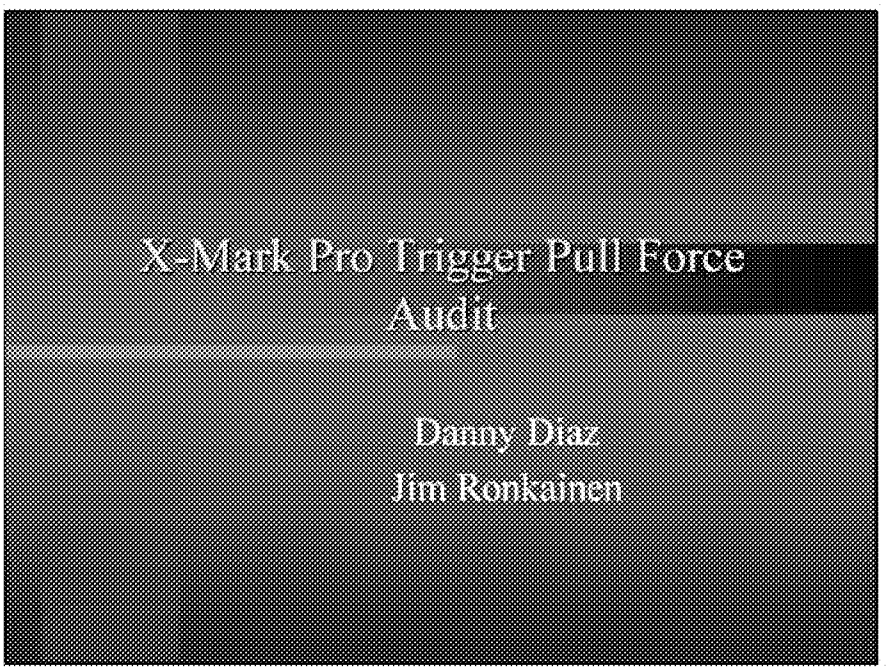


BARBER - RE 0001743

XMP Audit – Background

- Eight writers' rifles from a June hunt had higher than expected trigger pull forces
- Marketing measured trigger pull forces on 4 of the 8 guns above high limit (>5.5 lbs) after the hunt
- Marketing requested that production review the production trigger pull setting and verification process to understand why trigger pulls above high limit were found
- A warehouse audit of the trigger pull force on rifles with XMP trigger assemblies was requested by marketing at the August Product Team meeting

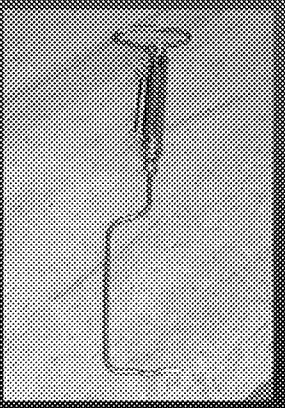
XMP Audit – The Task

- Measure trigger pull on a statistically valid sample of production rifles with XMP trigger assemblies
- Measure trigger pull using multiple measurement methods
- Analyze the data
- Report back on findings

BARBER - RE 0001745

XMP Audit – Equipment

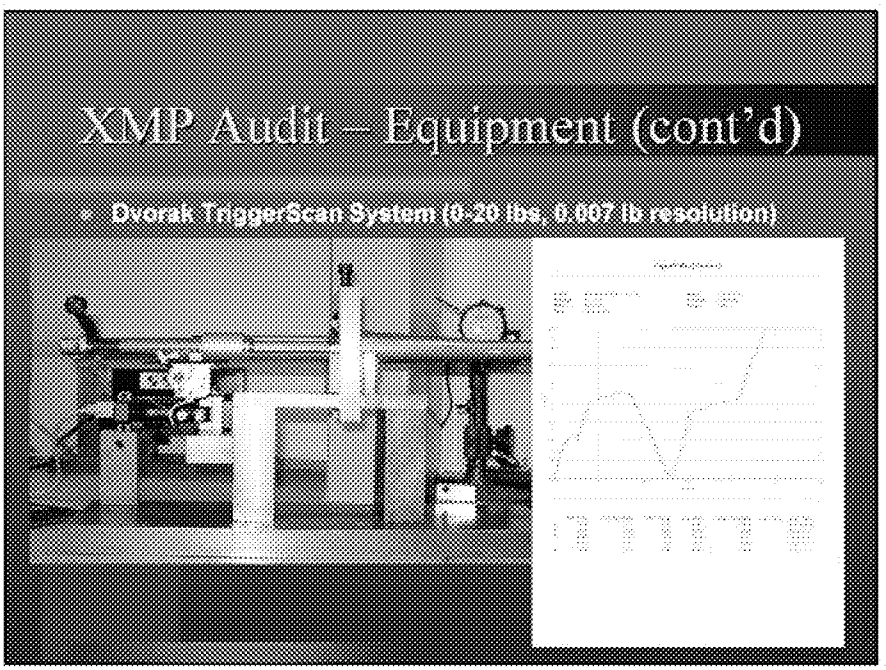
- Handheld Chatillon spring scale (0-10 lbs, ¼ lb resolution)



