

Remington Arms Company, Inc.
Ilion Research Division

April 22, 1976

to P. LINDE, P. Linde

From: Manual Firearms Design Group

WORK SCHEDULE

<u>MODEL 3200</u>	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
1. <u>Methods & Standards Reviews</u>			
a) Review of Oper. 175 (Final Assembly)	4-23-76	P. Nasypany	F
b) Review with Industrial Eng.: Oper. 10 (Frame Sub-Assembly) and Oper. 195-T (Trigger Pre-Play and Creep Repair)	4-23-76	P. Nasypany	A
2. <u>Elimination of Repairs through Redesign</u>			
a) Get costs and reports of scrap and repair operations to determine problem areas. Make list of problem areas.	4-30-76	P. Nasypany	A
b) Review fore-end fit problems.	4-30-76	P. Nasypany	A
c) High repair cost items will be reviewed to determine if they can be eliminated by design.	5-31-76	D. R. Lewis	A
1) Upsets at the corner of the Fore-end Iron-Mono-Block intersection.			
d) Stock fit methods were reviewed and the Standards changed.			
1) Bottom Tang operations 230 & 240 were reviewed and the problem located. New parts to be in Assembly 5-31-76.			
	5-31-76	D. R. Lewis	F

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	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 3200 - Continued</u>			
3. <u>Barrel Attachment at Muzzle</u>		P. Nasypany	
a) Make drawings of redesigned method and send to Model Shop for parts.	4-23-76		A
b) Test by shooting.	4-30-76		A
c) Get costs.			
4. <u>Fitting Top Lock to Frame Assembly</u>		P. Nasypany	
a) Adjustable Top Lock Shim			A
1) Make drawing and send to Model Shop	4-23-76		
2) Conduct strength and deformation tests	5-14-76		
3) Test by shooting and dry cycling	5-21-76		
4) Get costs			
b) Eccentric Top Lock Lever Screw		P. Nasypany	B
1) Make drawings, parts, and test			
2) Get costs			
5. <u>Top Lock Form</u>		D.E. Bullis	B
a) A longer Top Lock so as to do away with overlap of Frame in rear area.			
6. <u>Size Barrel Assembly/Mono-Block to Frame Assembly</u>			
a) Make parts and press frame inward to size to Mono-Block (completed 3/5/76). Design new method to open up tight frame to size and make parts and test.	5-7-76	P. Nasypany	A
b) Get costs			B
7. <u>Fore-end Breakage</u>			
a) Investigate location of breakages and probable causes.	5-14-76	P. Nasypany	A
8. <u>Barrel Loop Deformation</u>			
a) Write up report of design change costs etc.	4-23-76	P. Nasypany	A

<u>MODEL 3200 - Cont'd.</u>	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>9. Fore-end Unlatching Problems</u>			
(a) Summarize costs of different latch angle design. Investigate better finishing process for burr elimination (glass bead blasting, more effective tumbling media, re-dimensioning of Fore-end Latch). Review filing method and make new filing sample for production.	4-23-76	P. Nasypany	A
b) Consult with Hi-Dense Division on Fore-end Latch Blank changes to eliminate machining burrs. Costs.	4-23-76	P. Nasypany	A
c) Investigate making Fore-end Latch from Investment Casting (Completed). Write report.	4-23-76	P. Nasypany	A
<u>10. Front Connector made from Stamping</u>			
		P. Nasypany	
(a) Make drawings parts, and test			B
b) Get costs.			
<u>11. Unbalanced Sear</u>			
a) Parts up to heat treat & grind. Production problems to be checked with PE&C.		P. Nasypany	B
b) Drop tests for safety to be made.			
c) Get costs.			
<u>12. Cost Improvements</u>			
a) Investigate combining cocking rod and ejector cam plate clearance cuts in frame. Also drilling and countersinking of all top tang holes		P. Nasypany	B
b) Get costs.			
Devise a new method of assembling the Fore-end Iron to the Fore-end Plate.		D.R. Lewis	A

