2557-1-12-100

Xc: W.H. Coleman
J.R. Snedeker
J. Selan
R.S. Murphy
F.E. Martin
W.M. Curry
R.J. Sanzo
J.W. Bower (2)

CONFIDENTIAL

NBAR MEETING
JUNE 6, 1986

Responsibility

Magazine Assembly

A proposed design correction was turned over to the Model Shop on 6/5. Three prototypes should be complete 6/9.

W. Curry

Development testing of rifles with the three prototype magazines will begin on 6/9. If acceptable, the Model Shop will be requested to make sufficient quantities for design acceptance guns.

R. Murphy
W. Curry

Stocks

Six stocks are available for start of the Design Acceptance Test. *Monday 6-16-86*

R. Murphy

Some of the problems with the Don Allen Machine have been found, and corrections will be made.

W. Curry

Bolt Locks

The weight of the bolt lock has been reduced to minimize the tendency to relatch. Parts should be out of heat treat and ready for development testing on 6/9.

An alternative design employing a separate locking member will go to the Model Shop on 6/9.

F. Martin
W. Curry

Bolt Locks - Contd.

If neither of the above designs prove satisfactory, design acceptance testing will start with the original design which cannot be locked out.


J. Bower

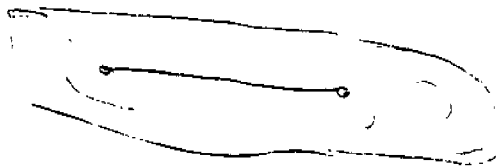
Design Acceptance Test

Pending magazine assembly testing, the Design Acceptance Test may start 6/16.

J. Snedeker

The next meeting is scheduled for 12:45 PM, Friday, June 13. Randy Murphy will chair the meeting.

 JWB:js



CC: B. W. Rau
R. Murphy

Wilmington, DE 19898
June 9, 1986

J. W. BOWER
E. O. FINI

EXPLORATORY SHOULDER ARMS CONSUMER RESEARCH

Attached is a schedule of group sessions (six in total) in which we plan to explore a number consumer related shoulder arms issues.

The first session in each city will involve women whose husbands hunt with a rifle or shotgun but they don't. The purpose of these sessions is to try to identify what (either physical or psychological) barriers are keeping these women from hunting with their husbands. Once the barriers are fully understood, ways might be devised to overcome them.

The second group in each city will involve men who have hunted with both a centerfire rifle and shotgun within the past two years. A number of issues will be explored with these hunters, including final confirmation of NBAR features.

A moderator's guide will be developed for both sessions and will be sent to you late June for review.


J. H. CHAMBERS

JHC/tvm
Attachment

EXPLORATORY SHOULDER ARMS CONSUMER RESEARCH

SCHEDULE OF FOCUS GROUPS

Colorado Market Research Services July 29 - 6:00 p.m.
2149 South Grape Street 8:00 p.m.
Denver, CO 80222
(303) 758-6424
Contacts: Vicki St. Gemme, Ruth Nelson

Hotel: Marriott Southeast
6363 E. Hampden Ave.
(303) 758-7000

Probe Research July 30 - 6:00 p.m.
2815 Valley View 8:00 p.m.
Dallas, TX 75234
(214) 241-6696
Contact: Helen Nicholas

Hotel: The Summit Inn
2645 LBJ Freeway
800-228-3555

The Field House, Inc. July 31 - 6:00 p.m.
5750 West 95th Street #316 8:00 p.m.
Overland Park, KS 66207
(913) 341-4245

Hotel: Marriott Hotel
10800 Metcalf
Overland Park, KS
(913) 451-8000p

File -
Monthly Reports

TO: J. W. BOWER

6/13/80

FROM: T. C. DOUGLAS

SUBJ: QUARTERLY REPORT - 2Q 80

MODEL 11-87

Transmittal of a plant heat treatment for the piston/seals was completed. Trial and Pilot guns for Research acceptance will be available June 17th.

Guns are being prepared for photographic samples per Dick Dietz.

Model 1100 - 20, 28, and 410 Gauges

A twelve-gun test has been designed to test the addition of a stainless steel magazine tube to the LT-20. This test will also include orifice changes in the magnum gun for enhanced performance of the 2 3/4" magnum lead and steel loads. The 20 ga. Special Field detent system will also be tested, as a cost reduction item. The test is scheduled for July, in conjunction with the 20 ga. choke tube trial and pilot.

If the stainless steel magazine tube and detent system tests successfully in the LT-20 magnum, it will be implemented in the 28 and 410 gauges without testing.

M/870 Functional Improvements

Research work is complete pending Production Trial - Pilot.

XP-100 in .223 Caliber

Production Trial and Pilot samples have been accepted by Research. The XP-100 has been released for Invoice Shipment.

M/700 in .338 WIN MAG

Transmittal of the classic version for 1987 and the BDL addition for 1988 is complete. Research work is now complete pending Production Trial and Pilot

File - Monthly
Reports

June 13, 86

To: JWB
From: RSM

June Quarterly Report

NBAR

A new bolt action rifle is being developed as a replacement for the Model 700 BDL. Introduction is scheduled for 1988. Technical improvements include a safety to block both the sear and trigger, a detachable magazine box, a revised extractor, a lightweight firing pin, an enclosed bolt plug, an independent bolt lock, and integral scope mounts.

At the conclusion of the developmental testing in April the first six rifles of the thirty rifle design acceptance test were built. In mid-May the testing began but was stopped after a limited amount of shooting due to the number and variety of magazine related malfunctions.

The redesign of the faulty components has been completed and successfully tested. Six rifles built to Remington standards are now ready to begin a second design acceptance test on June 16. Transmittal to production is now expected to be on August 1.

SYNTHETIC LONG STOCKS

An injection molded Rynite® synthetic long stock is being developed as a high value, low cost supplement to our Model 700 BDL for 1987. Our primary goal is to ensure reliable rifle accuracy in all temperature and humidity conditions in production volumes at a fraction of the cost of our current long stock. Stable accuracy in all environments currently is only available through the use of expensive handmade fiberglass stocks or time consuming glass bedding.

Choate Machine and Tool Company has been selected to be our vendor for 1987 and development of processing procedures and tooling is underway. Fifty prototypes are scheduled for delivery to Remington on or before August 1. Successful design acceptance testing will allow production to the warehouse in 4Q86 for a 1987 catalog introduction.

MODEL 700 KIT GUN

Remington as a company is increasingly becoming niche-oriented as we are willing to pursue smaller market segments. To satisfy the needs of the cost conscious hunter who desires to affordably customize a rifle, the 700 Kit Gun is scheduled for introduction in 1987. Our objective is to offer a completely tested Model 700 ADL barreled action in 270, 30-06, and 7mm Rem. Mag. assembled in a machined, unfinished stock. The customer has the option of customizing the stock configuration, stock finish, checkering pattern, etc. to his personal specifications.

Discussions with Marketing and Process indicate that this product can be introduced with little risk and no capital investment. ~~Formal economics are being prepared and a transmittal is planned by April 80.~~

This rifle has been transmitted to production. Formal economics and a stock finishing manual are being prepared.

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REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Xc: T.C. Douglas
R.S. Murphy
C.E. Ritchie
K.C. Rowlands
J.R. Snedeker

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Ilion, New York
July 25, 1986

TO: W.H. COLEMAN, II

FROM: J.W. BOWER

NEW PRODUCTS RESEARCH - MONTHLY REPORT - JULY, 1986

SHOTGUN DEVELOPMENT

Model 11-87

Research has tested Production's trial and pilot run of Model 11-87's and found them acceptable. Production has been released to manufacture product to the warehouse.

Slug Barrel Development

Tests were conducted with Remington, Winchester, Federal, and BRI slugs at 50 yards using 11 different types of Model 1100 and M/870 barrels for accuracy comparisons. Shooting was done from the shoulder and using a Franklin rest. Both sets of data indicate that the Winchester slug is the top overall slug. Remington was a distant second. The Winchester shot well in rifled and smooth barrels. Due to diameter differences between the Winchester (.730) and Remington (.690) slugs, the slug to bore (.725-.730) fit of the Winchester is tighter than the Remington.

We are currently trying to determine the optimum bore diameter for the Remington slug, keeping an eye on the Winchester performance. Once the optimum bore size is determined, we will try to get some ECM rifled shotgun barrels to see how they perform versus the optimum smooth bore.

SHOTGUN DEVELOPMENT - Cont.

NCS

A competitive evaluation test of the Browning B-80 has been conducted in which three guns were shot to 4,000 rounds each. The significant results were that the average malfunction rate was 4.6%, and this was caused mainly by an easily fouled internal gas system that had to be cleaned every 100 rounds to keep the guns functioning.

In addition, two guns were subjected to a 60,000 psi strength test that resulted in no failure of the barrel or locking system. The barrel material and dimensions are being analyzed.

Two Rynite® trigger plate assemblies have been dry cycled to 100,000 cycles each and drop tested every 10,000 cycles. At the end of the test, both assemblies were still functioning and had passed all drop testing, even up to six feet. However, both Rynite trigger plates had sustained damage - a report is being written.

Completion of the PDS developed electronic fire control has been delayed until August 12.

Legal has been requested to give an opinion as to the legal ramifications of box magazine fed autoloading shotguns and their compliance with migratory game bird hunting laws.

Temporary tooling is being manufactured for molding M/870 Rynite® stocks. Samples with thin walls are expected in late August. The internal core tooling will then be modified to allow molding of thick wall stocks. This will enable us to determine the advantages and disadvantages of both types.

Parker

The prototype was returned to Ilion on July 21. Testing should begin the week of July 28.

RIFLE DEVELOPMENT

NBAR

The NBAR performance to date has not been satisfactory. To determine if the problems lie with the design or with the prototype manufacture, six rifles were carefully measured and field tested. A total of two malfunctions occurred, both related to the unlatching of the magazine box. Since these results are significantly better than previous testing, six additional rifles are being assembled to the same design. If these rifles pass a field function test without a malfunction design acceptance testing will begin.

RIFLE DEVELOPMENT - Contd.

Synthetic Long Stock

Choate's subcontractor will be molding initial samples the week of August 4. A Remington engineer will be in attendance for the molding, and to bring samples back to Ilion for testing, if the molding is successful.

Model 700 Kit Gun

Although the Kit Gun has long been transmitted to Production a second transmittal will be needed for the 7mm Rem. Mag. This rifle will have the standard 700 barrel contour and a butt plate.

Sniper Weapon System

This program represents a possible government contract for sniper rifles to replace the current Army sniper rifle. The Sniper Weapon System (SWS) will be a M/700 action with a heavy 416 stainless steel barrel, synthetic stock, steel trigger guard, and a special trajectory compensating 10 or 12 power riflescope capable of hits out to 800 meters. The SWS will also have a hard carrying case, back-up iron sights, and a cleaning kit. Four barrels are currently under consideration:

1. Remington Custom Shop 40X barrel in H2 configuration.
2. Remington GFM barrel in H2 configuration.
3. Mike Rock vendor barrel with 5R rifling.
4. H&S Precision vendor (current USMC sniper barrel)

Barrels are currently under fabrication and accuracy testing should start the week of 7/28/86. After the best barrel is selected, we will do comparison testing of stocks from Lee Six and H&S Precision to determine which is the best stock.

JWB:js

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JWB:js

Fire Control

- Disassembly - Safety Forces
- Pivot Bushing Rotating - Change Clearance

Box Lock

- Configuration
- Detenting

Accuracy

- Gallery
- XP-100 Test Fixture

| | <u>Go</u> | <u>No Go</u> |
|--------------------|-----------|--------------|
| 1 - Box Lock | X | ? |
| 2 - Det. Mag. Box | | X |
| 3 - Integral Mnts | X | |
| 4 - Extractor | X | |
| 5 - Fire Pin Assy. | | ? |
| 6 - Lock Time | X | |
| 7 - Adj. Trig Pull | X | |
| 8 - Safety | | ? |

RATHBONE CORPORATION

Palmer, Massachusetts 01069

413/283-8961

Fax 413/283-8722 Telex: 956336
cold drawn profile shapes and pinion rod

To Attn: Fred Martin
REMINGTON ARMS COMPANY
New Products Research
Ilion NY 13357

Date July 30, 1986
Refer to Quote 6251
Contact #11 - House
Inquiry No. RFQ letter dated 5/6/86
phone confirmation 7/30/86
315-894-9961 X-256



We thank you for your inquiry and offer the following quotation
which remains in effect for 60 days from date of quote.

ITEM Item No. 1 - Sear, Safety Cam - B/P D-93658
Item No. 2 - Trigger - B/P D-93650 - REGRET

MATERIAL COLD DRAWN 1018 Steel

TEMPER ☒ As Drawn ☐ Special

PRICES 2000 lbs./1120 ft. at \$6.70 ft.
(Including Boxing)

Est. Wt./Ft. 1.7860

Prices quoted are subject to adjustment at time of shipment
as provided under terms and conditions on reverse side.

SET UP (NON RECURRING) \$7980.00

LENGTHS 10-12 ft random mill

TOLERANCES to print - quoting without detail B - will be flat to allow
for finishing to required radius and surface finish - unspec-
ified acute corners .015 radius max.

SPECIAL REQUIREMENTS

DELIVERY Sample 16-18 weeks from receipt of an order.
Bulk to be determined at time of order.

Surface imperfections will not be considered cause for rejection unless their depth exceeds 2 1/4% of the thickness
of the section where they occur or 0.003" whichever is greater unless otherwise mutually agreed prior to order entry.

The opportunity to make this quotation is appreciated. If for any reason you consider it unsatisfactory,
we would welcome your comments.

PRICE AND DELIVERY TO BE CONFIRMED AT TIME OF ORDER.

F.O.B. PALMER, MASS., U.S.A.

