Boulder County 2012 General Election
Post-Election Risk-Minimizing Audit Demonstration
Summary of Results
March 11, 2013

Overview

In 2014, all Colorado County Elections offices will be required by law to perform a risk-limiting audit. Boulder County has been performing a risk-minimizing audit since 2008, and arranged to demonstrate the process to other Colorado counties as well as the Secretary of State's office after the 2012 General Election. This demonstration audit was not the official election audit for the 2012 Boulder County General Election, which by statute was conducted immediately after the election following the current state standards. This report summarizes the results of this demonstration audit.

The audit was comprised of a manual tabulation of a statistical sample (roughly 0.2%) of the votes cast in the election followed by a comparison with the Election Day tally. Any discrepancies were investigated.

The 2012 General Election post-election audit included:

- 12,486 ballots on 65 audit units (MBBs); some MBBs contained multiple audit contests, resulting in a count of 78 MBB contests.
- Twelve contests, 10 of which were either state-wide or multi-county, with two in Boulder County only. None of the contests selected were uncontested.
- 9,055 ballot-contests – some of the batches selected contained multiple audit contests, but this number reflects the number of contest votes audited.
- No contests were within the state-mandated recount threshold (margin < 0.5% of winner). However, the Town of Erie Ballot Issue had a relatively tight margin of 0.8%.

The audit was based on a snapshot of the election taken November 15, nine days after Election Day. At that time all of the election ballots except for provisionals had been verified and counted, representing 98.5% of the election's final 180,712 ballots. These ballots were grouped in 1,089 individually tallied batches, also referred to throughout this document as MBBs. In order to protect voter anonymity, MBBs with fewer than 25 voters were combined for the selection process with another MBB. There were 22 such combinations created.

A meeting was held on December 6, 2012, for the purposes of demonstrating the contest and batch selection process. Due to scheduling conflicts, the actual audit was delayed until March 5-6, with the final results meeting being held on March 11.

To briefly summarize the audit results, no systemic errors were found in the voting equipment, and no trends or differences were identified across the various equipment paths. Of the 9,055 contest votes reviewed on 12,486 ballots in this year's audit, there were no differences found between the machine counts and the manual verification counts.

Audit Preparation and Setup

On December 6, the Boulder County Elections Department met with representatives from the Colorado Secretary of State's office and various county representatives to present an overview of our risk-minimizing audit process and to demonstrate the selection process for contests and batches for the manual count.

In this meeting, they:

1. Reviewed the techniques used for contest and MBB selection. The contest and MBB selection techniques were encapsulated in a parameterized spreadsheet:
   - **Contests**: selected randomly with probability proportional to margin

     M = Margin = diff between winner & loser
     V = ballots voted in contest
     m = relative margin = M/V

     Small relative margin ➔ more likely to select contest.

     How many contests: select contests as long as there are resources to audit them.
   - **MBBs**: selected randomly using the NegExp statistical technique[1]. This selection technique promises improved efficiency when auditing multiple contests in a large election.

     For each contest:
     Which MBBs → random with probability proportional to # contest ballots
     How many MBBs → weighted by margin and two NegExp parameters

     wpm = a bound on the miscount expected per MBB
     confidence = a measure of statistical effectiveness of the algorithm

2. Fine-tuned the MBB selection parameters. Each contest had tunable MBB selection parameters *wpm* and *confidence*, which are defined above.
   1. Negexp parameter defaults were set as follows:

Contest	wpm	Confidence
Federal	0.20	99%
State	0.20	99%
County	0.20	99%
Local	0.20	80%

   2. The value of *wpm* puts a ceiling on the amount of error (or miscount) anticipated in an MBB. This error bound must be greater than the margin for each contest. The default value of *wpm*=0.20 was used in the spreadsheet and did not have to be adjusted for the 12 contests audited:

[1] Aslam, Popa, Rivest, http://www.usenix.org/event/evt08/tech/full_papers/aslam/aslam_html