<u>MODEL 3200 - Cont'd.</u>	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
12. <u>Cost Improvements - Cont'd.</u>			
c) MonoBlock bottom radius to be combined with ejector rough mill slot.		D. Lewis	F
d) Bottom Tang Rough Mill Profile (Operations to be made in one loading.)		D. Lewis	F
e) Fore-end Iron clearance cut in MonoBlock to be combined with the Ejector Cam Plate clearance cut.		D. Lewis	F
f) Evaluated a method to pull Barrel MonoBlock locking radius tight to Frame radius at the joint pin operation.		D. Lewis	F
g) <u>Hammerless Ejection System</u> Redesign of ejection system to eliminate 8 parts. Models ready for test 6-15-76.	7-15-76	K. Soucy	F
h) <u>Cast Bottom Tang Unit</u> Bottom tang unit consisting of bottom tang, strut, and tang connecting block, to be Investment Cast as one piece. Also, Frame is redesigned to eliminate bottom tang tongue cut. Models ready for test 5-15-76.	7-15-76	K. Soucy	F
i) <u>Delete Cam Plates</u> Modification of hammerless ejection system. This system uses present frame surfaces instead of cam plates to cam the ejectors. Model being tested as of 4-14-76. Excessive wear is being experienced.	4-20-76	K. Soucy	A
j) <u>Screwed-in Top Barrel</u> Top Barrel and MonoBlock redesigned to screw in and Loctite Top Barrel instead of brazing. Samples are being made by Production and should be ready by 4-30-76.	6-1-76	K. Soucy	F
k) <u>Main Hammer Plunger Rod</u> Various redesigns of this part are being tried in an attempt to increase endurance life.		K. Soucy	C

	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 3200 - Continued</u>			
<u>12. Cost Improvements - Continued</u>			
l) <u>Welded Vent Rib</u> The possibility of welding the rib to the Top Barrel instead of brazing is being investigated.	5-15-76	K. W. Soucy	A
m) <u>Rear Connector Link</u> Part redesigned for fine-blank fabrication in order to eliminate subsequent machining operations. Parts ready for test 5-1-76.	7-15-76	K.W.Soucy	F
n) <u>Main Hammers</u> Redesign of part to eliminate two machining and one brazing operation. Bushings will be eliminated and nylon washers will be used for spacing. Hammers will be interchangeable.	6-15-76	K.W. Soucy	A
o) <u>Shaw Casting Process</u> General investigation of the process to determine applicability to M/3200 parts.	9-1-76	K.W. Soucy	A
p) <u>Warm Forged Ejectors and Trigger Guard</u> A forging vendor is currently evaluating these parts.	7-1-76	K.W. Soucy	F
q) <u>Snap-On Trigger Guard</u> A means of eliminating two assembly holes and one assembly pin is being investigated.		K.W. Soucy	B
r) <u>Fire Control</u> General investigation to reduce complexity and cost of Fire Control system.	Indeterminate	K. Soucy	A
s) <u>Recoil Force Gage</u> A new, simple, recoil force gage is being designed to test 3200 Presentation Pad candidates. This gage can be easily adjusted to accommodate different weight pads and still negate the inertia effects.		E.J. Young	B

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<u>MODEL #3200 - Continued</u>			
12. <u>Cost Improvements - Continued</u>			
t) <u>Excessive Brass on Cam Plates</u> Cam Plate dimensions were changed to eliminate gap caused by tolerance build-up. This caused excess brass fillet to form when brazing.		E. J. Young	F
13. <u>Fore-end Iron Process</u>			
a) Investigate cause and percentage of production scrap.	4-23-76	P. Nasypany	F
14. <u>Elimination of Front Trigger Adjusting Screw & Nut</u>			
a) Model drawings changed to eliminate use of the Front Trigger Adjusting Screw and Nut, and drilling and tapping of front hole in Trigger.	4-23-76	P. Nasypany	F
b) Drop tests completed.			
15. <u>Single Barrel Trap</u>			
a) Complete recoil reduction system Inventions Report and inventions drawings for patent application.	3-26-76	P. Nasypany	F
b) Test recoil reduction system in model gun to be endurance fired by D. Lewis.	4-30-76	P. Nasypany	A
c) Clarification drawings for Adjustable Sighting System have been made. Description of each method being written.	4-30-76	D.R. Lewis	AA
16. <u>Stocks for Bill Boettner</u>	Complete		
17. <u>Stock Shift Problems</u> With present volume, not feasible.		D.R. Lewis	