Terms: 1/2% 10 days - net 30
SET UP CHARGES — NET

RATHBONE CORPORATION

Sales Department: nb
cc: #11 - House
SIC 3484

Form 10

RATHBONE CORPORATION

TERMS AND CONDITIONS

PRICES — The prices stated in the accompanying quotation shall be adjusted to the Seller's prices in effect at the time of shipment. If transportation charges from point of origin of the shipment to a designated point are included in the prices stated in the accompanying quotation —

(a) any changes in such transportation charges shall be for the account of the Buyer;

(b) except as otherwise stated in the accompanying quotation, the Seller shall not be responsible for switching, spotting, handling, storage, demurrage or any other transportation or accessorial service, nor for any charges incurred therefore, unless such charges are included in the applicable tariff freight rate from shipping point to the designated point.

TAXES — Any taxes which the Seller may be required to pay or collect, under any existing or future law, upon or with respect to the sale, purchase, delivery, storage, processing, use or consumption of any of the material covered by the accompanying quotation, including taxes upon or measured by the receipts from the sale thereof, shall be for the account of the Buyer, who shall promptly pay the amount thereof to the Seller upon demand.

DELAY — The Seller shall be excused for any delay in performance due to acts of God, war, riot, embargoes, acts of civil or military authorities, fires, floods, accidents, quarantine restrictions, mill conditions, strikes, differences with workmen, delays in transportation, shortage of cars, fuel, labor or materials, or any other cause beyond the reasonable control of the Seller.

INSPECTION — Unless otherwise specified and agreed upon, the material to be furnished pursuant to an accepted order resulting from the accompanying quotation shall be subject to the Seller's standard inspection at the place of manufacture. If the Buyer is to inspect, or provide for inspection, at the place of manufacture, such inspection shall be so conducted as not to interfere unreasonably with the manufacturer's operation and consequent approval or rejection shall be made before shipment of the material. Notwithstanding the foregoing, if, upon receipt of such material by the Buyer, the same shall appear not to conform to the contract between the Buyer and the Seller, the Buyer shall immediately notify the Seller of such conditions and afford the Seller a reasonable opportunity to inspect the material. No material shall be returned without the Seller's consent.

BUYERS REMEDIES — If the material furnished to the Buyer shall fail to conform to the contract between the Buyer and the Seller (whether in failing to comply with any express or implied warranty or any applicable specifications or to be within the Seller's standard practices, tolerances and variations or in any other way whatsoever), the Seller shall replace non-conforming material at the original point of delivery and shall furnish instruction for the disposition of such non-conforming material. Any transportation charges involved in such disposition shall be for the Seller's account.

The Buyer's exclusive and sole remedy on account or in respect of the furnishing of non-conforming material shall be to secure replacement thereof as aforesaid. The Seller shall not in any event be liable for the cost of any labor expended on any non-conforming material or for any special, direct, indirect or consequential damages to anyone by reason of the fact that such material shall have been non-conforming.

PERMISSIBLE VARIATIONS — Unless otherwise specified and agreed upon all materials shall be furnished subject to the Seller's standard practice, tolerances and variations. The Seller reserves the privilege of shipping overages and underages of weight, length, size and/or quantity in accordance with such of the Seller's standard practices as may be applicable to the material to be furnished as a result of the accompanying quotation.

TERMS OF PAYMENT — The terms of payment shown in the accompanying quotation shall be subject to approval of the Seller's Credit Department and shall be effective from date of invoice. The cash discount shall not be allowed on any transportation charges included in delivered prices, or setup charges.

Shipments, deliveries and performance of work shall at all times be subject to the approval of the Seller's Credit Department and the Seller may at any time decline to make any shipment or delivery or perform any work except upon receipt of payment or upon terms and conditions or security satisfactory to such Department.

COMPLIANCE WITH LAWS — The Seller intends to comply with all laws applicable to its performance of any accepted order resulting from the accompanying quotation.

RENEGOTIATION — The Seller assumes only such liability with respect to renegotiation of contracts or subcontracts to which it is a party as may be lawfully imposed upon the Seller under the provisions of the Renegotiation Act which shall be applicable to any accepted order resulting from the accompanying quotation.

TOOLS AND DIES ARE DESIGNED AND USED BY US AND ARE RESERVED FOR THE USE OF PARTIES BEARING THE INITIAL EXPENSE BUT THE OWNERSHIP THEREOF IS NOT CONVEYED BY REASON OF SUCH CHARGE.

ACCEPTANCE OF PURCHASE ORDERS — ANY PURCHASE ORDER PURSUANT TO THE ACCOMPANYING QUOTATION SHALL NOT RESULT IN A CONTRACT UNTIL IT IS ACCEPTED AND ACKNOWLEDGED BY THE SELLER'S GENERAL SALES OFFICE AT PALMER, MASSACHUSETTS.

BUYER'S ACCEPTANCE OF ABOVE CONDITIONS - ANY ACCEPTED ORDER RESULTING FROM THE ACCOMPANYING QUOTATION SHALL BE SUBJECT TO THE TERMS AND CONDITIONS HEREIN CONTAINED OR REFERRED TO IN THE SELLER'S ACCOMPANYING QUOTATION AND TO NO OTHERS WHATSOEVER. NO WAIVER, ALTERATION OR MODIFICATION OF THE CONDITIONS HEREIN CONTAINED SHALL BE BINDING UNLESS IN WRITING AND SIGNED BY AN EXECUTIVE OFFICER OR BY THE MANAGER OF SALES OF THE SELLER.

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

CC: W. H. COLEMAN, II
A. R. BASZCZUK

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

ILION, NEW YORK
AUGUST 8, 1986TO: GARY BEDWORTH RANDY MURPHY
BILL CURRY JIM SNEDEKER
FRED MARTIN

FROM: JIM BOWER

NBAR PROGRESS

The Test Lab is currently conducting a pre-design verification evaluation of the NBAR. Based on that testing, four of the design features appear to be satisfactory:

- o MIM integral scope mounts
- o Extractor
- o Lock time
- o Adjustable trigger pull

Three other items are questionable and require further investigation:

- o Bolt lock
- o Firing pin endurance
- o Safety (difficult to operate)

One item, the detachable magazine box, requires further development before design verification testing. Two conditions exist on the box which make it unsatisfactory. First, the box is very difficult to remove manually; and, secondly, the box occasionally drops out when the rifle is fired.

The NBAR is currently planned as a 1988 offering, and preliminary drawings have been given to PE&C for estimating. With development work still required on the magazine box, the viability of a 1988 introduction has been questioned. Several options have been identified, with the most probably introduction date for each:

- o Continue development of the current NBAR magazine. Complete design verification testing and transmit. Introduction would most likely be delayed until 1989.
- o Design a new detachable box similar to the Kwik-Klip design, but avoiding patent infringement. A 1988 introduction is possible.
- o Purchase the rights to the Kwik-Klip design. A 1988 introduction is probable.
- o Drop the detachable box as a design feature, and introduce in 1988.
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- o Jim Bower will review PE&C's timetable for being able to warehouse in time for a 1988 introduction.

-3-

- o Fred Martin will resolve the three design features that are still questionable.
- o The rifles currently in test will be shot through 2,000 rounds to determine if other problems exist.

The next meeting will be on Tuesday, August 19, at 8:30, in the Research Conference Room.

JWB:bjr

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
SUPPORTPETERS
SUPPORTCC: W. H. COLEMAN, II
A. R. BASZCZUK

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

ILION, NEW YORK
AUGUST 8, 1986TO: GARY BEDWORTH
BILL CURRY
FRED MARTINRANDY MURPHY
JIM SNEDEKERFROM: JIM BOWER
*Jim*NBAR PROGRESS

The Test Lab is currently conducting a pre-design verification evaluation of the NBAR. Based on that testing, four of the design features appear to be satisfactory:

- o MIM integral scope mounts
- o Extractor
- o Lock time
- o Adjustable trigger pull

Three other items are questionable and require further investigation:

- o Bolt lock - *New Parts Being Reduced Hgt.*
- o Firing pin endurance - *To be evaluated on Test Competition*
- o Safety (difficult to operate) - ?

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JWB:bjr

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
OUTPORT*PETERS*
OUTPORT

CC: File - NCS Fire Control
File - New Bolt Action Rifle
K. C. Rowlands
R. S. Murphy

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

ILION, NEW YORK
AUGUST 8, 1986

TO: W. H. COLEMAN

FROM: J. W. BOWER



FOCUS PANELS

During the week of July 27, Randy Murphy and myself, along with Bruce Rau and Bud Fini from Marketing, attended a series of focus panels in Denver, Dallas, and Kansas City. Two sessions were held in each city, one consisting of a panel of men who had hunted within the last year, and a second consisting of a panel of women who did not hunt, but whose husbands hunt regularly.

The objective of the focus panels was to determine:

- o Final styling characteristics of the NBAR
- o What hunters would like to see in new offerings
- o Why such a small percentage of women hunt
- o Reaction to the REFAS fire control

Marketing will be issuing a complete analysis of the focus panels, but some general observations were interesting, and should be passed along now.

In regard to NBAR styling, most people preferred a satin metal finish over the current, shiny finish. The exception was in Denver, where the shiny finish was preferred. Almost unanimously, the panelists preferred the bead blasted/black oxidized finish over powder coat. People responded that the powder coat represented inferior quality. It appears that a great deal of education will be required to have the powder coat accepted.

Research had added a cut to the receiver, opposite the ejection port, to make it look less like the Ruger. In spite of the fact that there was no other purpose for the cut, the panelists spent a lot of time debating the functional merit of it (some said it was a lightening cut, some said it would improve ejection). There was no consensus for the cut. With its additional manufacturing cost it will be dropped from the NBAR design.

The panelists in all three cities preferred the styling of the Ruger 77 to the NBAR. We still have the dilemma that has plagued us from the start on the NBAR - how to make it look different than either the Model 700 or the Ruger 77, when people like the appearance of both of those rifles.

There was very little response to the question of what new features the panelists would like to see in shotguns or rifles. Substituting synthetic stocks on centerfire rifles was mentioned in each city. Other comments included reducing weight, and reducing the price.

This section was disappointing. The panels suggested that the customer will react to what is offered, rather than demanding features. It is up to Remington (or others) to take the lead in innovation.

In the discussion with female panelists we had hoped to discover product related reasons why women don't hunt. What came out, however, were reasons that were sociological and psychological. There was some mention that guns were too heavy, or kicked too much. But the preponderance of women responded that they didn't hunt because they were never asked, or they had to get up too early, or there were no bathroom facilities, or it was too cold, etc. My suspicion is that if we asked men who didn't hunt the same question, we would have gotten the same answers.

The final set of questions were looking for a reaction to an electronic fire control (REFAS) that required inputting a code to make it functional, and that would automatically shut itself off after a given period of time. Here we got very consistent reactions. Of the male panelists, 20%-50% liked the fire control. Of the female panelists, 100% liked it. Put those reactions together with a similar poll taken of Research engineers, where no one liked it, and I believe that the less people know about guns, the more they will accept an electronic fire control.

The main reason it was accepted by the women was the added safety feature that was more likely to prevent their children from playing with a gun. Those people with a good familiarity with firearms took the approach that guns were not inherently unsafe, and the best approach to safety was education.

My conclusion from these discussions is that there is a market for an electronic fire control. It is probably a small market which will take a long time to grow substantially.

JWB:bjr

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



xc: Gary Bedworth
Bill Curry
Randy Murphy
Tom Bauman
Bob Kozakowski
Jim Stekl
Tim McCormack

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

August 18, 1986

TO: J.W. Bower

FROM: F.E. Martin

In response to the request made by the writer, the following list of desired performance features has been compiled.

Centerfire Bolt Action Features

- o Round bottom receiver
- o Electronic fire control/ammunition
- o Interchangeable barrels/calibers
- o Takedown rifle with a 2 piece stock
- o Improved bolt lift/less angle/less force
- o No 3-position safety
- o Bolt lock/independent of safety
- o Bolt release/on receiver out of trigger guard
- o Magazine release outside of trigger guard
- o Detachable magazine - *Rotary Magazine*
- o Steel trigger guard/no washers!
- o Better open sights
- o Integral mount with after market mounting capabilities

JW Bower
Page 2
August 18, 1986

Centerfire Bolt Action Features
(continued)

- o Anti-double feed mechanism
- o Stainless steel bolt
- o Recoil reduction/elimination
- o Noise reduction
- o Synthetic or wood stock
- o Maintenance free
- o Adjustable fire control
- o Complete owner/operator manual
- o Protective-enclosed fire control free from debris
- o 35 Whelan, 458 x 2", 458 x 1 1/2", 276 Rigby, .14 Bumble Bee

FEM:sps

xc: Gary Bedworth
Bill Curry
Randy Murphy — out
Tom Bauman
Bob Kozakowski
Jim Stekl
Tim McCormack
FRED EMMER

RD-61-B
REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

August 18, 1986

TO: J.W. Bower

FROM: F.E. Martin

In response to the request made by the writer, the following list of desired performance features has been compiled.

Centerfire Bolt Action Features

- o Round bottom receiver *opinion or experience based*
- ~~o~~ Electronic fire control *and* ammunition
- ~~*~~ Interchangeable barrels/calibers
- o Takedown rifle with a 2 piece stock
- o Improved bolt lift/less angle/less force *easily?*
- o No 3-position safety
- o Bolt lock/independent of safety
- o Bolt release/on receiver out of trigger guard
- o Magazine release outside of trigger guard
- o Detachable magazine
- ~~*~~ o Steel trigger guard/no washers!
- ~~*~~ Better open sights
- ~~*~~ o Integral mount with after market mounting capabilities

what can we pursue/integrate

JW Bower
Page 2
August 18, 1986

Centerfire Bolt Action Features
(continued)

- o Anti-double feed mechanism
- *o Stainless steel bolt
- ! Recoil reduction/elimination
- ! Noise reduction
- *o Synthetic or wood stock *Drop-in bedding important*
- ! Maintenance free
- o Adjustable fire control
- ! Complete owner/operator manual
- ! Protective-enclosed fire control free from debris
- o 35 Whelan, 458 x 2", 458 x 1 1/2", 276 Rigby, .14 Bumble Bee

FEM:sps

- Device to prevent closing bolt on empty chamber
- Improved Optics
 - integrated scope/rifle package
 - LED feedback

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington



PETERS



xc: Gary Bedworth
Bill Curry
Randy Murphy
Tom Bauman
Bob Kozakowski
Jim Stekl
Tim McCormack

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

August 18, 1986

1:30 m
Tuesday - 8/27
Following day

TO: J.W. Bower

FROM: F.E. Martin

In response to the request made by the writer, the following list of desired performance features has been compiled.

