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Sent: Friday, July 19, 2002 4:47 PM
To: Diaz, Danny; Danner, Dale; Franz, Scott; Snedeker, Jim
Subject: Gun A33 - Extended SAAMI Jar-Off Testing

On Tuesday, July 16, 2002, Bolt Action Maintenance Review Design Acceptance Test (DAT) rifle A33 (Model 700 VS, 223 Rem) with a police firing pin assembly had the firing pin fall at the 6" level of the Extended SAAMI Jar-Off test in the "bottom of the stock up" attitude. Subsequent post-test inspection and measurement of the rifle showed that, while the trigger/sear engagement was within specification for the test (0.0187 versus 0.0190-0.0185), the trigger pull force was below the minimum limit permitted by the test (3.135 lbs actual versus 3.500 lbs minimum).

After the post-test measurements were completed, the trigger/sear engagement was adjusted to 0.0190 and the trigger assembly was lubricated per design engineering specifications. Prior to readjustment of the trigger pull screw, the trigger pull force was measured and found to be substantially below the minimum limit for the test (force measured was approximately 2.0 lbs versus 3.5 lbs minimum limit). The trigger pull force was then adjusted to be above the minimum specification (3.530 lbs actual versus 3.500 lbs minimum) and the Extended SAAMI Jar-Off test at 6" was repeated on the firearm. The rifle passed. Post-test measurements and subsequent relubrication and adjustments were made and the Extended SAAMI Jar-Off test was repeated again. The rifle passed. This cycle was repeated three more times for a total of five trials, with the rifle passing the test each time.

Based on the evidence gathered, the fall of the firing pin of rifle A33 during the initial Extended SAAMI Jar-Off test at 6" was due to inadequate relubrication of the trigger assembly between test cycles. The marked drop in trigger pull force after the trigger assembly was properly relubricated strongly supports this finding. This hypothesis is also supported by the fact that the properly lubricated and adjusted trigger assembly was retested and passed the 6" level of the Extended SAAMI Jar-Off test five times.

Some background may be helpful in understanding how and why lubrication affects trigger pull force. The trigger pull force is equal to the sum of the force due to the trigger pull spring plus the force due to friction between the trigger and other components within the trigger assembly. When the trigger assembly is not properly lubricated, the frictional component of the trigger pull force becomes larger, which necessarily causes the trigger pull spring component of trigger pull force to be smaller when the trigger pull force is adjusted to meet the trigger pull force limit for the test. Low trigger pull spring forces contribute to increased jar-off sensitivity.