Contest	wpm
Presidential Electors	0.20
Representative to the 113th United States Congress - District 4	0.20
Regent of the University Of Colorado - At Large	0.20
State Representative - District 33	0.20
District I Regional Transportation District Director	0.20
Court Of Appeals - Daniel Marc Taubman Vote For 1	0.20
Amendment S (Constitutional)	0.20
Amendment 64 (Constitutional)	0.20
City of Boulder Ballot Question No. 2c	0.20
Town of Erie Ballot Issue No. 2a	0.20
St. Vrain Valley School District Re-1j Ballot Issue No. 3a 1	0.20
Rocky Mountain Fire Protection District Ballot Issue 5a	0.20

3. Selected MBBs to audit. The ***wpm*** and ***confidence*** parameters selected above combined with the contest margin determined a selection probability for each MBB for each contest. To determine if an MBB is selected in the audit of the contest, its probability is tested against a randomly generated number – if the selection probability is greater than the random number then the MBB is tagged as an audit unit for the contest. Because a large number of random numbers were needed for this, a pseudorandom number algorithm was used to generate a list of random numbers. The algorithm required a 15-digit seed, which itself was randomly built by combining three random digits from each of five people. The resulting seed was 719-042-071-103-759.
4. Selected contests. The final task during the Audit Setup Meeting was to select contests. The first contest was selected by the rolling of four dice. Subsequent contests were selected by using the random number generator. Because the Town of Erie contest was relatively close, and there were no other contests that were close, it took a total of 43 picks in order to obtain the 12 selected contests. The random numbers and the contests selected are shown in Attachment 1.

   Note: Unopposed contests were excluded from selection by setting their contest probability to zero.

Attachment 2 summarizes the complete set of contests and MBBs that were selected. In total, 9,055 votes were to be manually verified for the 12 selected contests. These votes were contained within 12,486 ballots on 65 MBBs.

Before starting the manual verification process, a check was completed to ensure that the set of selected MBBs represented all scanners in use on Election Day as well as all voting methods, which was confirmed. Additional MBBs/contests would have been manually added if this had not been the case.

Conducting the Audit

Manual Verification

The manual verification process was organized by MBB and included:

1. Reviewing each ballot by hand to identify voting selections.
2. Recording selections on a Manual Verification Worksheet (MVW).
3. Tallying the selections recorded.
4. A comparison to Election Day results in order to verify machine count accuracy.

For each MBB selected, all associated ballots/batches were first collected to create the auditable batch (an MBB may contain cast vote results for one or more scanned batches). If an MBB contained multiple audited contests, the batch was processed once for each contest. Voter Intent was also a key element of the manual verification and the teams were trained to use the same voter intent guidelines that were used on Election Day.

The manual tally was performed in two-person teams. If a second count was required, the batch was given to a different audit team for the second count and if the subsequent count still did not match the machine count a third audit team different than the original two teams was utilized to perform the sort and stack verification method as a final step.

Attachment 3 shows a sample Manual Verification Worksheet (MVW) similar to the ones used by the manual verification teams during the counting process. Attachment 4 shows a sample Comparison Worksheet which is used by data entry to enter the counting results and compare them to the machine counts for the contest on that batch.

Two Person Audit Team Process

Two-person team configuration:

The two-person audit team technique, consisting of only a “Reader” and “Tallier”, was first trialed in the 2011 Coordinated Election audit and then fully utilized in the 2012 Primary audit, as well as this demonstration.

This technique took away the role of the Observer from the previously utilized four-person technique. The change created a requirement for active participation by each team member in the production of a single tally sheet (MVW) and increased team member responsibility in result accuracy.

Additional procedural steps were also implemented with this technique to improve accuracy on a single MVW. A few notable steps include, sorting and separating ballots containing the applicable contest, from those without, multiple verification steps designed to catch errors early and often, and a distinct third count verification that utilizes a sort and stack method at the contest selection level.