- why did we do this? 15 yrs ago? flat bottom receiver.*
- flat bottom receiver - established 700 accuracy.*
- min* ☐ **Centerfire Bolt Action Features**
- min* ☐ Round bottom receiver
- min* ☐ Electronic fire control/ammunition
- min* ☐ Interchangeable barrels/calibers
- min* ☐ Takedown rifle with a 2 piece stock
- ☐ Improved bolt lift/less angle/less force
- ☐ No 3-position safety
- ☐ Bolt lock/independent of safety
- ☐ Bolt release/on receiver out of trigger guard
- ☐ Magazine release outside of trigger guard
- ☐ Detachable magazine
- min* ☐ Steel trigger guard/no washers!
- min* ☐ Better open sights
- min* ☐ Integral mount with after market mounting capabilities *open sight, on receiver mounted scope base.*

Centerfire Bolt Action Features
(continued)

- o Anti-double feed mechanism
- ~~o~~ Stainless steel bolt >
- o Recoil reduction/elimination - *similar to Remington bolt action*
- o Noise reduction
- ~~o~~ Synthetic or wood stock
- o Maintenance free - *EPD coating*
- o Adjustable fire control
- o Complete owner/operator manual - *place in synthetic stock (or other place in rifle) to store manual.*
- o Protective-enclosed fire control free from debris
- o 35 Whelan, 458 x 2", 458 x 1 1/2", 276 Rigby, .14 Bumble Bee

FEM:sps

- o Follower stops so you can't close the bolt without removing the mag box or physically depressing the follower.
- o Improved optical package
- o grip/fore-end safety
- o rotary magazine box
- o synthetic bedding block in wooden stock.
- *mold-in-place.*

N' BAR 30-06

ON ALL Rifles Bolt Lock doesn't work
ON ALL Rifles Mag. Box would load wrong way

* GUN #1 - shell went under follower

GUN #2 - @ 1100 Rds piece of stock broke out at tang
@ 512 Rds Mag Box broke, @ 1625 Rds Mag box broke
@ 2200 Rds Stock cracked bottom rear trigger guard

GUN #3 - @ 2150 Rds Mag. Box broke

* GUN #4 - @ 600 Rds safety snap washed out of position, @ 600 Rds
replace fire control, no over travel, @ 2200 rds Stock
cracked at tang.

* GUN #5 - @ 800 rds change latch, @ 805 rds Mag Box broke

GUN #6 - @ 1550 rds set screw loose ^{front} causing FFM

Total Rds Fired on Each Rifle - 2,300
Total Rds Fired 13,800

* MAG Altered F.E.M to eliminate excessive movement

PAGE NO.: _____

TOTAL RDS FIRED: 100

TOTAL MALFUNCTIONS: 21

Malfunction Rate: $\frac{2}{2} 1.0\%$
ALL MALES.

[illegible]

FIELD CYCLE TEST RIFLES

TEST NO.: 3 REPORT NO.: _____

PAGE NO.: _____

DATE: 8-20-86 MODEL: N'BAR CALIBER: 30-06 SPES SERIAL NO.: XC0479PREVIOUS
ROUNDS
2200TEST TITLE: Field FunctionGUN # 4TOTAL RDS FIRED: 100TOTAL MALFUNCTIONS: 0MALFUNCTION RATE: 0

ALL MALFS.

MALF. RATE 1.0 %

| AMMUNITION Load Size | SHOOTER | NO. OF RDS. FIRED | FIRING | TRAPPED SHELL | DOESN'T EJECT | DOESN'T FLOW BACK | DOESN'T LOCK OPEN | FEED FROM MAGAZINE | SHELL JUMPS MAG. | BOLT STOPS SHELL MAG | DOESN'T LOCK UP | STEM CHAMBER | | | | MAG HELD. WORKS ERD. | STEM OVERHIDE | LOADS HARD | POWER OVERHIDE | ACTION RANGES UP | DOESN'T EXTRACT | BREAKAGES | ADJUSTMENTS | REPLACEMENTS | REMAINS ON BACK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | HIGH | LOW | RIGHT | LEFT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| R-125-FSP | 1 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | </ |

Box Unlatched Rm.

RIFLES

TEST NO.: 3

REPORT NO.: _____

PAGE NO.: _____

DATE: 8-20-86 MODEL: N'BAR CALIBER: 30-06 SPNG SERIAL NO.: XC0484

PREVIOUS TEST TITLE: Field Function

PREVIOUS
ROUNDS
2200

GUN #5

TOTAL RDS FIRED: 100

TOTAL MALFUNCTIONS: 0

MALFUNCTION RATE: 0

ALL MALES. 13.

MALE RATE 13.00%

[illegible]

RIFLES

TEST NO.:

REPORT NO. _____

PAGE NO.:

DATE: 8-20-86

MODEL: N'BAQ

CALIBER: 30-06 SPMS

SERIAL NO.: XC0485

PREVIOUS ROUNDS

TEST TITLE:

GUN # 6

TOTAL RDS FIRED:

TOTAL MALFUNCTIONS:

FAILURE RATE

ALL MALES

MALE RATE

[illegible]

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER

R2540234

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



CC: C. E. Ritchie
J. R. Snedeker
T. C. Douglas
K. S. Murphy
K. C. Rowlands
File-Monthly Reports

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

ILION, NEW YORK
AUGUST 26, 1986

TO: W. H. COLEMAN, II

FROM: *JW* J. W. BOWER

MONTHLY REPORT - NEW PRODUCT DEVELOPMENT - AUGUST, 1986

MODEL 11-87

Production has received samples of the new grip cap. Production of 2,000 shotguns is scheduled for October, with a total of 11,400 due in the warehouse by the end of the year.

NBAR

Based on 2,000 rounds of endurance and three field function tests on six rifles, the extractor, bolt assembly, firing pin assembly, and fire control all appear to be satisfactory. Problems remain with the feeding system and the bolt lock.

Several options are being investigated on the feeding system. The most promising appears to be a three-point contact box with a simplified front latch.

New bolt lock components should be out of the Model Shop by 8/27.

SYNTHETIC LONG STOCK (MODEL 700 SIERRA)

The molding vendor is waiting on a subcontractor to complete mold fabrication. Initial samples should be available in early September.

MODEL 700 KIT GUN

Transmittal of the 7MM Mag to Production is complete. Typesetting of the Stock Finishing Guide will begin this week, and finished Guides are expected for an October warehouse position.

SHOTGUN SLUG GUN DEVELOPMENT

A six inch section of a Hastings 1 in 34" twist rifled barrel was converted into a choke tube, and the following 5-shot groups were fired:

| <u>Ammunition</u> | <u>50 Yds.</u> | <u>100 Yds.</u> |
|-------------------|----------------|-----------------|
| BRI Sabot | 0.7 in. | 1.4 in. |
| Win. 1 oz. | 1.3 | 2.6 |
| Rem. 1 oz. | 2.6 | 9.5 |

Work is continuing with rifled choke tubes to determine length of rifling, bore and groove dimensions, and twist. (Rifled choke tubes had been tested previously with poor results. Part of the development program will attempt to determine the differences between those choke tubes and the current ones).

XP-100 IN 35 REM

Fourteen XP-100's with current manufacture Zytel stocks were sent to the Test Lab on August 21 for design acceptance testing. The actions were fired in the gallery accuracy device with the largest group being 2.5 in and the 14-gun average being 1.74 in.

Endurance testing of the Zytel stock remains to be done.

SNIPER WEAPON SYSTEM (M24 SWS)

The last vendor barrels were received August 21, and are being finished in the Custom Shop. Initial accuracy testing of four barrel types should be complete by August 29.

A draft of the Army's SWS specifications was received August 20. A list of questions is being compiled for a bidders meeting on September 8 in Dover, New Jersey. Terry Douglas, John Rogers, Bill Forsan, and Bruce Wincentzen will attend.

PARKER

The Parker concept gun has been function tested, drop tested, and returned to Kolar. Function testing uncovered a problem with the firing of the left barrel that appears to be minor. Kolar has been made aware of this, and has been asked to explain and resolve.

Jar-off and drop testing broke the stock and bent the frame. However, the gun did not fire. Kolar has been asked to inspect the action for damage.

NCS

PDS has encountered technical problems in their attempt to develop an electronically actuated hammer block (interposer) for the common fire control. They will supply a proposal, including a request for additional funding, to complete a revised prototype design.

A computer simulation of the Model 1100 locking system indicates that a 15° change in the locking angle will provide a smoother action, and reduce felt recoil. Parts are being fabricated to test.

The bolt/bolt carrier/action system, and the lower receiver for the NCS will be designed in such a way that they can accommodate either a box magazine or tubular feed. This will allow offerings to cover both anticipated markets.

Temporary tooling has been ordered for Model 870 synthetic fore-ends. Delivery of Model 870 synthetic stocks has been delayed until mid-September.

Parts for the following compensating gas system concepts are ready for testing:

- o flat washer pressure vent
- o cross hole pressure vent
- o 4-part M/11-87 pressure vent

JWB:bjr

REMINGTON ARMS COMPANY, INC.

ENGINEERING DEPARTMENT  COMPUTATION SHEET

CUPEND

COMPUTATION SHEET

SHEET NO

TITLE OF PROJ -

PROJ NO

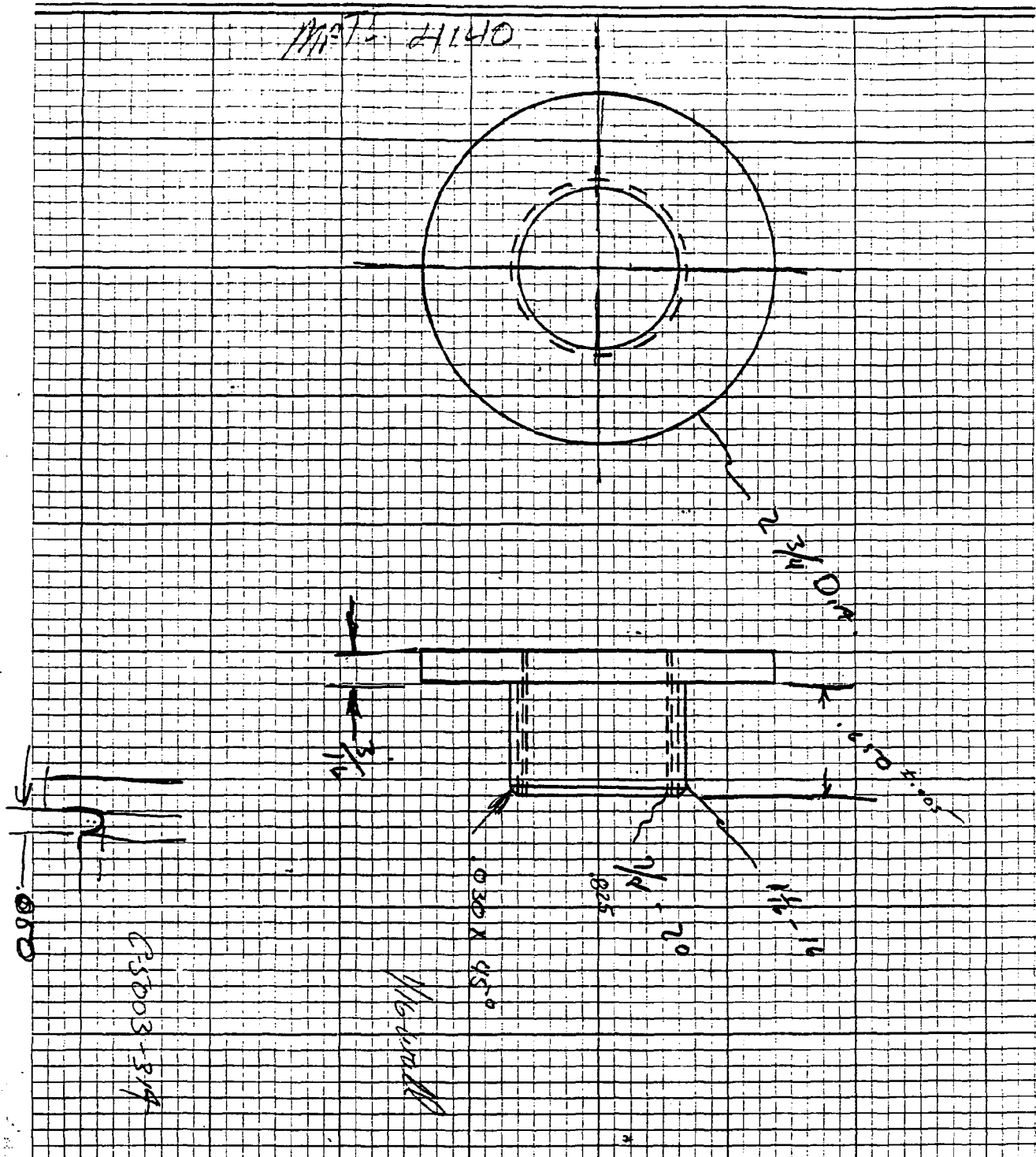
SUBJECT.

WORKS.

COMPUTER

DATE _____

- 19



REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

August 29, 1986

TO: J.W. Bower

FROM: F.E. Martin

New Bolt Action Bolt Lock

New bolt locks have been installed in the test rifles available. Stocks have been altered to allow for proper operation. Testing, dry cycle (hand operation) and twenty rounds per gun, results indicate better, but not optimum performance in the desired mode.