BARBER - RE 0001746

XMP Audit – Equipment (cont'd)

- Handheld Lyman digital trigger pull gage (0-12 lbs, 0.5 oz. resolution)



BARBER - RE 0001748

XMP Audit – The Procedure

- Measure trigger pulls using the Chatillon gage
  - 3 measurements – no cycling the safety (NSC) between trigger pulls
  - 3 measurements – cycling the safety (SC) between each pull
- Measure trigger pulls using the Lyman gage
  - 3 measurements – no cycling the safety (NSC) between trigger pulls
  - 3 measurements – cycling the safety (SC) between each pull
- Remove the action from the stock
- Measure trigger pulls using the Dvorak
  - 5 measurements – cycling the safety (CS) between each pull
  - 5 measurements – no cycling the safety (NSC) between trigger pulls
- Reassemble the action to the stock, verify function

XMP Audit – SKU Data

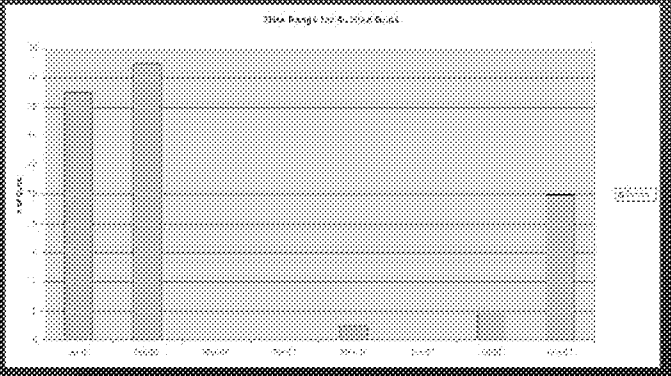
- A snapshot of bolt action centerfire rifle warehouse inventory on 6/30 served as the basis for SKUs selected
- 24 SKUs for test were selected proportionally to their warehouse inventory position
- Several SKUs from the original order required alternate selections as none of the available inventory had XMP trigger assemblies

SKU	Description	Qty	SKU	Description	Qty	SKU	Description	Qty
27965	700 CDL	9	27045	700 CDL	1	64972	700 CDL SF	*
27930	700 SPS DM	7	27046	700 CDL	1	64050	700 CDL BAC	1
64171	700 SPS SM C	5	27068	700 ADL Syn Y Sc	1	64064	700 CDL BAC	1
27928	700 SPS DM	5	27067	700 ADL Syn Sc	1	64035	700 CDL BAC	1
27911	700 CDL	2	27142	700 SPS SS DM C	1	64174	700 SPS SM C	1
27995	700 ADL Syn Sc	2	27143	700 SPS SS DM C	1	64062	700 Alaskan TI	1
64061	700 CDL BAC	2	27096	700 VSF	1	64270	700 Mtn LSS	1
64217	700 SPS Var	2	27145	700 SPS DM *	1			