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	<u>Completion</u> <u>Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 3200 - Cont'd.</u>			
18. <u>Epoxy Investigation</u>	5-15-76	D.R. Lewis	A
a) The Devcon "F" putty type epoxy is to be tested for chipping during shooting and slamming.			
19. <u>Lubrication Evaluation</u>	5-15-76	D.R. Lewis	A
a) A cold weather evaluation is to be conducted to determine the effects of cold on the lubrication properties of the G-N & FS-3451 Molycote Lub.			
20. <u>Stock Clearance Cut in Frame</u>		D.R. Lewis	B
a) The Stock clearance cut is to be laid out to determine if it can be made on a standard milling machine.			
21. <u>Interchangeable Main Hammers</u>		D.R. Lewis	F
a) New Main Hammer Bushings have been made in the Model Shop and are being assembled to the Hammers in production.			
22. <u>Welded Ejectors</u>		D.E. Bullis	A
A cost reduction method of making Ejectors. Estimate of \$.30 each from "Bird Electron Beam Co." (10,000 pcs.). Process is designing fixture for welding which may result in a lower estimate per piece.			
23. <u>Recoil Pad</u>		D.E. Bullis	A
To make a comparable pad at reduced cost.			
a) Field Pad	3-19-76		
b) Presentation Mod.	7-20-76		
c) Design recoil pad which does not have to be removed from the stock.			

<u>MODEL 3200 - Cont'd.</u>	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
24. <u>Rib & Ramp Alignment</u> For lower cost Top Lock through Formed Bar Stock			
a) Resolve Shape of Ramp	5-3-76	D. E. Bullis	A
25. <u>Formed Bar Stock</u> See if we can adapt Top Lock for Formed Bar Stock manufacture as a cost reducing measure.		D. Bullis	A
a) Top Lock	Estimate 4-30-76		
b) Broach			
c) Status (write-up)	4-30-76		
26. <u>Heavy Stock</u> To increase strength of Stock and stop percentage of scrap.		D. Bullis	A
a) Finish Samples	Complete		
b) Drawings	5-21-76		
c) Check Checkering	6-11-76		
27. <u>Electromark</u> Investigate new and cheaper method of removing color from Barrel Assembly in MonoBlock area.		D. Bullis	A
a) Remove color on MonoBlock	Complete		
b) Samples at Electromark	Complete		
c) Re-evaluate use of Hydrochloric Acid as a color remover.			
28. <u>Choke Investigation</u> To investigate for optimum specs. of our Modified Choke.		D. Bullis	C
a) Percentage of Patterns			
29. <u>Process Cold Headed Ejectors & Evaluate by Testing</u>	5-15-76	D. E. Bullis	A

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	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 788</u>			
1. <u>Firing Pin Heads</u>			
This is a Powdered Metal part for which the Powdered Metal supply is dwindling. It is being redesigned as a Formed Bar Stock part.			
a) Test - decision	5-17-76	E.J. Young D.E. Bullis	AA
b) Finish Drawings	5-19-76	E.J. Young D.E. Bullis	AA
2. <u>Safe More Positive</u>		E.J. Young	B
The detent on the 788 Safety is being redesigned to provide more positive "Safe" engagement.			
3. <u>Eliminate Receiver Sight Holes</u>		E.J. Young	B
a) Cost Reduction item			
4. <u>Bolt Plug Redimensioned</u>		E.J. Young	C
a) Threads will be moved forward to ease manufacture.			
5. <u>Check Receiver Fit to Stock</u>		E.J. Young	F
a) The Receiver was redimensioned to fit the model drawing Stock.			