A discussion with Scott Franz regarding a proposed addition to the present design was acceptable. Also, a discussion with Randy Murphy produced a possible alternative.

Changes are being made to lower the profile, per WH Coleman. This may result in a minor change to the rear of the bolt handle.

I will be on vacation the first week of September. If at all possible, could the meeting covering prototype parts fabrication, scheduled for September 5, be changed to September 8? I would like to be present.

FEM:sps

BOLT BODY ASS'Y

| | .057 DIA. X / .060 | .247 DIM. X / .251 | .204 DIM. / .208 | .157 DIA. / .158 | .245 DIM. | .244 DIM. X / .250 -.0025 | .322 DIM. / .328 |
|------|--------------------------|--------------------------|---------------------|---------------------|---------------|------------------------------------|---------------------|
| 0449 | .062 | .251 | .2035 | .157 | .244 | .2415 | .316 |
| 0450 | .062 | +.001 .252 | .2045 | .157 | .244 | -.004 .240 | -.005 .317 |
| 0451 | .061 | .249 | +.003 -.211 | .157 | +.002 .247 | .248 | .322 |
| x 1 | .060 | .249 | .204 | .157 | | -.005 .239 | |
| 2 | .060 | .248/.252 | -.001 -.197 | .157 | -.001 244 | -.009 .235 | -.008 .314 |
| 3 | .061 | .248 | -.009 -.200 | .157 | | -.002 .242 | |
| 4 | .060 | .251/.2525 | -.004 -.200 | .157 | -.001 .244 | -.005 239 | -.005 .314 |
| 5 | .060 | .248 | .207 | .157 | | -.002 .242 | |
| 6 | .060 | .248/.253 | -.005 -.199 | .157 | -.002 .243 | -.004 .238 | -.005 .317 |
| 7 | .060 | .250 | -.002 -.202 | .157 | | -.006 .238 | |
| 8 | .060 | .251 | -.002 -.202 | .157 | | -.004 .240 | |
| 9 | .060 | .252 | -.001 -.203 | .157 | | -.003 .241 | |
| 10 | .061 | .247/.251 | -.001 -.203 | .157 | .245 | -.004 -.240 | -.005 .317 |

Rec
Rec - 18 Custom Shop

6 Remington - Chambered Remington

Stocks - Rec

Barrels - .30 Cal 6

.370 Cal 8

.280 Cal 14

Extractors - Std. 21 Std. Old Style

Mag. 0

Bolts - 25 - EXTRACTOR

Bolt Stops 24

Bolt Stop Pin 16

Bolt Plugs 30

Firing Pin Assy 30

Trig Assy - 24

Need - EXTRACTORS

Bolt Locks

300 WBY Copper CRUSHER
26"

EXTRACTOR
#1100 - #1200

Indium

Steve LaCross

REMINGTON ARMS COMPANY, INC.

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FEM:aps

~~W. L. Coleman~~
2) File - New Bolt Action Rifle

CC: J. W. Bower
R. S. Murphy
B. W. Rau

Wilmington, DE 19898
September 2, 1986

E. O. FINI

SHOULDER ARMS EXPLORATORY GROUP SESSIONS

At the end of July, six group sessions were held in Denver, Dallas and Kansas City. In each city two groups were held, one with men who hunt with both a shotgun and center fire and one with women whose husbands hunt but they don't.

The purpose of the male sessions was to identify new product concepts; obtain a reaction to the REFAS concept (electronic fire control) and to further assess NBAR styling/feature options.

The purpose of the female sessions was to assess the reasons why more women don't hunt as well as obtain a reaction to the REFAS concept.

Please keep in mind that the results of these sessions are meant to provide direction only and are not scientifically projectable to the United States as a whole.

Male Sessions

- For the most part, the men in these sessions were satisfied with the shoulder arms they owned, very few could indicate anything they seriously disliked about the guns with which they hunt.
- When pressured, they would mention they wanted a "lightweight" gun or one that was more "accurate".
~~It appears to be extremely difficult to get the average consumer to either visualize or verbalize what they would like to see new in shoulder arms.~~

- A number of NBAR styling considerations were also evaluated. The first to be evaluated was the metal finish (shiny vs. bead blast). Of the thirty-three (33) men in the sessions, 20 preferred the flat bead blast finish while only twelve (12) preferred the shiny finish. The preference for a flat bead blast finish was particularly strong in Dallas where all participants picked bead blast. (See Table 1)
- When another form of flat metal finish was evaluated (powder coat), it was slightly preferred over a shiny finish in total (18 vs. 14 respectively). (See Table 2)

*significant cost
wanting to powder coat
need to educate people
that it is not an
inferior finish.*

However, when the two flat finishes were evaluated (bead blast vs. powder coat), bead blast was preferred by a wide margin (17 vs. 4). *The participants felt the powder coat finish looked "painted on". (See Table 3)

- In order to help make the NBAR receiver look different from the current M/700 and Ruger M/77 receivers, Research took some metal out of the NBAR receiver opening (scallop cut). When this styling feature was evaluated vs. the current M/700 receiver, the respondents reacted rather indifferently. (See Table 4)
- When the shape of the NBAR receiver was compared to the current M/700, the NBAR was slightly preferred (swayed by Kansas City). It must be mentioned, however, that the NBAR receiver had a flat finish and integral scope mounts, while the current M/700 receiver was shiny and did not have integral scope mounts. The Kansas City respondents reacted very positively to the integral scope mounts on the NBAR receiver. Many of those who picked the NBAR receiver liked the highly machined and "worked on" look the integral scope mounts gave the NBAR receiver without really knowing its purpose.
- It would be safe to hypothesize that had the M/700 receiver been evaluated with a flat finish and integral scope mounts it would have been preferred over NBAR receiver. (See Table 5)
- The receiver shape of the NBAR was also evaluated versus the Ruger M/77. Here, the M/77 (with integral scope mounts) was overwhelmingly preferred. Those who preferred the M/77 felt it had "more metal", "looks stronger" and "had more detail". (See Table 6)

*The M/77 also
has a shiny
finish*

*This comparison was not conducted in Denver.

- The results on Table 5 and 6 indicate that the NBAR receiver configuration does not generate as much consumer acceptance as the two most popular existing receiver configurations - the M/700 and the M/77.
- The men in these sessions were also exposed to the concept of an electronically fired shoulder arm. Generally, this idea met with considerable resistance. These men felt that the addition of "high tech" elements to guns was "just one more thing to go wrong". Furthermore, many stated that they go hunting to get away from the "high tech" world they live in everyday.
- There was also a great deal of concern that rain or an electrical storm could either inactivate the electronic gun or cause it to fire (in the case of lightning) inadvertently.
- A prototype shotgun with a mock-up of an electronic safety was shown to the participants. They were told that a secret code had to be programmed into the gun, via a series of dip switches, to get the gun to function. Furthermore, after 12 hours the gun would automatically shutdown. This concept also met with resistance but less than the electronic ignition. Many men felt guns were safe enough now if you know how to handle them.
- The issue of being theft proof was raised in that a thief would probably not steal a gun with an electronic safety because the code would be known only to the owner. Some respondents agreed, however, others felt that someone would eventually devise a way to figure out the code.

Female Sessions

- Discussions with women who don't hunt (but whose husbands do) indicated that the reason they don't hunt is not related to product issues.
- It appears that women don't hunt because of psychological, sociological and physical reasons.

- Very few women were against the activity of hunting (killing an animal) on moral grounds. They do not participate because:
 - hunting is done in cold/inclement weather conditions
 - hunting, particularly deer hunting, is too solitary (no one to talk to)
 - women like modern conveniences (no toilets in the woods)
 - someone has to mind the children
 - their husbands go hunting with other men, they (the women) would feel out of place.

*There seems to be
one woman who knows
about guns, she has
one likes an electronic
safety.*

The women were also exposed to the electronic safety concept. Here it met with greater acceptance. The female participants saw considerable merit in a gun which shuts itself off in 12 hours:

J. H. Chambers
J. H. CHAMBERS

JHC/tvm

TABLE 1

METAL FINISH - SHINY VS. BEAD BLAST (FLAT)

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|-------------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer Shiny | 12 | 7 | - | 5 |
| Prefer Bead Blast | 20 | 4 | 9 | 7 |
| No Preference | 1 | 1 | - | - |

TABLE 2

METAL FINISH - SHINY VS. POWDER COAT (FLAT)

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
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| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|--------------------|--------------|---------------|---------------|--------------------|
| | (21) | | (9) | (12) |
| Prefer Bead Blast | 17 | NA | 6 | 11 |
| Prefer Powder Coat | 4 | NA | 3 | 1 |
| No Preference | - | NA | - | - |

TABLE 4

SCALLOP CUT VS. NO SCALLOP CUT

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|-----------------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer Scallop Cut | 11 | 6 | 1 | 4 |
| Prefer No Scallop Cut | 10 | 2 | 5 | 3 |
| No Preference | 12 | 4 | 3 | 5 |

TABLE 5

RECEIVER SHAPE - NBAR VS. M/700 CLASSIC

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|----------------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer NBAR | 18 | 5 | 3 | 10 |
| Prefer M/700 Classic | 15 | 7 | 6 | 2 |
| No Preference | - | - | - | - |

TABLE 6

RECEIVER SHAPE - NBAR VS. RUGER M/77

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|---------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer NBAR | 4 | - | 3 | 1 |
| Prefer M/77 | 25 | 11 | 5 | 9 |
| No Preference | 4 | 1 | 1 | 2 |

CC: J. W. Bower
R. S. Murphy
B. W. Rau

Wilmington, DE 19898
September 2, 1986

E. O. FINI

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J. H. CHAMBERS

JHC/tvm

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|-------------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer Shiny | 12 | 7 | - | 5 |
| Prefer Bead Blast | 20 | 4 | 9 | 7 |
| No Preference | 1 | 1 | - | - |

TABLE 2

METAL FINISH - SHINY VS. POWDER COAT (FLAT)

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|--------------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer Shiny | 14 | 7 | - | 7 |
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TABLE 3

METAL FINISH - BEAD BLAST VS. POWDER COAT

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
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| | (21) | | (9) | (12) |
| Prefer Bead Blast | 17 | NA | 6 | 11 |
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| No Preference | - | NA | - | - |

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| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|-----------------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer Scallop Cut | 11 | 6 | 1 | 4 |
| Prefer No Scallop Cut | 10 | 2 | 5 | 3 |
| No Preference | 12 | 4 | 3 | 5 |

TABLE 5

RECEIVER SHAPE - NBAR VS. M/700 CLASSIC

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|----------------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer NBAR | 18 | 5 | 3 | 10 |
| Prefer M/700 Classic | 15 | 7 | 6 | 2 |
| No Preference | - | - | - | - |

TABLE 6

RECEIVER SHAPE - NBAR VS. RUGER M/77

| | <u>TOTAL</u> | <u>DENVER</u> | <u>DALLAS</u> | <u>KANSAS CITY</u> |
|---------------|--------------|---------------|---------------|--------------------|
| | (33) | (12) | (9) | (12) |
| Prefer NBAR | 4 | - | 3 | 1 |
| Prefer M/77 | 25 | 11 | 5 | 9 |
| No Preference | 4 | 1 | 1 | 2 |

9-9-86

To SWB
From RSM

Subject: 1987 Program Goals and Timing

A NBAR

To complete the development and support the processing (and production efforts) as well as develop future calibers and improvements in a way that recognizes and meets the needs of our customers so that company goals are met

Goals: - Improved bedding system with integral recoil lug (resulting in improved accuracy)

- detachable magazine
- independent bolt lock
- improved firecontrol
- improved bolt assembly

Personnel: Randy Murphy .2

Fred Martin .5

Design Team/Hit Squads as required

Bedding/Receiver Timing

Determine Bedding System

Mid Sept

Design By Committee

Begin Proto Feb. (6)

Mid Oct

Engineering Evaluation Starts

Mid Nov

Proto Feb. (24)

Dec.

Begin Acceptance Testing

March

Transmit

May

Magazine Timing

Determine Magazine Box Design ⁴ Persee Oct 1

Build Proto (10)

Nov 1

Test/Redesign by Committee

Dec 1

Order Vanded Castings ^{Box} (50)

Dec

Fabricate Reliable Sample (30)

Feb

Engineering Evaluation

Mid Feb

Acceptance Testing

March

Bolt Lock Timing

Investigate Alternative Designs

Sept. 19.

Design Complete

Nov 1

Fabricate Prototypes (6)

Dec 1

Test

Mid Dec

Fab. Reliable Sample (30)
(Injectalloy, vendor, etc)

Mid Feb

Engineering evaluation

March

Acceptance Testing

March

B. Mountain Rifle Short Action

to expand the Mountain Rifle in a way that satisfies the needs of production and marketing so that program timing makes sense and we are ahead of schedule for once.

Goals :- new stock former

- three caliber additions
- minimize development expense
- undercut budgeted expenditure

Personnel : Randy Murphy .1
Fred Martin .1
Bob Sanzo .2

Develop Former 1Q 87

Build Prototypes and Design 2Q 87
Acceptance test

Transmit 2Q 87

B. Low Cost Rimfire Rifle

to develop a low cost replacement for the Nylon 66 in a way that recognizes the budget and priority constraints in Research and Production so that Remington's product line and profits are enhanced.

Goals: - retail price under \$100.

- autoloading

- disposable (?) pre-loaded 50 round magazine

- synthetic stock

- sourced components as required

Personnel Randy Murphy .1

Jim Konkainen .2

Tom Plunkett .2

Irv Truax

Investigation/Design/Economics 1Q 87

Prototype Fabrication 2Q 87

Engineering Evaluation/Redesign 3Q 87

Processor Quotations to
Supply Assembled Rifles 4Q 87

B. Parker

to coordinate a program to accomplish the outsourced manufacture, and assembly, and in-house test pack and shipment of this shotgun in a way that identifies and capitalizes on the vendors and Remington's strengths so that Remington's reputation of quality and craftsmanship will be enhanced.