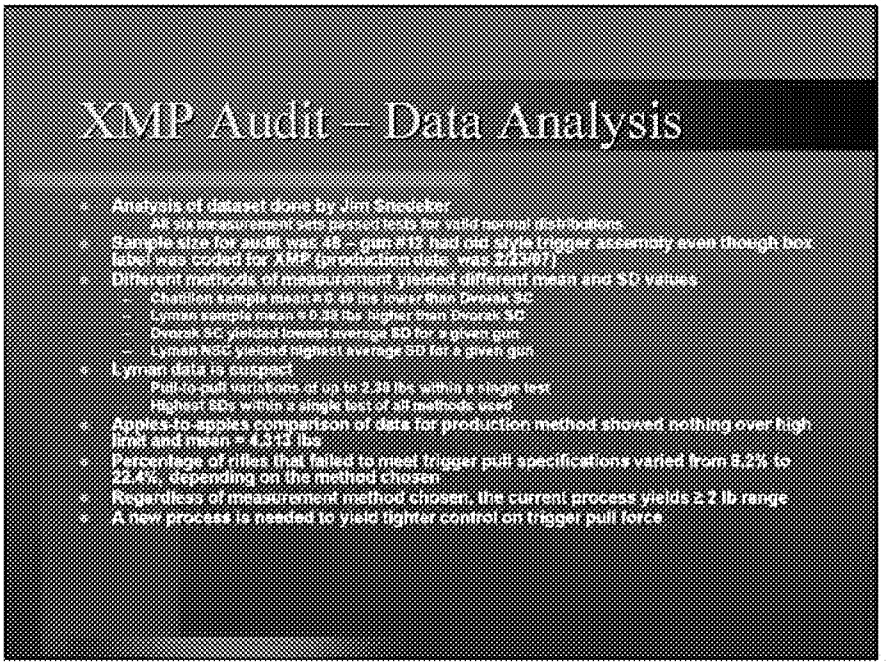
* non-XMP trigger assembly

XMP Audit – Data Analysis

- Production dates for audited sample range from 1/3/07 to 8/30/07



BARBER - RE 0001751



BARBER - RE 0001752

XMP Audit – Data Analysis

- Descriptive statistics for averages of measurements

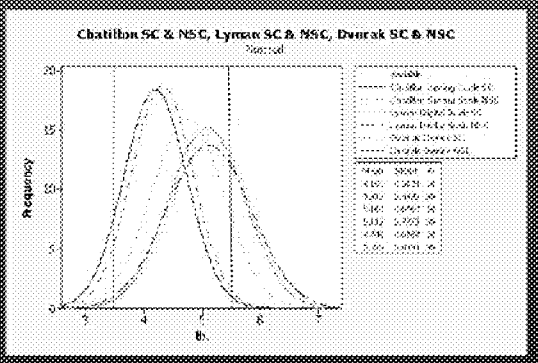
Method	Mean	SD	Min	Max	Range
Chatillon SC	4.195	0.5424	3.000	5.167	2.167
Chatillon NSC	4.313	0.6328	3.167	5.500	2.333
Lyman SC	5.164	0.6768	3.771	6.833	3.062
Lyman NSC	5.117	0.7270	3.354	6.917	3.563
Dvorak SC	4.749	0.6289	3.415	5.947	2.532
Dvorak NSC	5.079	0.6554	3.562	6.456	2.894

