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DATE: 12/30/91

TOPIC: DECEMBER 1991 PROGRESS REPORT

o PROCESS DEVELOPMENT/RESEARCH OF NBAR:

To further test the strength of the proposed locking system, a gun was assembled and subjected to an extreme high pressure condition. The gun consisted of a single piece barrel and receiver and a shrouded bolt. A single piece barrel bracket with twin locking lugs was silver soldered into the receiver. To produce the extreme pressure desired, the bore was obstructed with four bullets seated ahead of the chamber and a high pressure round fired in the gun. The locking lug/barrel bracket exited the receiver allowing the bolt to traverse rearward exiting the receiver and impacting the rear of the iron enclosure. The receiver showed deformation due to the exiting of the barrel bracket. The bolt shroud was no longer intact. The locking surfaces of the bolt and the barrel bracket showed material failure.

To develop an understanding of the loading applied to the locking lugs and receiver during firing, the prototype assemblies utilized a low temperature silver solder to join the barrel bracket and receiver. The original design concept involved the use of an electron beam to weld the locking lug/barrel bracket into the receiver. After reviewing the test results and discussing the design with Bob Salo of Ferranti Sciaky, (electron beam specialists) it became apparent that electron beam welding would not be an effective joining process for these two components. To avoid the critical joining operation of these two components, Gary Barnes suggested Electrical Discharge Machining (EDM) the lugs from the inside of the receiver. Jim Ronkanien and I developed a symmetrical locking lug system that may be achievable using the EDM operation. Ingersoll GMBH (specializing in production EDM equipment) has been contacted and are currently reviewing the application, results are expected by Jan. 3, 1992.

Victor Vishnitsky from Cation is currently investigating the use of the Electrochemical Machining (ECM) process to ream centerfire rifle barrels prior to ECM rifling. The ECM rifling process does not effect the bore diameter or surface finish, therefore, the bore must be finished prior to rifling. Previously, prototype ECM rifled barrels required a three step operation, drill, ream and ball size to produce a finished bore. The objective of ECM reaming is to eliminate the ball sizing operation. If applicable, an ECM reaming operation will be developed for the NBAR and possibly the M/7400-7600 barrels. There are currently 80 NBAR blanks in process that will be available for Cation to process and return for evaluation.

To reduce the number of new parts and lead time required to produce prototype actions, the NBAR bolt was designed around the current M/700 long action firing pin assembly. The resulting design was sufficient for testing, but would prove to be too heavy for a sporting rifle. Thus, to reduce the weight of the NBAR bolt assembly, the bolt plug, firing pin head and bolt designs were altered. Experimental prints have been completed and tooling ordered to produce the lighter bolt assembly.