In comparing the average number of batches requiring additional counts over the last five audits (including this demonstration), the data suggests that at the audit unit (MBB) level, the average rate of manual verification counting errors has decreased by over 19%, from 31% of all audit units requiring additional counts to 12%.

Sort & Stack Verification:

The sort & stack verification technique ("third count") is an improved method for resolving mismatched results. If the results didn't match up for the first count, the course of action was to have a different team complete a second count, adding special attention and documentation for any ballot that might provide a difference in voter intent. In this audit, the first count mismatch occurred on nine MBBs, with eight being resolved by this second count. The one unresolved difference therefore proceeded to the third count verification process intended to confirm an accurate MVW record before proceeding to the investigation of election night resolution actions, as well as to pull up any identified voter intent ballots for comparison. The third count was uniquely executed using the sort and stack verification method.

Using a team with sort and stack experience, all contest ballots were first pulled and sorted into two piles, "Ballots with contest" and "Ballots without contest", and counts verified to ensure proper sorting. Then, each contest ballot was reviewed and placed into a unique pile, based on the contest selection (i.e. Yes, No, Overvote, Undervote). Finally, for each selection stack, the ballots were reviewed again, counted, recorded on the MVW, and tallied. If there was any question in the validity of count, the batch was re-verified separately to confirm.

For the one third count required in this audit, it was confirmed that the first two manual counts were attributed to audit team error, misidentifying the number of ballots that did not contain the audit contest, and no true difference existed. The third count results matched accurately to the machine count totals.

Comparison with Election Day Results

Election Day results were prepared for the MBBs and compared with the hand tally. If there was a discrepancy, the contest in question was counted again by a different audit team. The audit teams were instructed which contest to count but were not told what the discrepancy was.

For each batch included in the audit, the manual verification comparison was documented by combining the manual verification worksheet results (i.e., Attachment 3) with the Election Day results into a Comparison Worksheet. Attachment 4 shows the machine count source data, as well as the comparison worksheet.

Discrepancy Investigations

Comparisons of Election Day results against manual verification results indicated that out of the 9,055 ballot contests audited, there were no differences found.

The manual verification "first counts" resulted in nine discrepancies across the 78 MBB contests audited. Eight of these discrepancies were resolved by the second count. One was resolved by a third count, resulting in 10 total second/third counts. All of these 10 could be attributed to human errors in the manual verification counts, for which the following reasons were identified:

1. Incorrect distinction between ballots with and without contest (4)
2. Recording error by teams, one of which was just in the totals row (5)
3. Electronic data entry error when recording the count results – should not have been a second count (1)

For the one batch that had to go to a third count, the incorrect distinction between ballots with and without the contest was the cause for both extra counts.

Nine of the 10 discrepancies were encountered on the first of two days of counting. When reviewing the errors at the end of the first day, process improvements were identified which were incorporated on the second day. By making changes to the manual verifying process, which primarily consisted of the teams verifying all of their counts after each group of 10 ballots, there was only one manual verification error encountered the second day.

One discrepancy was identified in the machine count of total ballots on one batch. The program which is used to process the output of the Hart Tally system counts the ballots in a batch by using a contest that is on every regular election ballot, and counting how many ballots contain that contest. The contest used for this process for the 2012 General Election was the presidential race. However, one Landowner ballot was mistakenly included in the batch (Landowner ballots are normally kept in their own batch), and since Landowner ballots contain only one contest – a special district contest for which non-resident landowners are allowed to cast a ballot – the machine count produced by the pre-processing program was off by one. The machine count of total ballots in the batch was updated manually and a second count was not required for this batch.

Since there were no election results in question after the manual verification was complete, it was not necessary to complete a statistical analysis on the contest outcomes to analyze the impact on the election results.