Goals: - B Grade Parker

- modern mechanism that satisfies current safety requirements
- hard case included

Personnel: Randy Murphy .25

Jim Bowser

Jim Smedeker

Jim Martin

} as required

Receive 6 Parker Prototypes

1Q 87

Solicit Quotes on Drawing Package

1Q 87

Test

2Q 87

Order Production Start-up

June 87

Trial and Pilot

4Q 87

Product Available

1Q 88

C: 3200 Improvement

To coordinate the outsourced development of a 3200 based competition shotgun family in a way that minimizes development and production expenditures so that a profit can be made recognizing that we are targeting a limited market.

Goals: to develop a moderately priced competition shotgun family

- features to be determined (will include those demanded by serious competitors)

Personnel:

Randy Murphy .15

Scott Franz .1

Jim Bauer

Jim Sneider

Bud Finn

} As Required

9-19-86

To: SWB
From: RSM

Subject: September Quarterly Report

NBAR

A new bolt action rifle is being developed to compliment the Model 700 BDL. Introduction is scheduled for mid-1988 or 1989. Technical improvements include a safety to block both the sear and trigger, a detachable magazine box, an improved extractor, a lightweight firing pin, an enclosed bolt plug, an independent bolt lock, and integral scope mounts.

As a result of a meeting of Remington bolt action rifle experts a new technical feature will be added to this rifle. To improve accuracy a new bedding system will be incorporated into the design. Task force recommendations to solve the magazine box and bolt lock problems are being pursued and a program has been developed to coordinate the development of these improvements.

Synthetic Long Stock (or Model 700 RS)

An injection molded Kynile synthetic long stock is being developed as a high value, low cost supplement to our Model 700 BDL for 1987. Our primary goal is to ensure reliable rifle accuracy in all temperature and humidity conditions in production volumes at a fraction of the cost of our current long stock. Stable accuracy in all environments currently is only available through the use of expensive handmade fiberglass stocks or time consuming glass bedding.

Choate Machine and Tool Company has been selected to be our vendor for 1987 and development of tooling is in progress. Difficulties in mold fabrication have delayed the delivery of prototype stocks to Remington. Pending any further setbacks, stocks are expected in late September for evaluation. Successful testing will allow production to the warehouse in 4Q86 for a 1987 catalog introduction.

Model 700 Gun kit

Remington as a company is increasingly becoming niche-oriented as we are willing to pursue smaller market segments. To satisfy the needs of the cost conscious hunter who desires to affordably customize a rifle, the 700 Gun kit is scheduled for introduction in 1987. Our objective is to offer a completely tested Model 700 ADSL barreled action in 243, 308, 270, 30-06 and 7mm Rem Mag. assembled in a machined, unfinished stock. The customer has the option of customizing the stock configuration, stock finish, checkering pattern, etc. to his personal specifications. Marketing and Process indicate that this product can be introduced with little risk and no capital investment.

This rifle has been transmitted to production. Formal economics and a stock finishing guide are being prepared. Warehouse of the first production run is expected in January 87.

Parker

To coordinate a program to accomplish the outsourced manufacture and assembly, and in-house test, pack and shipment of this shotgun in a way that identifies and capitalizes on the vendors and Remington's strengths so that Remington's reputation of quality and craftsmanship will be enhanced.

A request for quotation has been in place with the vendor for prototype and production cost estimates since May. This has delayed the start of the prototype fabrication to a point where completion by year's end is doubtful. A meeting with the vendor is planned for the near future and a complete set of drawings of the latest design will be procured to investigate alternate vendors.

C. 3200 Improvement

To coordinate the outsourced development of a 3200 based competition shotgun family in a way that minimizes development and production expenditures so that a profit can be made recognizing that we are targeting a limited market.

A contract has been placed and "concept guns" are

CONFIDENTIAL

RD-40-B

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington


PETERS


cc: J. W. Bower
C. E. Ritchie
J. C. Hutton
W. L. Ericson
J. R. Snedeker
File-Quarterly R & D Report

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

ILION, NEW YORK
SEPTEMBER 25, 1986

TO: L. F. NONEMAKER

FROM: W. H. COLEMAN, II



**REMINGTON RESEARCH
AP & PP DEPARTMENTS
QUARTERLY R & D DIVISION REPORT**

MODEL 11-87 AUTOLOADING SHOTGUN

Research completed evaluation of Production's trial and pilot sample, and found it acceptable. Production has been released to manufacture product to the warehouse.

A reduction in Model 11-87 specifications was agreed to at a September 12 meeting of Marketing, Production, and Research. The field grade version will be dropped from the line, with the Premier spec. absorbing that volume. This decision was based primarily on anticipated economics in stock and fore-end processing. Pricing of the Premier is being adjusted accordingly.

SYNTHETIC STOCKS AND FORE-ENDS

The initial Rynite ® stock offering will be on the Model 700RS centerfire rifle. Injection molded Rynite ® will provide the functional performance of fiberglass at a manufacturing cost one-third less than walnut. The product will be included in the 1987 catalogue. Introduction of Rynite ® stocks and fore-ends on shotguns will follow in 1988 or 89.

QUARTERLY R & D DIVISION REPORT

SEPTEMBER 25, 1986

PAGE 2

SYNTHETIC STOCKS AND FORE-ENDS (CONT'D)

Initial samples of Model 700 RS stocks will be molded by our Arkansas vendor on September 25. Samples will be returned to Ilion immediately for testing.

NEW BOLT ACTION RIFLE (NBAR)

A new bolt action rifle is being developed to replace the Model 700 BDL. Technical improvements include a safety to block both the sear and trigger, a detachable magazine box, an improved extractor, a lightweight firing pin for improved lock time, an independent bolt lock, and integral scope mounts.

Research has changed the project scope to include improved accuracy of the NBAR, to a level significantly better than the Model 700 line, by incorporating a bedding system which will be unique in production rifles. Introduction of the NBAR is presently scheduled for mid-1988 or 1989.

Bedding systems for either a round or flat bottom receiver are being investigated. Concepts include a molded synthetic block to be inserted into a wood stock, a foamed-in-place synthetic block, or an aluminum bedding block.

SLUG GUN DEVELOPMENT

Slug shotguns are used for hunting deer, as are centerfire rifles. Many areas do not allow centerfire rifles because of population densities. It is anticipated that more and more areas will restrict rifles, making slug guns increasingly popular. This program is aimed at developing a slug gun with 75-100 yard accuracy that approaches that of centerfire rifles.

Testing of rifled choke tubes indicates that a choke tube can stabilize a shotgun slug. Testing is underway to determine the length of rifling, bore and groove dimensions, and twist.

QUARTERLY R & D DIVISION REPORT

SEPTEMBER 25, 1986

PAGE 4

RECEIVER FLEXIBLE MANUFACTURING SYSTEM (CONT'D)

positioning scale has delayed start-up approximately three weeks. The machine will be ready for development use by 9/19/86. Continuation of establishing tool life values and operating parameters for the production process will resume immediately. A second stand alone machine has been pre-purchased, and is now being installed to provide additional capacity needed in order to develop NC programs and processes in time for the Phase 2 and 3 projects. This machine originally scheduled for purchase under Phase 3 will be put into production use upon completion of all development work.

WHC:bjr

RD-44-B

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
SUPER

PETERS
SUPER

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

File - Quarterly Report VERSION B
(NOT used)

T. F. L. [unclear]

ILION, NEW YORK
SEPTEMBER 2, 1986

TO: W. H. COLEMAN, II

FROM: W. L. ERICSON

Item for Quarterly R & D Report

New Products Research continues its substantial efforts in contributing to the defense of product liability litigation. One senior engineer and one designer devote the bulk of their time to appearing as expert witnesses at trials; to responding to plaintiffs' interrogatories and requests for documents; to developing exhibits and product tests to be used as evidence; and to participating in the development of the technical aspects of Remington's defense strategies. They appeared as defense witnesses in six major trials in the past quarter, ~~including the Lugo (M/788), Head (M/7400), Atchley (M/7400), Boughtman (M/1100), Lewy (M/700) and Simpson (M/522) trials.~~

New Products Research also affords the facilities and personnel of the Photo and Test Lab for conducting examinations of firearms in litigation, and of the Model Shop for preparing cutaway firearms and other trial exhibits.

W. L. Ericson

WLE:bjr

VERSION A

RD-49-B

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

August 29, 1986

TO: W.H. Coleman, II

FROM: W.L. Ericson

Item for Quarterly R & D Report

As you requested, I would suggest the following item for inclusion in the report:

New Products Research continues its substantial efforts in contributing to the defense of product liability litigation. In the past quarter, expert witnesses from Research were instrumental in the successful defense of the Lugo v. Remington (M/788) and Head v. Remington (M/7400) trials. Although the Atchley v. Remington (M/7400) trial terminated with a hung jury, eleven of the twelve members of the jury were convinced that Remington was blameless. Research personnel also exerted great diligence in the defense of the Baughtman v. Remington (M/1100), Lewy v. Remington (M/700) and Simpson v. Remington (M/552) trials. Although these three trials ended with either adverse judgments or settlement payments, the amounts of these unavoidable losses may have been greatly reduced by the efforts of the Remington witnesses.

W.L. Ericson

WLE:sps

CONFIDENTIAL

TC Douglas

RD-49-B

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington


PETERS


cc: J. W. Bower
C. E. Ritchie
J. C. Hutton
W. L. Ericson
J. R. Snedeker
File-Quarterly R & D Report

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

ILION, NEW YORK
SEPTEMBER 25, 1986

TO: L. F. NONEMAKER

FROM: W. H. COLEMAN, II



**REMINGTON RESEARCH
AP & FP DEPARTMENTS
QUARTERLY R & D DIVISION REPORT**

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QUARTERLY R & D DIVISION REPORT

SEPTEMBER 25, 1986

PAGE 2

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QUARTERLY R & D DIVISION REPORT

SEPTEMBER 25, 1986

PAGE 3

SNIPER WEAPON SYSTEM

The Firearms Business Team has decided to take a more aggressive approach to military contracts. The M24 Sniper Weapon System is a new rifle/optics system for the United States Army. Research is putting together a concept rifle based on the Model 700 action.

Terry Douglas, John Rogers, Bill Forson, and consultant Bruce Wincentzen attended a bidders meeting September 8 in Dover, New Jersey. Revised specifications were issued and technical questions were addressed. It is anticipated that the Request for Proposal (RFP) will be issued on October 1, with bidders responses due by November 15.

NEW CONCEPT SHOTGUN

The Model 870 and Model 1100 have been in the line since 1950 and 1963 respectively. This program will replace both of these models, probably in the early 1990's, with new products that will utilize state-of-the-art technology and materials. While this is principally a shotgun program, developments coming out of it are expected to also be implemented into centerfire and rimfire rifles. Major objectives of this program have been defined as:

- o Improved Cost/Value relationship.
- o Reduced recoil & muzzle jump.
- o Reduced weight.
- o More extensive application of Biotechnology or Human engineering the Man/Gun interface.
- o Safety innovations.

RECEIVER FLEXIBLE MANUFACTURING SYSTEM

The R&D stand alone T-10 CNC machining center originally installed at EDL for developing NC programs and processes for the commercial system, has been relocated in the new Building 65 at Ilion. The machine shipped in late July was expected to be ready for use the first week of September, but difficulties with grouting of the machine, alignments and a defective Ferrand

QUARTERLY R & D DIVISION REPORT

SEPTEMBER 25, 1986

PAGE 4

RECEIVER FLEXIBLE MANUFACTURING SYSTEM (CONT'D)

positioning scale has delayed start-up approximately three weeks. The machine will be ready for development use by 9/19/86. Continuation of establishing tool life values and operating parameters for the production process will resume immediately. A second stand alone machine has been pre-purchased, and is now being installed to provide additional capacity needed in order to develop NC programs and processes in time for the Phase 2 and 3 projects. This machine originally scheduled for purchase under Phase 3 will be put into production use upon completion of all development work.

WHC:bjr

SYNTHETIC STOCKS

JWB
10/14/86

LONG STOCKS

- MODEL 700 RS
- BDL ACTION
- MOUNTAIN RIFLE SHAPED STOCK
- LONG ACTION CALIBERS
 - 30-06
 - 270
 - 280
- 1987 CATALOG
- ACTION ITEMS
 - COMPLETE MOLD ALTERATIONS OCT. 22
 - ASSEMBLE ACTION WITH PACHMYER PAD OCT 23
 - COMPLETE MOLD FOR GRIP CAP NOV 15
 - COMPLETE MOLD FOR RECOIL PAD DEC 15
 - COMPLETE TESTING AND EVALUATION JAN 15
 - RESOLVE CAMOFLAGE SUPPLIER NOV 15
 - GET CHOATE TO SIGN CONTRACT OCT 30
 - DETERMINE 1988 SYNTHETIC STOCK OFFERING JAN 15
- OTHER STOCKS
- NBAR
 - CONSIDERATION TO OFFERING NBAR WITH ONLY SYNTHETIC STOCK IN FIRST YEAR. WILL AT LEAST BE AN OPTION.
- ADL ACTION
 - CURRENT STOCK MOLD OK. SECONDARY OPERATION NOW OPENS UP FLOOR PLATE AREA.
- SHORT ACTION CALIBERS
 - SMALLER VOLUME DIFFICULT TO JUSTIFY MOLD COST
 - CHALLENGE - FIND A WAY TO REDUCE MOLD COST!
 - CAN WE USE TEMPORARY MOLD?
 - IS THERE SUCH A THING AS A DISPOSABLE MOLD?