		<u>Completion</u>	<u>Responsibility</u>	<u>Priority</u>
		<u>Date</u>		
<u>MODEL 580 SERIES</u>				
1.	<u>580 Cocking Piece</u> This is a Powdered Metal part for which the Powdered Metal supply is dwindling. It is being redesigned as a Formed Bar Stock part. a) Test - Decision	3-26-76	E.J. Young	AA
2.	<u>580 Safety</u> 580 Safety must be redesigned to eliminate hard "On Safe" condition. a) Design b) Model Shop c) Test d) Final Drawings	 5-21-76 6-14-76 7-8-76 7-14-76	E.J. Young	A
3.	<u>Retract Firing Pin and Bolt Head Detent</u> The Firing Pin is being redesigned to retract and to act as a Bolt Head Detent. This will eliminate the Firing Pin hanging up on the cartridge rim coming up from the magazine. The detent feature will allow the Bolt to be put back into the Receiver easily. a) Model Shop b) Test - Decision c) Final Drawing	 4-23-76 5-24-76 5-28-76	E.J. Young	A

	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 580 SERIES - Cont'd.</u>			
<u>Step Sear</u>		E. Young	A
A step has been designed into the Sear to increase the space between it and the Receiver. This will lessen the problem of debris interfering with the Sear causing follow down.			
a) Test - Decision	6-4-76		
b) Final Drawing	6-14-76		
<u>581 Single Shot</u>		E. Young	B
() Molded plastic inserts have been designed to convert the 581 into a single shot. A model has been made. The concept is ready for proposal to Marketing.			
<u>Bolt Body Lock Up Clearance</u>		E. Young	B
a) The Bolt of the 580 Series may operate more smoothly if the clearance between the Bolt Body (at the Locking Lugs) and the Receiver is increased.			
<u>20-Round Metal Magazine</u>		E. Young	C

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	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 540X - 541S</u>			
<u>Bolt Stop Breakage</u>		E. Young	A
The Bolt Stop on the 540XR Fire Control breaks too easily. It is being redesigned.			
a) Test - Decision	5-3-76		
b) Final Drawing	5-10-76		
<u>540XR Tuning</u>		E. Young	B
a) Explore the possibility of tuning a 540XR for accuracy using 40XB bedding escutcheons.			
<u>Modify 540XR Receiver for Anschutz Sights</u>		E. Young	C
a) Investigate dovetailing a 540XR Receiver for Anschutz Sights.			
<u>540X-541S Safety Alterations</u>		E. Young	F
a) Safetys are being altered to replace Safety Retaining Screw with a pin.			
<u>22 RIMFIRE ACCURACY PROGRAM</u>			
Basic planning is complete. Long lead time items are ordered.		E. Young	A

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	<u>Completion</u> <u>Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>22-308 & 6mm-308</u>			
1. <u>"NO-GO" Head Space Gage</u>			
a) Model Shop	4-23-76	E. J. Young	A
 <u>MODEL 600</u>		F. E. Martin	
<u>Trigger Connector</u> We have recently received several reports from the field of M/600 Trigger Connectors breaking. Research has been asked to evaluate the effect of broken Connectors on the safety of this rifle. A test guns is to be assembled and types of failures studied.	5-15-76		A
<u>Trigger Guard</u> Desire to replace the Delrin Trigger Guard of this model with one of metal has increased. A metal Trigger Guard has been designed and samples obtained from Investment Casting vendor. Samples have been completed in R&D Model Shop and are ready for assembly. Changes that are to be made are cosmetic and can be obtained by altering the dies.	6-1-76		B
<u>New Style Fire Control</u> To reduce assembly problems in Center Fire line and to increase safety in this model, an adaptation of the reliable M/700 Fire Control has been prepared for the M/600. Model drawings have been completed and sent out for quotes. 250 guns have been assembled with excellent results. More work is to be done on this model to increase effectiveness of the Safety Detent and to prepare samples of the new Fire Control. Drawing must be transmitted when design is accepted.	8-1-76		A

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MODEL 700

<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
	F. E. Martin	

.308 Varmint

6-1-76

A

An accuracy program for this caliber has to be developed by Design and Test to correlate accuracy of hand loaded ammo and factory ammo. This will be done to enable Production to use a factory loaded round to test accuracy of this model.