* Table includes data for gun #12 – non-XMP trigger assembly

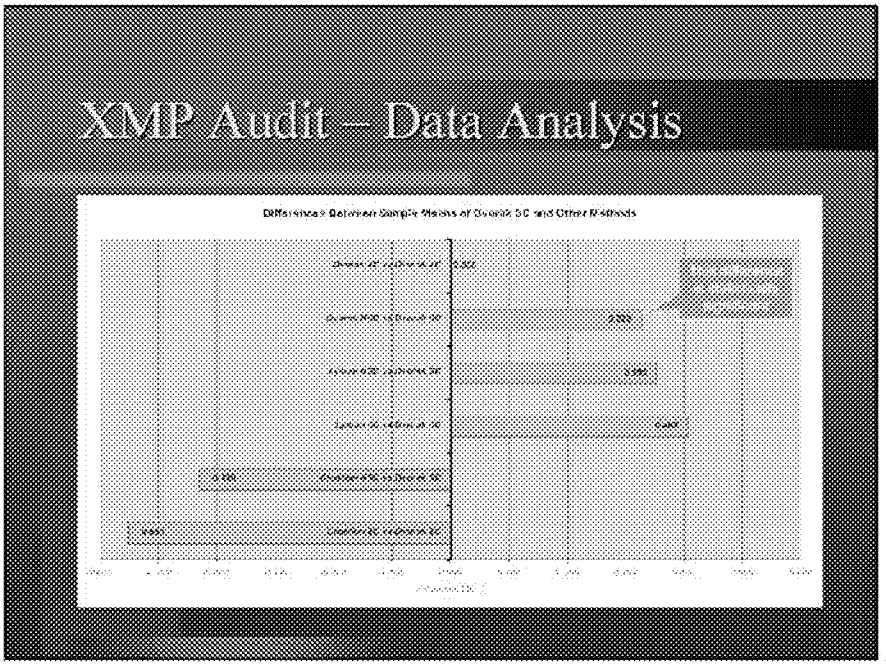
 BARBER - RE 0001753

XMP Audit – Data Analysis

- Comparison of distribution of averages of measurements by method

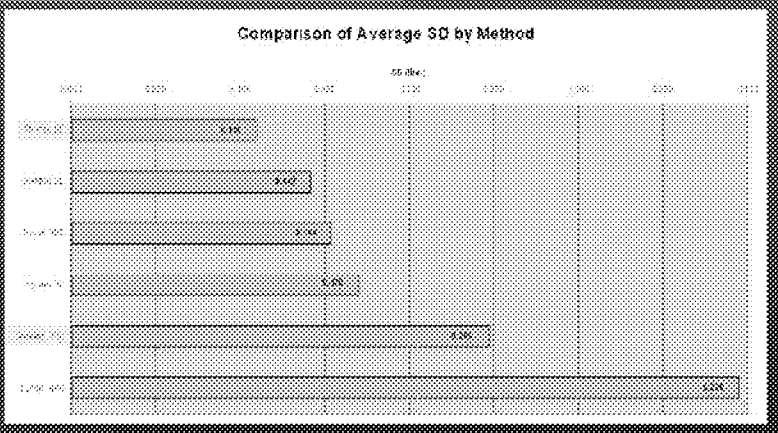


BARBER - RE 0001754



BARBER - RE 0001755

XMP Audit – Data Analysis



XMP Audit – Data Analysis

- **Comparison of Nonconformity Found By Each Method**

Method	# < LSL	# > USL	# OUT	% nonconforming
Chatillon 3C	4	0	4	9.3%
Chatillon NSC	4	0	4	9.3%
Lyman 3C	0	11	11	22.4%
Lyman NSC	1	9	10	20.4%
Dynisk 3C	2	0	2	10.2%
Dynisk NSC	0	10	10	20.4%