SHORT STOCKS AND FOREENDS

- MODEL 870
- STOCK
 - INITIAL SAMPLES RECEIVED; MOLD ALTERATIONS BEING MADE(TEMP MOLD)
- ACTION ITEMS
 - COMPLETE HARDWARE FOR CURRENT SAMPLES
 - TEST CURRENT SAMPLES
 - COMPLETE MOLD ALTERATIONS
 - TEST NEW SAMPLES
 - COLOR-DEC WOOD STOCK AND FOREEND FOR MARKETING REVIEW
- FOREEND
 - TEMPORARY TOOLING BEING BUILT
- ACTION ITEMS
 - COMPLETE TEMPORARY TOOLING
 - TEST SAMPLES
 - MOLD ALTERATIONS(AS NEEDED)
- GENERAL
 - BUILD PROTOTYPES FOR DESIGN ACCEPTANCE TESTING
 - SAMPLES IN BLACK, COLOR-DEC CAMO, COLOR-DEC WOOD GRAIN?
 - DESIGN ACCEPTANCE TESTING
 - REVIEW MARKETING STRATEGY WITH FINI/RAU

To: JWB
From: RSM

10-30-86

Subject: October/November Monthly Report

NBAR

The task force recommendations to solve the magazine box and bolt lock problems and implementation of the improved bedding system is being pursued and schedules to meet the program goals are being met. Close attention is being paid to the receiver and stock progress through the Model Shop.

Specifically:

- Ronkainen magazine system in Model Shop
- Calkins magazine system in Model Shop
- Mod-kwik Rip system started.
- Set-screw bolt lock override; bolt plugs and locks complete, need to be colored, set screws in Model Shop
- Rynik bedding inserts for flat bottom receivers molded.
- Bedding inserts in Model Shop to be altered for round bottom receivers
- Round bottom receivers in Model Shop
- Stocks for bedding system testing in N/C
- Inletting samples expected from N/C for adhesive testing

- Kwik Klip/Trexler meeting planned

M/700 RS Longstock

Choate Machine and Tool Company has been selected to be our vendor for 1987 and development of tooling is significantly behind schedule. They have assured us that prototypes will be molded on 12/31, however this remains to be seen. The status of the grip cap, stock insert and butt pad is unknown.

Preliminary accuracy and strength testing has given promising results and I expect future prototypes will perform similarly.

M/700 Gun Kit

This rifle has been transmitted to production. The balance of the stock finishing guide should be typeset by 1/7 so that guides will be on hand for a 1/87 production run (if required).

Parker

A request for quotation has been in place with Kolar for prototype and production cost estimates since May. They have been asked to give us a firm date to expect their estimates.

I will call on 1/31 for that date.

The ejector system has been redesigned and is in the Model Shop.

3200 Improvement

A contract has recently been placed with Kolar for concept guns incorporating a number of improvements. Opposite the recent dealings with Gamba as well as the Parker program progress I feel that this program should be reviewed.

Mountain Rifle Short Action

For your info. a new Mountain Rifle stock has been started in the N/C shop.

Note: Pending any severe schizophrenic tendencies on my part the rifle group should not have any more personnel problems.

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington*PETERS*

xc: T. C. Douglas
R. S. Murphy
K. C. Rowlands
C. E. Ritchie
J. R. Snedeker
File-Monthly Reports

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

ILION, NEW YORK
NOVEMBER 3, 1986

TO: W. H. COLEMAN, II

FROM: J. W. BOWER

NEW PRODUCTS DEVELOPMENT MONTHLY REPORT - OCTOBER

MODEL 11-87 AUTOLOADING SHOTGUN

Production has begun to put product in the warehouse.

SYNTHETIC STOCKS AND FORE-ENDS

Initial samples of Model 700 RS stocks, molded by Choate, have been shot, and performance is within program criteria. The samples displayed cosmetic blemishes which are being corrected with mold revisions. Choate was molding again on October 31. A Research person is in Arkansas to assist Choate as needed, and to bring stocks back to Ilion.

One of the original stocks, with cosmetic blemishes, is being reworked in the Model Shop to remove the blemishes. It will be fitted with an action and be available for the writers seminar.

A small quantity of prototype synthetic Model 870 stocks have been molded and are being strength tested. The temporary tooling is being modified to correct minor imperfections. When complete, the mold will be shipped to the texturing vendor.

SNIPER WEAPON SYSTEM

Remington's proposal to the Department of the Army is due on November 14, along with eight sample rifles. The only remaining design questions pertain to the fire control, specifically trigger pull and safety on-off force. Product is in test to satisfy Army specifications. If unsuccessful, we will take exceptions and fall back to the standard Model 700 or 541-X design.

A meeting was held on October 31 to develop a plan for completing the paperwork by November 14.

NBAR

Task forces recommendations on the magazine box, bolt lock, and bedding are being pursued. Schedules to meet program goals are being met. Specifically:

- o The Calkins and Ronkainen magazine designs are in the Model Shop.
- o Bolt plugs and locks are complete, less color, for the set-screw bolt lock override. Set screws are in the Model Shop.
- o Rynite bedding inserts for flat bottom receivers have been molded.
- o Bedding inserts for round bottom receivers are in the Model Shop for alterations.
- o Round bottom receivers are in the Model Shop.
- o Stocks for bedding system testing are in the N/C Shop.
- o A meeting with Kwik-Klip is scheduled for Friday, November 7, in Allentown.

NEW CONCEPT SHOTGUN

PDS has been notified that their consulting contract will not be renewed.

The esthetics of the box magazine fed shotgun were considered objectionable by a review team. Future design efforts will concentrate on a tubular magazine fed system.

Parts for the "Flat Washer" and "Transverse Hole" pressure vent gas systems are nearing completion. Testing will begin shortly.

Teams have been set up to develop ideas on NCS ergonomics, as well as how to achieve improved accuracy, reduced recoil, and improved safety.

PARKER

A request for quotation has been in place with Kolar since May. Kolar has again been asked for a firm date for completion of the quote.

The ejector system has been redesigned and is in the Model Shop.

ALUMINUM RECEIVER

Work has begun on a lightweight 12 ga. Model 1100 with an aluminum receiver. Developments include a method for attaching the feed latch without staking, an interceptor latch stud that does not require welding, and an insert for attaching the magazine tube to the front of the receiver.

JWB:bjr

Laboratory No. _____

Book No. 2148

Department _____

Charge No. _____

Date Issued _____

Date Closed _____

JUL 23 1957

THIS BOOK MICROFILMED
AS COMPLETE
MAKE NO ADDITIONAL ENTRIES

LABORATORY NOTEBOOK

Assigned to: _____

Previous Data Books: _____

Next Data Book: _____

Names of others making entries in this book:

NAME

A&B Scientific Notebook Co.

2417 N. Western Ave.
Chicago, IL 60647 • 312/252-4895

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER
KINZER V. REMINGTON

R2540291

Project No. E-5202-
Bank No.

Title New Bull Action Rifle

From Page No.

Assembly of the "New Bull Action Rifle" to be referred to as the VIBAR was started June 16, 1985. noted will be problem areas and areas for change in construction:

- Bull Plugs, angled, assembly slots, for firing pin head. (firing pin - Army)
- Bull body should be protected from deformation action firing shoulder on
- New Bull lock what in bull mechanism
- Bull lock what in specimen can be seen
- Check dimension on trigger from E of head side to top of trigger plunger surface
- Add dimension for bull stop slot - bracketed dimension to drawing (overseen)
- Add dimension for "safety" guard to bull stop
- Bull lock to be redesigned - larger foot for plunger and contact - redesign spring - close work
- New ~~specimen~~ spring for Bull lock lever.
- Trigger = See. Add to be "lipped" for safety action. Trigger were changed when bull was changed.

To Page No.

Witnessed & Understood by me,

Date

11-4-86

Invented by

Date

3-1-85

Recorded by J. J. White

V. J. White

From Page No. -

More notes for NBAR fabrication

• Small block was to be redesigned - affect cam making at about the same general - Need a new method of fitting in place (Cam)

• Check shell block spring length

• Shell block cam spring should be every working - work spring will cover then what in cam after when present of operation

• Check in the case if some material thickness for bolt shell and bolt stop

• Length when shift to set cam and bell crank out away from side of receiver - every the shifting on motion of bolt lock part

Many assembly trigger pulls were taken and found to be heavier than had been expected

Several other and trigger springs were checked to see how they compared to the model drawing for load and free length

Will drawing for the cam spring in load of 5.5" to 6.7" and a free length of .980 the trigger spring load is 3.64" to 3.04"

Witnessed & Understood by me,

D. J. M. T.

Date

11/4/86

Invented by

Recorded by J. J. M. T.

Date

3-1-85

To Page No.

From Page No. -

and a free length of .875" then the cam of the cam spring will complete movement!

Didn't have the required load and with the exception of one did not meet the free length spec.

See Spring - (Comparison)

Measured Load

| | |
|-----|-------------|
| 1.9 | Free Length |
| 3.2 | .486 |
| 4.3 | .476 |
| | .485 |

New cam springs were made and heat treated and measured with the results shown below

See Spring (New)

Mean Load

| | |
|-----|-------------|
| 4.0 | Free Length |
| 4.4 | .475 |
| 4.5 | .485 |
| 4.0 | .479 |
| 4.8 | .479 |
| 4.7 | .484 |
| 4.8 | .483 |
| 4.9 | .479 |

Model shop parts still do not meet the model drawing

Witnessed & Understood by me,

D. J. M. T.

Date

11/4/86

Invented by

Recorded by J. J. M. T.

Date

3-3-85

To Page No.

4

Project No. C-3003-
Book No. _____

TITLE New-Bolt Action Rifle

From Page No. _____

Back it was felt that length and weight were close enough for testing - the trigger springs adjustable in some position -

Trigger spring

Measured length

3.6
1.9
1.5
2.6

As before new springs were made and measured results are shown below

Trigger Spring (New)

Weight 875

3.3
3.3
3.5
3.4
3.6
3.5
3.3
3.3

Now as before the springs did not meet completely the model drawing specs. but were used anyway.

It should be noted now that we have experienced

Witnessed & Understood by me,
J. Smith

Date 11/14/86

Invented by

Recorded by 2 & M. T.

To Page No. _____

Date

3-1-85

TITLE

New-Bolt Action Rifle

Project No. C-3003-
Book No. _____

From Page No. _____

high trigger pull with springs that were below model drawing specifications it should have been evident that we would have higher trigger pull when the springs are made to model drawing. I have felt before we shall now like to get in the determining factor for trigger pull in this system.

* Initial testing for economy over shot by the system and as recorded above Gun No. X00405 shot groups 2.22 - 2.22 - 2.53 for an average of 2.33 Gun No. X00407 shot groups of 1.55 - 2.00 - 1.30 for an average of 1.61 well below the required factory spec. of 3.50 for the caliber.

Now both locks have been received and will be assembled and evaluated as soon as the necessary bill books are received. The trigger spring system received from

Witnessed & Understood by me,
J. Smith

Date 11/4/86

Invented by

Recorded by 2 & M. T.

To Page No. _____

Date

3-1-85

6

Project No. C-5002

Book No. _____

TITLE

New Bull Action Rpt.

From Page No. _____

*the model setup will be assembled and evaluated
one problem showing up in the hole it is to
operate in is to small - must be opened up and
have clean on drawing changed*

NOTEBOOK COMPLETE - NO FURTHER ENTRIES WILL BE MADE IN THIS BOOK.