8mm Rem. Magnum

8-1-76

A

The development of this caliber and rifle continues on schedule. Four (4) Pressure & Velocity Barrels have been completed. Six (6) prototype rifles are completed. The remaining barrels will be completed by the end of the month. Pressure & Velocity and Accuracy Barrels are to be distributed among Ilion, Bridgeport, and Lonoke. In order to maintain our schedule, loading of ammunition will be done here at Ilion. Loading dies have been fabricated in our Model Shop with testing by both the Test Lab and the Design Section proceeding as planned.

7x64mm (European)

C

This caliber in connection with the M/700 continues under investigation. A prototype will be made and shooting done.

	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 700 - Cont'd.</u>			
<u>Bolt Plug</u> A redimension of the Bolt Plug and Bolt Body drawing will be done to reduce manufacturing tolerance and eliminate assembly problems.		F. Martin	B
<u>M/700 Components Investigation</u>		F. Martin	
<u>One-Piece Trigger</u> This part is being evaluated with respect to making it from Formed Barstock,			C
<u>Fire Control Housing</u> Part is being evaluated with the possibilities of reducing the number of component parts.			C
<u>Sear Safety Cam</u> Formed Bar Stock investigation is being made on part.			C
<u>Barrel Bracket</u> Testing to eliminate bending of this M/700 component is being done and will continue relative to 8mm. In Test Lab with 8mm Rem. Magnum.	8-1-76		A
<u>Fire Control</u> Testing of the use of Molybdate lubricant in this component will be done. Tie-in will be made with D. R. Lewis, Research, and C. F. Prosser-W. E. Ackley, Production.	5-15-76		A
<u>Stock Interference</u> It has been reported that areas of M/700 Stock are causing problems in assembly and functioning. These areas will be checked and eliminated as soon as possible.			B

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	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 700 - Cont'd.</u>			
<u>M/700 Components Investigation - Cont'd.</u>		F. E. Martin	
<u>Trigger Guard</u> There is a periodic problem with this part and is being looked at.			
<u>Rear Sight</u> A re-evaluation of this part is being made by R&D and Production. Changes are expected to be made within the next four weeks.			
<u>Scope Bases</u>			C
Several instances of this problem have been reported. It is felt that the problem should be defined and resolved through changes in manufacturing process or by notifying the vendors of this problem area.			
<u>Magazine Components</u>	6-1-76		A
An extensive evaluation of all components in the M/700 feeding system is to be undertaken to ease assembly problems and reduce the number of gallery rejects due to feeding.			
<u>M/40XC CF & M/40XB RF Sporter</u>		F. E. Martin	C
Feeding problem in these models has been reported and will be investigated as time permits.			
<u>M/40XC Accuracy & Barrel Configuration</u>	5-15-76	F. E. Martin	A
More testing will be done. Guns are being prepared for Ft. Benning. Accuracy is being worked on. Also, a stock drawing for the M/40XR and 40XC must be made.			

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	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>METALLIC SILHOUETTE PROGRAM</u>			
<u>Rim Fire Targets</u>		F. Martin	
The possibilities of purchasing targets from outside sources is being looked into with Purchasing. It is hoped that a flame cut target can be used.			
<u>Lightweight Firing Pins</u>			B
M/700 - Models have been made and more testing is to be done.			
(M/40XB - Some work on these have been done but a final design has to be made and parts obtained from the Model Shop. Testing regarding endurance must also be done. (Note: Parts in heat treat to be assembled)			
<u>BARRELS</u>	4-15-76	F. Martin	A
Several Barrels must be made for W. E. Leek and Col. Askins. These will have integral barrel weights, be 27-1/4" long, and of stainless steel. They will be completed by the Model Shop as blanks become available. Caliber 280 Rem. Barrels are involved.			
<u>MISCELLANEOUS WORK</u>	As Required	F. Martin	A
Customer Complaints, Shooting, Reorganize Files, and Inventions Report, to be done as necessary.			
5-31-76			
<u>XP-100 Safety Lever</u>			
New design is being worked up to have this model conform to new state regulations.			