Audit Results

No systemic errors were found in the voting equipment, and no trends or differences were identified across the various equipment paths. Of the 9,055 contest votes reviewed in this year's audit, there were no differences found between the machine counts and the manual verification counts.

The results of the audit of the 2012 General Election were presented to representatives from the Secretary of State's office, various counties, as well as observers on March 11, 2013. Since this was a demonstration audit, there was no sign-off document required.

Attachment 1 - Contest Selection

Random #	Contest	Already Selected?	Contest Ballots	Total Contest Ballots	Num Contests
0.6730	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1		3128	9055	12
0.8850	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.8657	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.3409	COURT OF APPEALS - Daniel Marc Taubman Vote For 1		149		
0.4584	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.3436	COURT OF APPEALS - Daniel Marc Taubman Vote For 1	Already Picked			
0.1033	REGENT OF THE UNIVERSITY OF COLORADO - AT LARGE Vote For 1		708		
0.8301	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.6043	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.4965	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.5687	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.8763	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.4685	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.3895	Amendment 64 (CONSTITUTIONAL) Vote For 1		558		
0.6791	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.3735	Amendment S (CONSTITUTIONAL) Vote For 1		558		
0.0100	PRESIDENTIAL ELECTORS Vote For 1		558		
0.1043	REGENT OF THE UNIVERSITY OF COLORADO - AT LARGE Vote For 1	Already Picked			
0.1980	STATE REPRESENTATIVE - DISTRICT 33 Vote For 1		216		
0.8112	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.9671	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.6869	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.9903	ROCKY MOUNTAIN FIRE PROTECTION DISTRICT BALLOT ISSUE 5A Vote For 1		50		
0.8954	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.4193	City of Boulder Ballot Question No. 2C Vote For 1		900		
0.5776	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.3852	Amendment 64 (CONSTITUTIONAL) Vote For 1	Already Picked			
0.8556	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.0019	PRESIDENTIAL ELECTORS Vote For 1	Already Picked			
0.8361	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.3694	Amendment S (CONSTITUTIONAL) Vote For 1	Already Picked			
0.6127	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.5759	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.2685	DISTRICT I REGIONAL TRANSPORTATION DISTRICT DIRECTOR Vote For 1		2078		

Attachment 1 - Contest Selection

Random #	Contest	Already Selected?	Contest Ballots	Total Contest Ballots	Num Contests
0.6996	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.8775	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.8103	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.5057	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			
0.9707	ST. VRAIN VALLEY SCHOOL DISTRICT RE-1J BALLOT ISSUE NO. 3A: Vote For 1		76		
0.2124	STATE REPRESENTATIVE - DISTRICT 33 Vote For 1	Already Picked			
0.2373	DISTRICT I REGIONAL TRANSPORTATION DISTRICT DIRECTOR Vote For 1	Already Picked			
0.0515	REPRESENTATIVE TO THE 113TH UNITED STATES CONGRESS - DISTRICT 4 Vote For 1		76		
0.6611	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	Already Picked			