THIS BOOK MICROFILMED
AS COMPLETE
MAKE NO ADDITIONAL ENTRIES

JUL 23 1987

END OF BOOK

Witnessed & Understood by me,

Date

11/4/86

Invented by

Recorded by

Date

To Page No. _____

Project No. _____

Book No. _____

TITLE

From Page No. _____

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Recorded by

Date

#03#
LIST PAR C T C RES.NBAR

| **PART NAME** | DATE | CREATION TIME | ACCESS DATE |
|-----------------------------------------------------|----------|---------------|-------------|
| RES.NBAR.BARREL | 6-26-86 | 10:00:38 | 1-5-87 |
| RES.NBAR.BARREL-ASSY | 9-4-86 | 7:15:21 | 1-5-87 |
| RES.NBAR.BARREL-ASSY-COMPLETE | 5-28-86 | 17:09:45 | 1-5-87 |
| RES.NBAR.FOLLOWER-LA | 6-5-86 | 9:28:15 | 1-5-87 |
| RES.NBAR.BARREL-VAR | 6-5-86 | 9:41:17 | 1-5-87 |
| RES.NBAR.BARREL-MAG | 8-4-86 | 7:28:44 | 1-5-87 |
| RES.NBAR.BOLT-BODY | 10-7-86 | 17:29:27 | 1-5-87 |
| RES.NBAR.SCOPE-MOUNT-CLAMP | 6-26-86 | 8:49:06 | 1-5-87 |
| RES.NBAR.BOLT-BODY-ASSY | 10-7-86 | 17:26:06 | 1-5-87 |
| RES.NBAR.STOCK-PLUG | 6-5-86 | 10:23:24 | 1-5-87 |
| RES.NBAR.MAGAZINE-RELEASE | 3-10-86 | 21:44:05 | 1-5-87 |
| RES.NBAR.BOLT-HEAD | 6-11-86 | 17:52:09 | 1-5-87 |
| RES.NBAR.BOLT-HEAD-BLANK | 4-15-86 | 18:16:23 | 1-5-87 |
| RES.NBAR.BOLT-LATCH | 7-22-86 | 9:06:09 | 1-5-87 |
| RES.NBAR.BOLT-LATCH-PIVOT-PIN | 6-25-86 | 8:57:06 | 1-5-87 |
| RES.NBAR.BOLT-LOCK-PLUNGER.DSF | 9-1-86 | 11:14:46 | 1-5-87 |
| RES.NBAR.BOLT-PIN | 1-6-86 | 13:41:48 | 1-5-87 |
| RES.NBAR.BOLT-PLUG | 6-13-86 | 7:49:44 | 1-5-87 |
| RES.NBAR.BOLT-ASSY.TJP | 10-7-86 | 17:43:42 | 1-5-87 |
| RES.NBAR.BOLT-PLUG-WASHER.SMM | 3-12-86 | 14:22:34 | 1-5-87 |
| RES.NBAR.BOLT-STOP | 3-14-86 | 12:59:45 | 1-5-87 |
| RES.NBAR.BOLT-STOP-RELEASE | 3-18-86 | 9:02:30 | 1-5-87 |
| RES.NBAR.BOLT-STOP-RELEASE.BLANK | 9-24-85 | 10:20:36 | 1-5-87 |
| RES.NBAR.EXP1600.BOLT-LATCH.DSF | 8-29-86 | 14:56:00 | 1-5-87 |
| RES.NBAR.SCOPE-MT-SWS-ASSY.TJP | 8-28-86 | 8:34:59 | 1-5-87 |
| RES.NBAR.TSTACK.REAR-MAG-LATCH-MAX.DSF | 5-29-86 | 6:57:26 | 1-5-87 |
| RES.NBAR.TSTACK.REAR-MAG-LATCH-MIN.DSF | 5-29-86 | 6:59:31 | 1-5-87 |
| RES.NBAR.TSTACK.MAG-RELEASE-MAX.DSF | 5-30-86 | 15:34:02 | 1-5-87 |
| RES.NBAR.TSTACK.MAG-RELEASE-MIN.DSF | 5-30-86 | 15:47:39 | 1-5-87 |
| RES.NBAR.TSTACK.MAG-BOTTOM-MAX.DSF | 5-29-86 | 13:46:37 | 1-5-87 |
| RES.NBAR.TSTACK.MAG-BOTTOM-MIN.DSF | 5-29-86 | 14:07:18 | 1-5-87 |
| RES.NBAR.TSTACK.TRIG-GUARD-MAX.DSF | 5-30-86 | 9:04:47 | 1-5-87 |
| RES.NBAR.TSTACK.TRIG-GUARD-MIN.DSF | 5-30-86 | 9:06:04 | 1-5-87 |
| RES.NBAR.TSTACK.MAG-MIN.DSF | 6-2-86 | 8:03:59 | 1-5-87 |
| RES.NBAR.TSTACK.MAX-BOX-CLEAR-GUARD.DSF | 6-2-86 | 14:36:56 | 1-5-87 |
| RES.NBAR.TSTACK.MAG-MAX.DSF | 6-2-86 | 8:09:23 | 1-5-87 |
| RES.NBAR.TSTACK.MIN-BOX-CLEAR-GUARD.DSF | 6-4-86 | 7:02:54 | 1-5-87 |
| RES.NBAR.TSTACK.MEAN-BOX-CLEAR.SMM | 6-5-86 | 9:34:15 | 1-5-87 |
| RES.NBAR.EJECTOR | 1-15-86 | 7:25:08 | 1-5-87 |
| RES.NBAR.EJECTOR-WASHER | 1-15-86 | 7:04:53 | 1-5-87 |
| RES.NBAR.EXP1610.BOLT-LATCH.TJP | 9-8-86 | 14:08:48 | 1-5-87 |
| RES.NBAR.EXTRACTOR-222 | 10-3-85 | 9:12:45 | 1-5-87 |
| RES.NBAR.EXTRACTOR-MAG | 10-9-85 | 10:14:43 | 1-5-87 |
| RES.NBAR.FIRCTRL-PLATE-LFT | 4-4-86 | 9:37:27 | 1-5-87 |
| RES.NBAR.FIRCTRL-PLATE-RT | 3-26-86 | 7:50:23 | 1-5-87 |
| RES.NBAR.FIRING-PIN-ASSY | 6-26-85 | 22:00:15 | 1-5-87 |
| RES.NBAR.FIRING-PIN-ASSY-LA | 3-14-86 | 7:19:34 | 1-5-87 |
| RES.NBAR.FIRING-PIN-CROSS-PIN | 3-12-86 | 13:05:49 | 1-5-87 |
| RES.NBAR.FIRING-PIN-LA | 6-26-86 | 9:37:28 | 1-5-87 |
| RES.NBAR.FIRING-PIN-SA | 1-8-86 | 8:04:11 | 1-5-87 |
| RES.NBAR.FIRING-PINHEAD | 9-12-86 | 19:25:45 | 1-5-87 |
| RES.NBAR.EXP-1627.BOLT-PLUG.SET-SCREW-BOLT-LOCK.EAK | 10-6-86 | 14:15:32 | 1-5-87 |
| RES.NBAR.FRONT-SPACER | 3-12-86 | 12:50:54 | 1-5-87 |
| RES.NBAR.EXP-MAG-LATCH.TJP | 10-14-86 | 21:07:32 | 1-5-87 |
| RES.NBAR.GUARD-SCREW | 7-16-86 | 9:37:22 | 1-5-87 |
| RES.NBAR.EXP-MAG-LAT-RET.TJP | 10-14-86 | 20:56:59 | 1-5-87 |
| RES.NBAR.EXP-MAG-LAT-TP.TJP | 10-14-86 | 20:51:41 | 1-5-87 |
| RES.NBAR.EXP-MAG-LAT-TP.FHS | 10-6-86 | 14:34:20 | 1-5-87 |
| RES.NBAR.EXP-MAG-LAT-TP.TJP | 10-14-86 | 20:59:16 | 1-5-87 |
| RES.NBAR.EXP-1629.BOLT-LOCK.SET-SCREW.DSF | 12-10-86 | 11:52:10 | 1-5-87 |

| | | | |
|------------------------------------------------|----------|----------|---------|
| RES. NBAR. EXP-MAG-LAT-FP. TJP | 10-14-86 | 20:59:16 | 1- 5-87 |
| RES. NBAR. EXP-1629. BOLT-LOCK. SET-SCREW. DSF | 12-10-86 | 11:52:10 | 1- 5-87 |
| RES. NBAR. MAG-RELEASE. TJP | 6- 6-86 | 9:21:48 | 1- 5-87 |
| RES. NBAR. EXP-MAG-LAT-KLC. TJP | 12- 3-86 | 19:20:05 | 1-23-87 |
| RES. NBAR. EXP-1635. MAG-LATCH-LEVER. FHS | 10- 8-86 | 19:49:02 | 1- 5-87 |
| RES. NBAR. MAGAZINE-BOTTOM | 6-26-86 | 7:11:57 | 1- 5-87 |
| RES. NBAR. MAGAZINE-LA | 6- 6-86 | 10:12:48 | 1- 5-87 |
| RES. NBAR. EXP-1636. MAG-LATCH-PIN. FHS | 10- 8-86 | 19:41:40 | 1- 5-87 |
| RES. NBAR. EXP-1637. MAG-LATCH-PIVOT-PIN. FHS | 10-14-86 | 6:56:28 | 1- 5-87 |
| RES. NBAR. EXP-1638. MAG-BOX. FHS | 10-17-86 | 10:24:34 | 1- 5-87 |
| RES. NBAR. BOLT-LOCK-FEDESIGN. TJP | 10-14-86 | 12:03:05 | 1- 5-87 |
| RES. NBAR. REAR-GUARD-SCREW | 7-22-86 | 15:02:13 | 1- 5-87 |
| RES. NBAR. REAR-MAG-LATCH | 5-28-86 | 10:40:05 | 1- 5-87 |
| RES. NBAR. REAR-SPACER | 7-12-86 | 12:55:27 | 1- 5-87 |
| RES. NBAR. RECEIVER | 1-27-87 | 8:20:15 | 1-27-87 |
| RES. NBAR. EXP-BOLT-PLUG. EAK | 10-29-86 | 8:43:23 | 1- 5-87 |
| RES. NBAR. RIVET | 6-26-86 | 8:28:24 | 1- 5-87 |
| RES. NBAR. EXP-1643. BOLT-LOCK. SET-SCREW. TJP | 10-14-86 | 17:36:18 | 1- 5-87 |
| RES. NBAR. SAFETY | 3-12-86 | 11:53:48 | 1- 5-87 |
| RES. NBAR. SAFETY-ASSY | 7-30-86 | 7:52:54 | 1- 5-87 |
| RES. NBAR. SAFETY-BUTTON | 3-12-86 | 10:45:37 | 1- 5-87 |
| RES. NBAR. SAFETY-PIVOT-PIN | 4-14-86 | 7:29:48 | 1- 5-87 |
| RES. NBAR. SCOPE-MOUNT | 6- 5-86 | 16:06:22 | 1- 5-87 |
| RES. NBAR. SCOPE-MOUNT-ASSY | 6-26-86 | 8:19:17 | 1- 5-87 |
| RES. NBAR. SCOPE-MOUNT-NUT | 6-26-86 | 9:06:33 | 1- 5-87 |
| RES. NBAR. SCOPE-MOUNT-RING | 6-11-86 | 12:51:29 | 1- 5-87 |
| RES. NBAR. SEAR-SAFETY-CAM | 6-26-86 | 8:03:24 | 1- 5-87 |
| RES. NBAR. EXP-DETENT-PLUNGER. EAK | 10-28-86 | 16:11:18 | 1- 5-87 |
| RES. NBAR. STD-EXTRACTOR | 6-24-86 | 7:48:52 | 1- 5-87 |
| RES. NBAR. STOCK | 10-14-86 | 15:21:58 | 1- 5-87 |
| RES. NBAR. STOCK. NC1 | 11- 6-86 | 15:48:03 | 1- 5-87 |
| RES. NBAR. STOCK-INSERT | 10- 8-86 | 16:09:23 | 1- 5-87 |
| RES. NBAR. STOCK-RIVET | 6-26-86 | 8:34:43 | 1- 5-87 |
| RES. NBAR. STOCK-WASHER | 1- 6-86 | 13:57:45 | 1- 5-87 |
| RES. NBAR. TRIG-ADJ-LEVER | 4-14-86 | 7:47:21 | 1- 5-87 |
| RES. NBAR. TRIG-PULL-ADJ-SCREW | 6-30-86 | 9:37:31 | 1- 5-87 |
| RES. NBAR. TRIG-PULL-PLUNGER | 6-26-86 | 8:56:50 | 1- 5-87 |
| RES. NBAR. TRIGGER. SMH | 11-11-86 | 19:18:45 | 1- 5-87 |
| RES. NBAR. TRIGGER-ADJUSTMENT | 8- 2-86 | 9:42:14 | 1- 5-87 |
| RES. NBAR. TRIGGER-ASSY | 5-16-86 | 8:27:55 | 1- 5-87 |
| RES. NBAR. EXP-BOLT-LOCK. TJP | 11- 4-86 | 8:31:39 | 1- 5-87 |
| RES. NBAR. TRIGGER-ASSY-PIN | 4-16-86 | 3:39:52 | 1- 5-87 |
| RES. NBAR. TRIGGER-BLK-PLUNGER | 6-24-86 | 15:41:54 | 1- 5-87 |
| RES. NBAR. TRIGGER-GUARD | 7- 2-86 | 18:27:11 | 1- 5-87 |
| RES. NBAR. TRIGGER-HOUSING-ASSY | 4- 4-86 | 9:48:50 | 1- 5-87 |
| RES. NBAR. TRIGGER-SPRING | 1-13-86 | 13:54:02 | 1- 5-87 |

#07#LIST* PART C SMS

** ERROR CALL C006 **

--FILE NOT FOUND

#07#

####LIST* PART C SMS

RES.SWS

####LIST* PART C RES.SWS

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#07#LIST* PART C RES.SWS

| **PART NAME** | CREATION | | ACCESS DATE |
|--------------------------|----------|----------|-------------|
| | DATE | TIME | |
| RES.SWS.FIRE-CONTROL.TJP | 11- 4-86 | 17:29:42 | 1- 5-87 |

#07#LIST* PART C RES.700SWS

PART NAME

RES.700SWS.EEXP1661.STOCK.FHS

| DATE | CREATION | | ACCESS DATE |
|----------|----------|------|-------------|
| | DATE | TIME | |
| 12-29-86 | 12:45:53 | | 1- 5-87 |

57



RES. NBAR. TRIGGER-GUARD.

