15-Apr-1991

xc:H.Munson
D.Thomas

To:J.Ronkanien
From:J.R.Snedeker
Ref: Cost estimate - M/700 Stainless Steel Project

This project will involve modifying the model 700 Bolt Action Rifle by using a Stainless Steel barrel, barrel bracket, bolt body assembly, receiver, and electro-less nickel plated fire control. The following calibers are anticipated at this time: 30-06, 270, 280, 7mm Rem Mag, 338 Win Mag, and the 300 Win Mag (or the 300 Wtrby).

The Design Acceptance Testing program for this project will consist of the following tests:

- o Intentional Abuse - high pressure overload.
- o Environmental Testing
- o Drop Testing
- o Dry cycling
- o Accuracy
- o Endurance

Intentional Abuse Test-

The Intentional Abuse test will be performed to insure that there is no loss of ability to withstand extremely high pressure overload stress due to either changes in materials or in processing. 12 Rifles will be used for this test (two of each caliber). The procedure will involve the working up of a high pressure load for each of the six calibers. When the load is determined, 12 rounds will be loaded and 10 of those 12 rounds will be shot in a pressure barrel to determine the mean pressure and the standard deviation of the load. The two remaining rounds will be used to test the rifles. The rifles will have the bores plugged with 4 bullets forced into the bore to a position just ahead of the chamber as per standard procedure.

Estimate:

12 guns (two of each cal.)- 4 man days to work up the loads, calibrate the equipment, do the actual testing.
4 man-days x 8 hrs/man-day = 32 man-hrs
32 man-hrs x $20/hr. = $640.

Environmental Testing -

The Environmental Testing will concentrate on the corrosion effects of salt on the appearance, function and safe use of the rifle. See F. Schmidt for an estimate for this testing.

Drop Testing -

12 rifles (two of each caliber) will be subjected the standard S.A.M.M.I drop test. (These twelve rifles will be used for the strength test as noted above.)

Estimate:

Drop test, Jar off test, and Rotation test; all positions as specified by the standard, examine for damage and record test results - 1 man-day.

1 man-day x 8hrs/man-day = 8 man-hrs

8 man-hrs x $20/hr. = $160.

Dry Cycling -

Two rifles will be dry-cycled to 50,000 cycles each to include the full closing, opening, and re-cocking of the action as well as the operation of the trigger and safety arm. The purpose of this test is to determine wear on the parts as well as the possible effects of "galling" between the working surfaces.

Estimate:

2 rifles to 50,000 cycles each; ~25 days with inspections performed every 1000 cycles for the first 5000 cycles and every 5000 cycles thereafter until 50,000 cycles.

1 man-hr/day to monitor and examine rifles and record data.

25 days x 1 man-hr/day = 25 man-hrs

25 man-hrs x $20/hr. = $500.

Accuracy -

The 12 guns (two of each caliber) used for the endurance test will be used for the Accuracy testing. The purpose of this test is to determine the effect on accuracy of using a stainless steel barrel. Accuracy will be measured at 0 rds, 1000 rds, 2000 rds, 4000 rds and a final check (for information) at the end of 10,000 rds.

The test will be shot at 100 yards in the test lab 200 yard range from the bench rest position. 3, five-shot groups will be shot for each rifle at each of the above specified endurance round levels per standard procedures. Targets will be gathered, digitized and analyzed.

Estimate:

(at any of the round level):
12 rifles; 3 man-days to shoot 3, five-shot groups, gather targets, digitize and analyze information;
3 man-days x 8hrs/man-day = 24 man-hrs
24 man-hrs x $20/hr. = $480.

@ 0 rds - $480.
@ 1000 rds - $480.
@ 2000 rds - $480.
@ 4000 rds - $480.
@ 10,000 rds - $480.

Total = $2400.

Ammo used: ~20 rds/rifle/rd level
20 rds x 12 rifles x 5 rd levels = 1200 rds
1200 rds x $.13/rd = $156

$2400
$ 156

Total = $2556

Endurance Testing -

The Endurance portion of the testing is intended to cycle the rifles under live fire load conditions to determine (among other things) if any critical dimensional or factory setting changes occur over the life cycle of the firearm. Checks are also made to determine if any excessive ware or material failures or breakages occur.

All 12 rifles (two of each caliber) will be shot to 4000 rds. (twice the normal expected 100 year life expectancy of the product). Half the rifles (6, one of each caliber) will be shot another 6000 rds to a total of 10,000 rds to check for any possible material failures.

Estimate:

Ammunition:

12 rifles to 4000 rds = 48,000 rds
6 rifles to 10,000 rds = 36,000 rds
Total 84,000 rds

84,000 rds x $.13/rd = $10,920.

Labor at 2000 rds/day/man = 42 man-days
42 man-days x 8hrs/man-day = 336 man-hrs
336 man-hrs x $20/hr. = $ 6,720.

ammo $10,920.
labor $ 6,720.
Total $17,640.

Totals:

o	Intentional Abuse	$ 640.
o	Environmental Testing	see F.Schmidt
o	Drop Testing	$ 160.
o	Dry cycling	$ 500.
o	Accuracy	$ 2,556.
o	Endurance	$ 17,640.
	Total:	$ 21,496.

Note: above estimate does not include the cost of the rifles which will be unusable after the testing is complete.