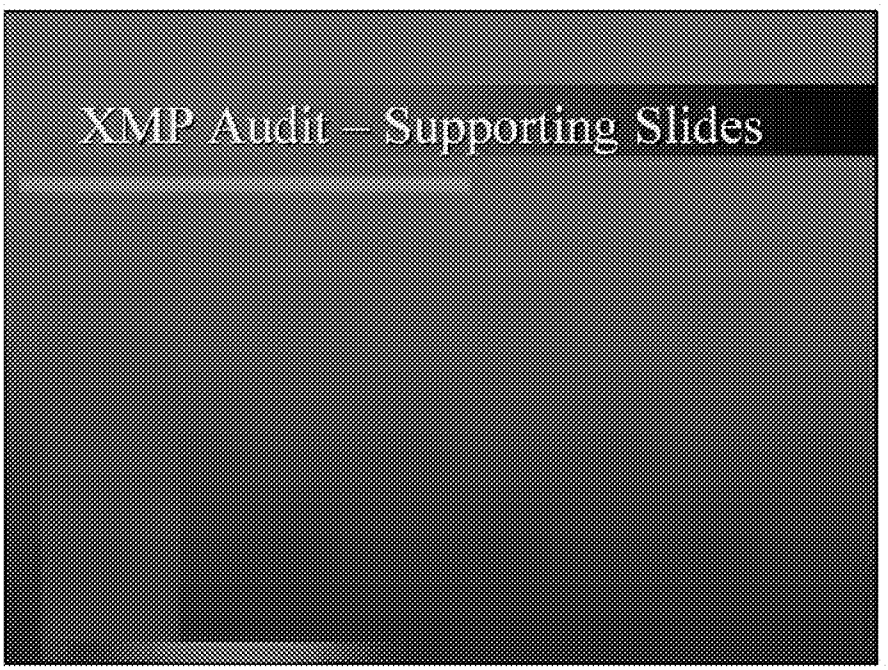
XMP Audit – General Observations

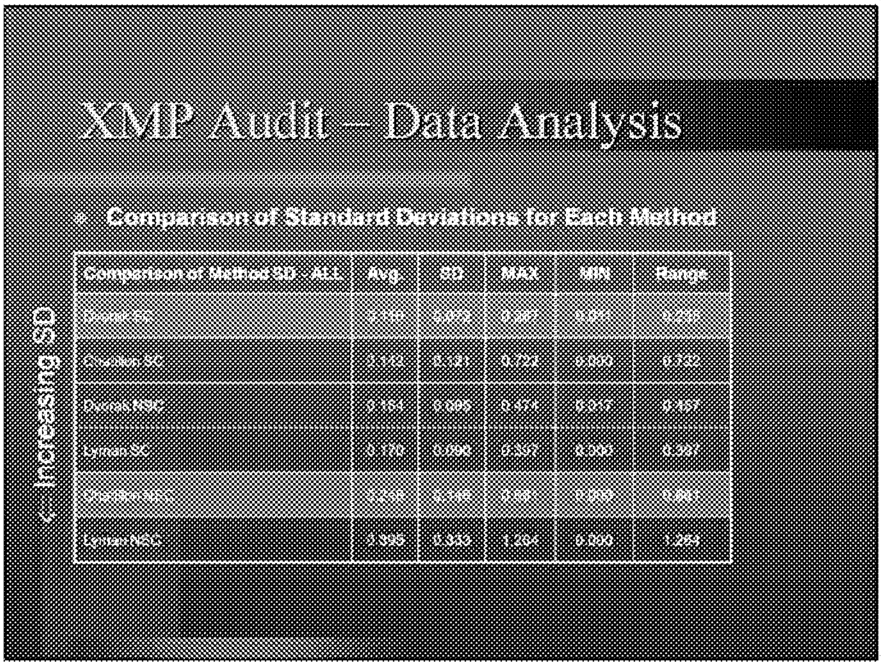
- Some trigger assemblies show more pull-to-pull variation than others
  - Variation seemed to be independent of measurement method
  - Source of the variation is unknown
- Chatillon spring scale measured trigger pull ~0.49 lb lower than Dvorak SC
- Lyman digital force gage measured trigger pull ~0.38 higher than Dvorak SC
- Dvorak SC yielded lowest average pull-to-pull SD
- Lyman NSC yielded highest average pull-to-pull SD

BARBER - RE 0001758

XMP Audit - Recommendations

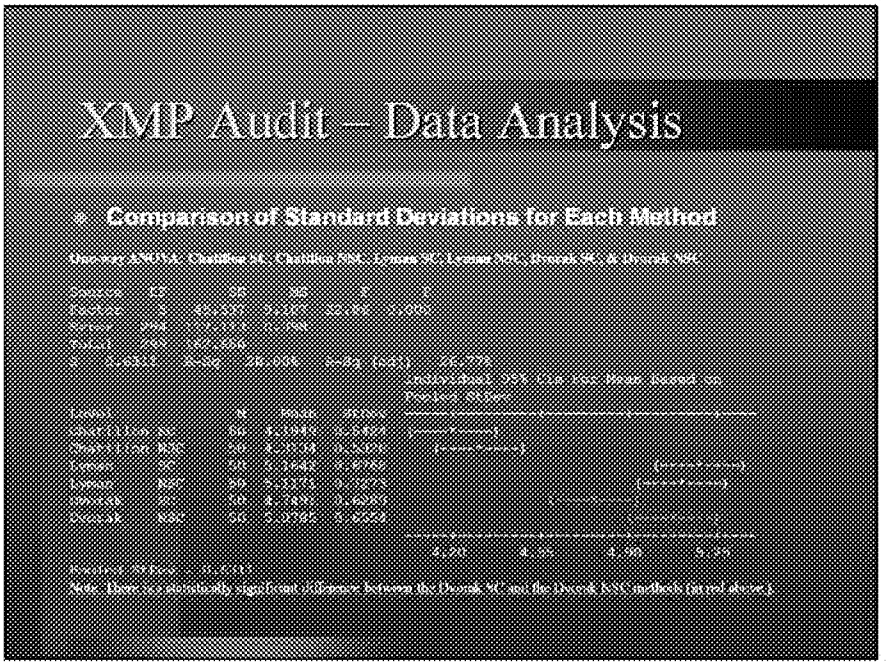
- Need a new trigger pull setting and measuring process
- The new process should:
  - Provide better resolution of the measurement than current method
  - Provide a tighter setting range (if possible)
  - Remove the effects of the operator on the measurement wherever possible
  - Minimize impact on product cost while maximizing productivity
  - Provide information on trigger pull other than just peak force





 BARBER - RE 0001761

RE0001733


XMP Audit – Data Analysis
Comparison of Standard Deviations for Each Method