Attachment 2 - Contest and MBB Audit Results Summary

	PRESIDENTIAL ELECTORS Vote For 1	REPRESENTATIVE TO THE 113TH UNITED STATES CONGRESS - DISTRICT 4 Vote For 1	REGENT OF THE UNIVERSITY OF COLORADO - AT LARGE Vote For 1	STATE REPRESENTATIVE - DISTRICT 33 Vote For 1	DISTRICT I REGIONAL TRANSPORTATION DISTRICT DIRECTOR Vote For 1	COURT OF APPEALS - Daniel Marc Taubman Vote For 1	Amendment S (CONSTITUTIONAL) Vote For 1	Amendment 64 (CONSTITUTIONAL) Vote For 1	City of Boulder Ballot Question No. 2C Vote For 1	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	ST. VRAIN VALLEY SCHOOL DISTRICT RE-1J BALLOT ISSUE NO. 3A: Vote For 1	ROCKY MOUNTAIN FIRE PROTECTION DISTRICT BALLOT ISSUE 5A Vote For 1	Audit Summary			
	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	**12**	**Contests Selected**		
MBBs to Audit	2	1	3	2	16	1	2	2	5	42	1	1	**65**	**MBBs Selected for Audit**		
Ballot-Contests	558	76	708	216	2078	149	558	558	900	3128	76	50	**78**	**MBB Contests Selected**		
													9,055	**Ballot-Contests Selected**		
													12,486	**Total Ballots Included for Audit**		
													10	**Recounts Required**		**Counts Required**
j_ed_065, j_ed_129									Audited				68	Selected	1	1
j_ed_125					Audited								49	Selected	1	1
j_ed_138										Audited			58	Selected	1	1
p_ed_009										Audited			325	Selected	1	1
p_ed_186	Audited		Audited				Audited	Audited	Audited				408	Selected	5	1
p_ed_223										Audited			415	Selected	1	1
p_ed_250				**Audited**									457	Selected	1	**2**
p_ed_283										Audited			178	Selected	1	1
p_ev_198, p_ed_178					Audited					Audited			221	Selected	2	1
p_ev_382										Audited			149	Selected	1	1
p_ev_419										Audited			300	Selected	1	1
p_ev_461					Audited								300	Selected	1	1
p_mb_1011										**Audited**			149	Selected	1	**2**
p_mb_1028					Audited								150	Selected	1	1
p_mb_1031												Audited	150	Selected	1	1
p_mb_1034					Audited								150	Selected	1	1
p_mb_1053										Audited			149	Selected	1	1
p_mb_1059					Audited								148	Selected	1	1
p_mb_1121										Audited			150	Selected	1	1
p_mb_1127					**Audited**								150	Selected	1	**2**
p_mb_1136										Audited			150	Selected	1	1
p_mb_1141										Audited			150	Selected	1	1
p_mb_1151										Audited			150	Selected	1	1

	PRESIDENTIAL ELECTORS Vote For 1	REPRESENTATIVE TO THE 113TH UNITED STATES CONGRESS - DISTRICT 4 Vote For 1	REGENT OF THE UNIVERSITY OF COLORADO - AT LARGE Vote For 1	STATE REPRESENTATIVE - DISTRICT 33 Vote For 1	DISTRICT I REGIONAL TRANSPORTATION DISTRICT DIRECTOR Vote For 1	COURT OF APPEALS - Daniel Marc Taubman Vote For 1	Amendment S (CONSTITUTIONAL) Vote For 1	Amendment 64 (CONSTITUTIONAL) Vote For 1	City of Boulder Ballot Question No. 2C Vote For 1	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	ST. VRAIN VALLEY SCHOOL DISTRICT RE-1J BALLOT ISSUE NO. 3A: Vote For 1	ROCKY MOUNTAIN FIRE PROTECTION DISTRICT BALLOT ISSUE 5A Vote For 1	Audit Summary			
	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	12	Contests Selected		
MBBs to Audit	2	1	3	2	16	1	2	2	5	42	1	1	65	MBBs Selected for Audit		
Ballot-Contests	558	76	708	216	2078	149	558	558	900	3128	76	50	78	MBB Contests Selected		
													9,055	Ballot-Contests Selected		
													12,486	Total Ballots Included for Audit		
													10	Recounts Required		Counts Required
j_ed_065, j_ed_129									Audited				68	Selected	1	1
p_mb_1169					Audited								150	Selected	1	1
p_mb_175										Audited			300	Selected	1	1
p_mb_177										Audited			**269**	Selected	1	1
p_mb_182										Audited			300	Selected	1	1
p_mb_282					Audited								150	Selected	1	1
p_mb_287										**Audited**			299	Selected	1	**2**
p_mb_294		Audited				Audited					Audited		149	Selected	3	1
p_mb_321										Audited			150	Selected	1	1
p_mb_335										Audited			300	Selected	1	1
p_mb_338					Audited								300	Selected	1	1
p_mb_345										Audited			300	Selected	1	1
p_mb_357										**Audited**			300	Selected	1	**2**
p_mb_360										Audited			150	Selected	1	1
p_mb_404										Audited			150	Selected	1	1
p_mb_470					Audited				Audited				300	Selected	2	1
p_mb_474										Audited			300	Selected	1	1
p_mb_488										Audited			300	Selected	1	1
p_mb_496					Audited								149	Selected	1	1
p_mb_528										Audited			150	Selected	1	1
p_mb_532										Audited			150	Selected	1	1
p_mb_539										**Audited**			150	Selected	1	**2**
p_mb_541			Audited						Audited				150	Selected	2	1
p_mb_569					Audited								148	Selected	1	1
p_mb_575										**Audited**			150	Selected	1	**2**