#00#COUNT ENT

| COUNT | ENTITY |
|-------|--------------------|
| 8 | POINT |
| 189 | LINE |
| 90 | ARC |
| 75 | B-SPLINE |
| 64 | TABULATED CYLINDER |
| 5 | RULED SURFACE |
| 84 | TEXT NODE |
| 1 | NODAL SUBFIGURE |
| 1 | PART PARAMETER |

TOTAL= 517

LAYERS USED: 0, 10-11, 20-25, 100, 102, 254

GEOM ONLY: 0, 10-11, 20-25, 100, 102

EXT ONLY: 254

COPY old name new name

INPUT DEVICE IS SD
 *08*LIST PART C RES.NBAR

| **PART NAME** | DATE | CREATION TIME | ACCESS DATE |
|-----------------------------------------|----------|---------------|-------------|
| RES.NBAR.BARREL | 6-26-86 | 10:00:38 | 1- 5-87 |
| RES.NBAR.BARREL-ASSY | 8- 4-86 | 7:15:21 | 1- 5-87 |
| RES.NBAR.BARREL-ASSY-COMPLETE | 5-20-86 | 17:00:45 | 1- 5-87 |
| RES.NBAR.FOLLOWER-LA | 6- 5-86 | 9:28:15 | 1- 5-87 |
| RES.NBAR.BARREL-VAR | 6- 5-86 | 9:41:17 | 1- 5-87 |
| RES.NBAR.BARREL-MAG | 8- 4-86 | 7:28:44 | |
| RES.NBAR.BOLT-BODY | 10- 7-86 | 17:29:27 | |
| RES.NBAR.SCOPE-MOUNT-CLAMP | 6-26-86 | 8:49:06 | |
| RES.NBAR.BOLT-BODY-ASSY | 10- 7-86 | 17:26:06 | |
| RES.NBAR.STOCK-PLUG | 6- 5-86 | 10:23:24 | 1- 5-87 |
| RES.NBAR.MAGAZINE-RELEASE | 3-10-86 | 21:44:05 | 1- 5-87 |
| RES.NBAR.BOLT-HEAD | 6-11-86 | 17:52:09 | 1- 5-87 |
| RES.NBAR.BOLT-HEAD-BLANK | 4-15-86 | 18:16:23 | 1- 5-87 |
| RES.NBAR.BOLT-LATCH | 7-22-86 | 9:06:09 | 1- 5-87 |
| RES.NBAR.BOLT-LATCH-PIVOT-PIN | 6-26-86 | 8:57:06 | 1- 5-87 |
| RES.NBAR.BOLT-LOCK-PLUNGER.DSF | 8- 1-86 | 11:14:40 | 1- 5-87 |
| RES.NBAR.BOLT-PIN | 1- 6-86 | 13:41:48 | 1- 5-87 |
| RES.NBAR.BOLT-PLUG | 6-13-86 | 7:49:44 | 1- 5-87 |
| RES.NBAR.BOLT-ASSY.TJP | 10- 7-86 | 17:43:42 | 1- 5-87 |
| RES.NBAR.BOLT-PLUG-WASHER.SMM | 3-12-86 | 14:22:34 | 1- 5-87 |
| RES.NBAR.BOLT-STOP | 3-14-86 | 12:59:45 | 1- 5-87 |
| RES.NBAR.BOLT-STOP-RELEASE | 3-18-86 | 9:02:30 | 1- 5-87 |
| RES.NBAR.BOLT-STOP-RELEASE.BLANK | 9-24-85 | 10:20:30 | 1- 5-87 |
| RES.NBAR.EXP1600.POLT-LATCH.DSF | 8-29-86 | 14:56:00 | 1- 5-87 |
| RES.NBAR.SCOPE-MT-SWS-ASSY.TJP | 8-28-86 | 8:34:59 | 1- |
| RES.NBAR.TSTACK.REAR-MAG-LATCH-MAX.DSF | 5-29-86 | 6:57:26 | 1- |
| RES.NBAR.TSTACK.REAR-MAG-LATCH-MIN.DSF | 5-29-86 | 6:59:31 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-RELEASE-MAX.DSF | 5-30-86 | 15:34:02 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-RELEASE-MIN.DSF | 5-30-86 | 15:47:39 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-BOTTOM-MAX.DSF | 5-29-86 | 13:46:37 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-BOTTOM-MIN.DSF | 5-29-86 | 14:07:18 | 1- 5-87 |
| RES.NBAR.TSTACK.TRIG-GUARD-MAX.DSF | 5-30-86 | 9:04:47 | 1- 5-87 |
| RES.NBAR.TSTACK.TRIG-GUARD-MIN.DSF | 5-30-86 | 9:00:04 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-MIN.DSF | 6- 2-86 | 8:03:59 | 1- 5-87 |
| RES.NBAR.TSTACK.MAX-BOX-CLEAR-GUARD.DSF | 6- 2-86 | 14:30:50 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-MAX.DSF | 6- 2-86 | 8:09:23 | 1- 5-87 |
| RES.NBAR.TSTACK.MIN-BOX-CLEAR-GUARD.DSF | | | |

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|-----------------------------------------------------|----------|----------|---------|
| RES.NBAR.BOLT-PIN | 1- 6-86 | 11:14:40 | 1- 5-87 |
| RES.NBAR.BOLT-PLUG | 6-13-86 | 7:49:44 | 1- 5-87 |
| RES.NBAR.BOLT-ASSY.TJP | 10- 7-86 | 17:43:42 | 1- 5-87 |
| RES.NBAR.BOLT-PLUG-WASHER.SMM | 3-12-86 | 14:22:34 | 1- 5-87 |
| RES.NBAR.BOLT-STOP | 3-14-86 | 12:59:45 | 1- 5-87 |
| RES.NBAR.BOLT-STOP-RELEASE | 3-18-86 | 9:02:30 | 1- 5-87 |
| RES.NBAR.BOLT-STOP-RELEASE.BLANK | 9-24-85 | 10:20:30 | 1- 5-87 |
| RES.NBAR.EXP1600.BOLT-LATCH.DSF | 8-29-86 | 14:56:00 | 1- 5-87 |
| RES.NBAR.SCOPE-MT-SWS-ASSY.TJP | 8-28-86 | 8:34:59 | 1- 5-87 |
| RES.NBAR.TSTACK.REAR-MAG-LATCH-MAX.DSF | 5-29-86 | 6:57:26 | 1- 5-87 |
| RES.NBAR.TSTACK.REAR-MAG-LATCH-MIN.DSF | 5-29-86 | 6:59:31 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-RELEASE-MAX.DSF | 5-30-86 | 15:34:02 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-RELEASE-MIN.DSF | 5-30-86 | 15:47:39 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-BOTTOM-MAX.DSF | 5-29-86 | 13:46:37 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-BOTTOM-MIN.DSF | 5-29-86 | 14:07:18 | 1- 5-87 |
| RES.NBAR.TSTACK.TRIG-GUARD-MAX.DSF | 5-30-86 | 9:04:47 | 1- 5-87 |
| RES.NBAR.TSTACK.TRIG-GUARD-MIN.DSF | 5-30-86 | 9:00:04 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-MIN.DSF | 6- 2-86 | 8:03:59 | 1- 5-87 |
| RES.NBAR.TSTACK.MAX-BOX-CLEAR-GUARD.DSF | 6- 2-86 | 14:30:50 | 1- 5-87 |
| RES.NBAR.TSTACK.MAG-MAX.DSF | 6- 2-86 | 8:09:23 | 1- 5-87 |
| RES.NBAR.TSTACK.MIN-BOX-CLEAR-GUARD.DSF | 6- 4-86 | 7:02:54 | 1- 5-87 |
| RES.NBAR.TSTACK.MEAN-BOX-CLEAR.SMM | 6- 5-86 | 9:34:15 | 1- 5-87 |
| RES.NBAR.EJECTOR | 1-15-86 | 7:25:08 | 1- 5-87 |
| RES.NBAR.EJECTOR-WASHER | 1-15-86 | 7:04:53 | 1- 5-87 |
| RES.NBAR.EXP1610.BOLT-LATCH.TJP | 9- 8-86 | 14:08:48 | 1- 5-87 |
| RES.NBAR.EXTRACTOR-222 | 10- 3-85 | 9:12:45 | 1- 5-87 |
| RES.NBAR.EXTRACTOR-MAG | 10- 9-85 | 10:14:43 | 1- 5-87 |
| RES.NBAR.FIRCTRL-PLATE-LFT | 4- 4-86 | 9:37:27 | 1- 5-87 |
| RES.NBAR.FIRCTRL-PLATE-RT | 3-26-86 | 7:50:23 | 1- 5-87 |
| RES.NBAR.FIRING-PIN-ASSY | 6-26-85 | 22:00:15 | 1- 5-87 |
| RES.NBAR.FIRING-PIN-ASSY-LA | 3-14-86 | 7:10:34 | 1- 5-87 |
| RES.NBAR.FIRING-PIN-CROSS-PIN | 3-12-86 | 13:05:49 | 1- 5-87 |
| RES.NBAR.FIRING-PIN-LA | 6-26-86 | 9:37:28 | 1- 5-87 |
| RES.NBAR.FIRING-PIN-SA | 1- 8-86 | 8:04:11 | 1- 5-87 |
| RES.NBAR.FIRING-PINHEAD | 9-12-86 | 19:25:45 | 1- 5-87 |
| RES.NBAR.EXP-1627.BOLT-PLUG.SET-SCREW-BOLT-LOCK.EAK | 10- 6-86 | 14:15:32 | 1- 5-87 |
| RES.NBAR.FRONT-SPACER | 3-12-86 | 12:50:54 | 1- 5-87 |
| RES.NBAR.EXP-MAG-LATCH.TJP | 10-14-86 | 21:07:32 | 1- 5-87 |
| RES.NBAR.GUARD-SCREW | 7-16-86 | 9:37:22 | 1- 5-87 |
| RES.NBAR.EXP-MAG-LAT-RET.TJP | 10-14-86 | 20:56:59 | 1- 5-87 |
| RES.NBAR.EXP-MAG-LAT-TP.TJP | 10-14-86 | 20:51:41 | 1- 5-87 |
| RES.NBAR.EXP-MAG-LAT-TP.FHS | 10- 6-86 | 14:34:20 | 1- 5-87 |
| RES.NBAR.EXP-MAG-LAT-TP.TJP | 10-14-86 | 20:59:16 | 1- 5-87 |
| RES.NBAR.EXP-1629.BOLT-LOCK.SET-SCREW.DSF | 12-10-86 | 11:52:10 | 1- 5-87 |
| RES.NBAR.MAG-RELEASE.TJP | 6- 6-86 | 9:21:48 | 1- 5-87 |
| RES.NBAR.EXP-MAG-LAT-KLC.TJP | 12- 3-86 | 19:20:05 | 1-23-87 |
| RES.NBAR.EXP-1635.MAG-LATCH-LEVER.FHS | 10- 8-86 | 19:49:02 | 1- 5-87 |
| RES.NBAR.MAGAZINE-BOTTOM | 6-26-86 | 7:11:57 | 1- 5-87 |
| RES.NBAR.MAGAZINE-LA | 6- 6-86 | 10:22:48 | 1- 5-87 |
| RES.NBAR.EXP-1636.MAG-LATCH-PIN.FHS | 10- 8-86 | 19:41:40 | 1- 5-87 |
| RES.NBAR.EXP-1637.MAG-LATCH-PIVOT-PIN.FHS | 10-14-86 | 6:50:28 | 1- 5-87 |
| RES.NBAR.EXP-1638.MAG-BOX.FHS | 10-17-86 | 10:24:34 | 1- 5-87 |
| RES.NBAR.BOLT-LOCK-REDESIGN.TJP | 10-14-86 | 22:03:05 | 1- 5-87 |
| RES.NBAR.REAR-GUARD-SCREW | 7-22-86 | 15:02:13 | 1- 5-87 |
| RES.NBAR.REAR-MAG-LATCH | 5-29-86 | 10:40:05 | 1- 5-87 |
| RES.NBAR.REAR-SPACER | 3- 1-86 | 12:55:27 | 1- 5-87 |
| RES.NBAR.RECEIVER | 1- 1-87 | 8:20:11 | 1-27-87 |
| RES.NBAR.EXP-BOLT-PLUG.EAK | 10- 2-86 | 8:43:21 | 1- 5-87 |
| RES.NBAR.RIVET | 10- 2-86 | 8:28:24 | 1- 5-87 |

RES.NBAR.EXP-1643.BOLT-LOCK.SET-SCREW.TJP

| | | | |
|---------------------------------|----------|----------|---------|
| RES.NBAR.SAFETY | 10-14-86 | 17:30:18 | 1- 5-87 |
| RES.NBAR.SAFETY-ASSY | 3-12-86 | 11:53:48 | 1- 5-87 |
| RES.NBAR.SAFETY-BUTTON | 7-30-86 | 7:52:54 | 1- 5-87 |
| RES.NBAR.SAFETY-PIVOT-PIN | 3-12-86 | 10:45:37 | 1- 5-87 |
| RES.NBAR.SCOPE-MOUNT | 4-14-86 | 7:29:48 | 1- 5-87 |
| RES.NBAR.SCOPE-MOUNT-ASSY | 8- 5-86 | 16:06:22 | 1- 5-87 |
| RES.NBAR.SCOPE-MOUNT-NUT | 6-26-86 | 8:19:17 | 1- 5-87 |
| RES.NBAR.SCOPE-MOUNT-RING | 6-26-86 | 9:00:33 | 1- 5-87 |
| RES.NBAR.SEAR-SAFETY-CAM | 6-11-86 | 12:51:29 | 1- 5-87 |
| RES.NBAR.EXP-DETENT-PLUNGER.EAK | 6-26-86 | 8:03:24 | 1- 5-87 |
| RES.NBAR.STD-EXTRACTOR | 10-28-86 | 16:11:18 | 1- 5-87 |
| RES.NBAR.STOCK | 6-24-86 | 7:48:52 | 1- 5-87 |
| RES.NBAR.STOCK.NC1 | 10-14-86 | 15:21:58 | 1- 5-87 |
| RES.NBAR.STOCK-INSERT | 11- 6-86 | 15:48:03 | 1- 5-87 |
| RES.NBAR.STOCK-RIVET | 10- 8-86 | 16:09:23 | 1- 5-87 |
| RES.NBAR.STOCK-WASHER | 6-26-86 | 8:34:43 | 1- 5-87 |
| RES.NBAR.TRIG-ADJ-LEVER | 1- 6-86 | 13:57:45 | 1- 5-87 |
| RES.NBAR.TRIG-PULL-ADJ-SCREW | 4-14-86 | 7:47:21 | 1- 5-87 |
| RES.NBAR.TRIG-PULL-PLUNGER | 6-30-86 | 9:37:31 | 1- 5-87 |
| RES.NBAR.TRIGGER.SMM | 6-26-86 | 8:50:50 | 1- 5-87 |
| RES.NBAR.TRIGGER-ADJUSTMENT | 11-11-86 | 19:10:45 | 1- 5-87 |
| RES.NBAR.TRIGGER-ASSY | 8- 2-85 | 9:42:14 | 1- 5-87 |
| RES.NBAR.EXP-BOLT-LOCK.TJP | 5-16-86 | 8:27:55 | 1- 5-87 |
| RES.NBAR.TRIGGER-ASSY-PIN | 11- 4-86 | 8:31:39 | 1- 5-87 |
| RES.NBAR.TRIGGER-BLK-PLUNGER | 4-16-86 | 8:39:52 | 1- 5-87 |
| RES.NBAR.TRIGGER-GUARD | 6-24-86 | 15:41:54 | 1- 5-87 |
| RES.NBAR.TRIGGER-HOUSING-ASSY | 7- 2-86 | 18:27:11 | 1- 5-87 |
| RES.NBAR.TRIGGER-SPRING | 4- 4-86 | 9:48:50 | 1- 5-87 |
| | 1-13-86 | 13:54:02 | 1- 5-87 |