	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>4100-S TRAP</u>			
1. <u>Testing for Chatter</u>			
a) Serial No. 1000 set up with .011 out of round Mainshaft being dry cycled for adverse conditions.	5-7-76	E.D. Rankins K. Rowlands	A
b) Serial No. 1113 - Set up with 1.000" thick Clutch Housing with .200" thick concentricity ring; Standard Sprags	5-7-76	E.D. Rankins K. Rowlands	A
c) Inspect castings for perpendicularity of Mainshaft holes to Clutch Housing face.	4-30-76	E.D. Rankins	A
d) Look into reasons that cause chatter:- sprags, clutches, alignment, etc.		E.D. Rankins K. Rowlands	F
e) Six (6) 1" thick Clutch Housings to be made in Model Shop.	5-7-76	K. Rowlands	A
f) Further test to be made with standard Clutch Housing with thin spacers.		E.D. Rankins K. Rowlands	F
g) Check on modified Sprags.	5-7-76	K. Rowlands	A
h) Cocking Clutch Lube - further testing and evaluation needed.			
i) Install modified Clutch Housings in traps at Ilion Fish and Game Club.	5-7-76		A
j) Rewire (4) traps at Ilion Fish and Game Club to new layout.	5-7-76		A
k) Modify 8 prototype traps in the field - wiring and Clutch Housings with concentricity rings.	5-31-76		A

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	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MODEL 4100-S TRAP - Cont'd.</u>			
2. <u>Manuals</u>			
a) 4100 Trap Manual to be completed. At printers now per Bob Andrews. 1000 copies per Joe Callahan.	4-30-76	B. Andrews (Du Pont)	A
b) 1. 4100-S Skeet Trap Manual:- initial copywriting, editing, photography, art work, typesetting.	4-30-76	F.G. Hart	A
2. Preparation of camera, ready mechanicals	5-14-76	E.D. Rankins	A
3. Final Printing	6-1-76		A
3. <u>Drawings</u>			
a) Finalize prints - update 4100 Trap Assembly	6-1-76	E.D. Rankins	C
b) Draw 4100-S Assembly print E size	6-1-76		C
c) Layout drawings 4100-S	4-30-76		A
4. <u>Cost Reduction - 4100 Trap</u>			
		E.D. Rankins K. Rowlands	F
a) Possibly eliminate some castings.			
b) Investigate other possibilities.			
5. <u>Cost Reduction - 4100-S Skeet Trap</u>			
		E.D. Rankins K. Rowlands	F
a) Possibly eliminate base casting.			
b) Investigate other possibilities.			

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	<u>Completion Date</u>	<u>Responsibility</u>	<u>Priority</u>
<u>MECHANICAL TRAP DESIGN - 3 TYPES</u>			
		E.D. Rankins K. Rowlands	
1. Simple Mechanical Trap	8-1-76		B
a) Design Prototype	5-1-76		B
b) Part Drawings	6-1-76		B
c) Model Parts for (3) Prototype	7-16-76		B
d) Testing Prototype	7-30-76		B
e) Manual of Operation & Repair	11-1-76		C
2. Mechanical Trap with Electric Release	10-1-76		C
3. Mechanical Trap with Electric Release and readable Auto Angling and Auto Elevating.	4-1-77		D
<u>MODEL 4100</u>			
1. Investigate Auto Angling Functioning.		E.D. Rankins	F
a) Check traps at Illion Fish and Game Club.			
b) Investigate cause of Auto Angling to malfunction intermittently.			