	PRESIDENTIAL ELECTORS Vote For 1	REPRESENTATIVE TO THE 113TH UNITED STATES CONGRESS - DISTRICT 4 Vote For 1	REGENT OF THE UNIVERSITY OF COLORADO - AT LARGE Vote For 1	STATE REPRESENTATIVE - DISTRICT 33 Vote For 1	DISTRICT I REGIONAL TRANSPORTATION DISTRICT DIRECTOR Vote For 1	COURT OF APPEALS - Daniel Marc Taubman Vote For 1	Amendment S (CONSTITUTIONAL) Vote For 1	Amendment 64 (CONSTITUTIONAL) Vote For 1	City of Boulder Ballot Question No. 2C Vote For 1	TOWN OF ERIE BALLOT ISSUE NO. 2A: Vote For 1	ST. VRAIN VALLEY SCHOOL DISTRICT RE-1J BALLOT ISSUE NO. 3A: Vote For 1	ROCKY MOUNTAIN FIRE PROTECTION DISTRICT BALLOT ISSUE 5A Vote For 1	Audit Summary			
	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	12	Contests Selected		
MBBs to Audit	2	1	3	2	16	1	2	2	5	42	1	1	65	MBBs Selected for Audit		
Ballot-Contests	558	76	708	216	2078	149	558	558	900	3128	76	50	78	MBB Contests Selected		
													9,055	Ballot-Contests Selected		
													12,486	Total Ballots Included for Audit		
													10	Recounts Required		Counts Required
j_ed_065, j_ed_129									Audited				68	Selected	1	1
p_mb_615										Audited			150	Selected	1	1
p_mb_628										**Audited**			150	Selected	1	**3**
p_mb_671										Audited			150	Selected	1	1
p_mb_687										Audited			150	Selected	1	1
p_mb_690				Audited									150	Selected	1	1
p_mb_714										Audited			150	Selected	1	1
p_mb_720										Audited			150	Selected	1	1
p_mb_768										Audited			149	Selected	1	1
p_mb_781										Audited			150	Selected	1	1
p_mb_820										Audited			150	Selected	1	1
p_mb_823					Audited					Audited			150	Selected	2	1
p_mb_842										**Audited**			150	Selected	1	**2**
p_mb_852					Audited								150	Selected	1	1
p_mb_911										Audited			149	Selected	1	1
p_mb_916										Audited			150	Selected	1	1
p_mb_950					Audited								150	Selected	1	1
p_mb_960									Audited				150	Selected	1	1
p_mb_982	Audited		Audited				Audited	Audited					150	Selected	4	1

Attachment 3 - Sample Manual Verification Worksheet (MVW)

Contest	TOWN OF ERIE BALLOT ISSUE NO. 2A - Vote Yes or No
District Styles	DS - 19 & 20

Audit ID	SYS
p_mb_532	C
Date	Batch #
	84
Contest Sequence #	Count #
1 of 1	1

Team: **Out:** **In:**

	Print First and Last Name	Affiliation
Reader		
Tallier		

Ballots w/ contest:

Ballots w/o contest:

Total Ballots:

Staff initials of verification:

Option	**Groups 1-5**	**Groups 6-10**	**Groups 11-15**	**Groups 16-20**	**Groups 21-25**	**Total**
Yes						
No						
OVER						
UNDER						
NOB						
Group Total						

Attachment 3 - Sample Manual Verification Worksheet (MVW)

Contest	TOWN OF ERIE BALLOT ISSUE NO. 2A - Vote Yes or No
District Styles	DS - 19 & 20

Team: **Out:** **In:**

	Print First and Last Name	Affiliation
Reader		
Tallier		

Ballots w/ contest:

Ballots w/o contest:

Total Ballots:

Staff initials of verification:

Audit ID	SYS
p_mb_532	C
Date	Batch #
	84
Contest Sequence #	Count #
1 of 1	1

Option	Group 1	Group 2	Group 3	Group 4	Group 5	Total
Yes	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
No	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
OVER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
UNDER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
NOB	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
Group Total						

Option	Group 6	Group 7	Group 8	Group 9	Group 10	Total
Yes	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
No	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
OVER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
UNDER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
NOB	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
Group Total						

Attachment 3 - Sample Manual Verification Worksheet (MVW)

Contest	TOWN OF ERIE BALLOT ISSUE NO. 2A - Vote Yes or No
District Styles	DS - 19 & 20

Audit ID	SYS
p_mb_532	C
Date	Batch #
	84
Contest Sequence #	Count #
1 of 1	1

Team: **Out:** **In:**

	Print First and Last Name	Affiliation
Reader		
Tallier		

Ballots w/ contest:

Ballots w/o contest:

Total Ballots:

Staff initials of verification:

Option	Group 11	Group 12	Group 13	Group 14	Group 15	Total
Yes	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
No	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
OVER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
UNDER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
NOB	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
Group Total						

Option	Group 16	Group 17	Group 18	Group 19	Group 20	Total
Yes	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
No	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
OVER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
UNDER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
NOB	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
Group Total						

Attachment 3 - Sample Manual Verification Worksheet (MVW)

Contest	TOWN OF ERIE BALLOT ISSUE NO. 2A - Vote Yes or No
District Styles	DS - 19 & 20

Team: **Out:** **In:**

	Print First and Last Name	Affiliation
Reader		
Tallier		

Ballots w/ contest:

Ballots w/o contest:

Total Ballots:

Staff initials of verification:

Audit ID	SYS
p_mb_532	C
Date	Batch #
	84
Contest Sequence #	Count #
1 of 1	1

Option	Group 21	Group 22	Group 23	Group 24	Group 25	Total
Yes	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
No	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
OVER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
UNDER	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
NOB	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	01 02 03 04 05 06 07 08 09 10	
Group Total						

Attachment 4 - Sample Comparison Worksheet

Contest	TOWN OF ERIE BALLOT ISSUE NO. 2A - Vote Yes or No
District Styles	DS - 19 & 20

Team: **Out:** **In:**

	Print First and Last Name	Affiliation
Reader		
Tallier		

Ballots w/ contest:	
Ballots w/o contest:	
Total Ballots:	
Staff initials of verification:	

Audit ID	SYS
p_mb_532	C
Date	Batch #
	84
Contest Sequence #	Count #
1 of 1	1

	Count 1				Count 2				Count 3			
Option	**Part 1**	**Part 2**	**Part 3**	**Total**	**Part 1**	**Part 2**	**Part 3**	**Total**	**Part 1**	**Part 2**	**Part 3**	**Total**
Yes	0	0	0	0								
No	0	0	0	0								
OVER	0	0	0	0								
UNDER	0	0	0	0								
NOB	0	0	0	0								
Ballots Cast	0	0	0	0								

MVW Count	Machine Count	Difference
0		**0**
0		**0**
0		**0**
0		**0**
0		**0**
0		**0**