Memorandum

May 8, 2003

To: Danny Diaz
Scott Franz
From: Jim Ronkainen

RE: Alteration to Fluted Firing Pin EET Plan

On April 17, 2003, I revised the Engineering Evaluation Test (EET) plan for the fluted firing pin to include testing of the trigger assembly from the Bolt Action Maintenance Review (BAMR) program in the SAAMI Jar Off (TLW1116J), SAAMI Rotation (TLW1116K), and SAAMI Drop testing (TLW1116L). The purpose of this change was to allow for the evaluation of the performance of the fluted firing pin when used in conjunction with the recently transmitted BAMR trigger assembly design in the above named tests.

On May 7, two failures occurred during the course of conducting SAAMI Jar Off testing with the BAMR trigger assemblies and the fluted firing pins. The first failure was on gun A-5, a Model 700 ADL Synthetic in 300 Win Mag in the "bottom down" orientation. Two drops prior to the failure, the stock on gun A-5 broke and was replaced with a Model 700 ADL Long Action Standard synthetic stock (incorrect barrel channel) because there were no synthetic magnum ADL stocks available. Initially, I attributed the failure on gun A-5 to using the incorrect stock and continued testing with the intent of repeating the test on A-5 with the correct stock when it was available. The second jar off test failure was on gun A-7, a Model 700 Varmint Synthetic in 308 Win in the "bottom up" orientation. After the second failure, all SAAMI Jar Off testing with the BAMR trigger assemblies was halted to investigate the cause of the two failures. Post-test measurements of the trigger assembly settings for both rifles showed there had been no significant change in the trigger/sear engagement or trigger pull force as a result of the SAAMI Jar Off test.

Investigation into the history associated with the BAMR trigger assemblies selected for use in this test found that the trigger assemblies had previously been through a large number of Jar Off/Rotation/Drop/ Extended Jar Off test "impacts" as part of the BAMR Design Acceptance Test (DAT). All of the BAMR trigger assemblies used for the fluted firing pin testing had 14 previous impacts from SAAMI Jar Off/Rotation/Drop plus from 18 to 30 additional impacts from Extended Jar Off testing, for a total of 32 to 44 impacts per trigger assembly. Previous testing has demonstrated that repeated Jar Off/Rotation/Drop impacts will "sensitize" a trigger assembly and action to impact, causing it to fail tests it had previously passed. The root cause for this "sensitization" is not currently known or completely understood, but is hypothesized to be related to imperceptible changes to the gun components as a result of the repeated, violent impacts caused by Jar Off/Rotation/Drop testing. Extended Jar Off test impacts pose especially high energy levels for the guns (from 1.5X to 4X the kinetic energy levels of SAAMI Jar Off), hastening the sensitization of the gun to impact testing. In addition to the previous impacts, eleven of the BAMR trigger assemblies had 500 rounds of previous live-fire testing while the twelfth trigger assembly had 1000 rounds of previous live-fire testing as part of the BAMR DAT. The BAMR trigger assemblies used on guns A-5 and A-7 had 44 and 32 previous impacts, respectively, and 500 rounds each of previous live-fire testing.

The SAAMI test criteria for Jar Off, Rotation, and Drop testing stipulate the use of new trigger assemblies. Based on their history, the BAMR trigger assemblies employed for this testing were not new. Based on my investigation, I believe the previous impact type testing of the BAMR trigger assemblies, especially the Extended Jar Off testing, sensitized the trigger assemblies to impact testing and was the cause of the failures experienced in our testing. Since the BAMR trigger assemblies were not new and had potentially been sensitized by previous testing, all testing with the BAMR trigger assemblies and the fluted firing pin assemblies was stopped. Any future testing of the fluted firing pin with the BAMR trigger assembly will require that new trigger assemblies be available.