

# Post-Election Audit Summary

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## November 8, 2016 General Election

*United States President/Vice President*

*Justice of the Supreme Court FTC 1/2/2017*

*Judge of the Court of Common Pleas (Domestic Relations Division) FTC 1/19/2017*

Beginning December 6, 2016 we conducted a Risk-Limiting Post-Election Audit for the November 2016 General Election. There were 617,350 total ballots cast in the election. A total of 72 unique batches were audited, consisting of a hand count total of 24,677 ballots from the three audited contests. The accuracy rate for the post-election audit is 99.99%, due to one (1) discrepancy.

There was one discrepancy in vote totals among all ballot pages audited, found during the hand count of the Judge of the Court of Common Pleas (Domestic Relations Division) FTC 1/19/2017 contest. In the Election Day category of Independence 00-D, the hand count revealed that Tonya R. Jones, the winner, had received 53 votes instead of the 52 votes reported in the Official Canvass; also the number of under votes was 265 instead of 266. In order to investigate this discrepancy more fully, we scanned all the ballots from this batch on a DS850 scanner. The scan results matched the hand counted results for the judicial race. Additionally, the results for eight other contests that appeared on the second ballot sheet for the precinct were changed by one vote.

Audited race and batch details are provided below:

RACE	TOTAL BALLOTS CAST	UNIQUE BATCHES AUDITED	TOTAL BALLOTS AUDITED	NUMBER OF PRECINCTS IN CONTEST
<b>United States President/Vice President</b>	617,350	8	1,952	975
<b>Justice of the Supreme Court FTC 1/2/2017</b>	617,350	19	6,382	975
<b>Judge of the Court of Common Pleas (Domestic Relations Division) FTC 1/19/2017</b>	615,296	45	16,343	975

Our Risk-Limiting Audit was based upon the Kaplan-Markov method as explained by Philip B. Stark and Mark Lindeman. Auditing best practices recommend we split up the total ballots cast by precinct into multiple batch types. We utilized five batch types each consisting of one single ballot type category: Absentee, Election Day, Provisional, Post Absentee, and Post Election Day.

A master spreadsheet was created for each contest with statistical formulas to determine the number of batches that must be audited in order to reach a 90% confidence level. This confidence level means the audit has at least a 90% probability of leading to a full recount if the apparent outcome is incorrect.

We used a “Probability Proportional to Error Bound with Replacement” selection method. We assigned numbers ranging from 000000 through 999,999 for each batch within the Presidential and Justice of the Supreme Court contests. The Judge of the Common Pleas contest required an assignment of 0000000 – 9,999,999. Unique ranges of numbers were allocated to specific batches based upon their error bound - i.e. the greater the possibility of a miscount within a batch, the more numbers assigned, and the more likely it is to be selected. For example, if a single batch has a high probability of a miscount, multiple numbers would be assigned to that single batch, making the random selection of that batch more likely during the audit. Each of those individual numbers might be randomly selected and included in the overall batch audit requirement, but the single batch to which those numbers are assigned would need to be audited only once. To obtain the precinct batch number we rolled differently colored dice numbered 0 - 9, each one of the colored dice representing one digit of the batch number.

#### *United States President/Vice President*

PRECINCT NAME	NUMBER OF TIMES SELECTED	SELECTED BATCH TYPE	OFFICIAL BALLOTS CAST	AUDIT HAND COUNT	DIFFERENCE / DISCREPANCY
<b>BROADVIEW HEIGHTS -01-A</b>	1	Absentee	355	355	0
<b>CLEVELAND -05-H</b>	1	Provisional	14	14	0
<b>CLEVELAND -14-N</b>	1	Absentee	85	85	0
<b>CLEVELAND HEIGHTS -01-C</b>	1	Provisional	22	22	0
<b>LAKWOOD -01-I</b>	1	Absentee	214	214	0
<b>NORTH OL MSTED -02-C</b>	1	Election Day	452	452	0
<b>SOUTH EUCLID -02-B</b>	1	Absentee	363	363	0
<b>STRONGSVILLE -03-G</b>	1	Election Day	447	447	0
<b>TOTAL</b>		-	<b>1,952</b>	<b>1,952</b>	<b>0</b>

*Justice of the Supreme Court FTC 1/2/2017*

PRECINCT NAME	NUMBER OF TIMES SELECTED	SELECTED BATCH TYPE	OFFICIAL BALLOTS CAST	AUDIT HAND COUNT	DIFFERENCE / DISCREPANCY
BAY VILLAGE -03-A	1	Absentee	307	307	0
CLEVELAND -02-I	1	Election Day	322	322	0
CLEVELAND -04-A	1	Election Day	195	195	0
CLEVELAND -06-G	1	Election Day	312	312	0
CLEVELAND -06-R	1	Absentee	300	300	0
EUCLID -03-B	1	Provisional	17	17	0
GARFIELD HEIGHTS -04-B	1	Election Day	423	423	0
GARFIELD HEIGHTS -06-A	1	Election Day	451	451	0
GARFIELD HEIGHTS -07-A	1	Absentee	264	264	0
LAKESWOOD -02-E	1	Absentee	246	246	0
MAYFIELD HEIGHTS -00-F	1	Absentee	262	262	0
NORTH OLMSTED -04-A	1	Election Day	409	409	0
NORTH ROYALTON -04-A	1	Election Day	491	491	0
PARMA -05-A	1	Election Day	549	549	0
PARMA -09-D	1	Election Day	415	415	0
SEVEN HILLS -04-A	1	Election Day	465	465	0
SOLON -05-A	1	Election Day	598	598	0
SOUTH EUCLID -03-A	1	Provisional	20	20	0
WESTLAKE -02-B	1	Absentee	336	336	0
<b>TOTAL</b>		-	<b>6,382</b>	<b>6,382</b>	<b>0</b>

*Judge of the Court of Common Pleas (Domestic Relations Division) FTC 1/19/2017*

PRECINCT NAME	NUMBER OF TIMES SELECTED	SELECTED BATCH TYPE	OFFICIAL BALLOTS CAST	AUDIT HAND COUNT	DIFFERENCE / DISCREPANCY
BAY VILLAGE -04-C	1	Election Day	591	591	0
BEDFORD -04-A	1	Election Day	366	366	0
BEDFORD HEIGHTS -04-A	1	Absentee	279	279	0
BROADVIEW HEIGHTS -03-A	1	Election Day	376	376	0
BROOK PARK -04-C	1	Election Day	522	522	0
CHAGRIN FALLS -00-B	1	Election Day	520	520	0
CLEVELAND -01-K	1	Absentee	80	80	0
CLEVELAND -04-D	1	Absentee	121	121	0
CLEVELAND -06-F	1	Absentee	111	111	0
CLEVELAND -06-P	1	Absentee	153	153	0
CLEVELAND -09-P	1	Election Day	405	405	0
CLEVELAND -14-C	1	Election Day	297	297	0
CLEVELAND -14-M	1	Election Day	308	308	0
CLEVELAND -15-G	1	Election Day	398	398	0
CLEVELAND -16-B	1	Election Day	374	374	0
CLEVELAND -16-J	1	Election Day	370	370	0
CLEVELAND HEIGHTS -02-B	1	Election Day	454	454	0
CLEVELAND HEIGHTS -02-C	1	Absentee	390	390	0
CLEVELAND HEIGHTS -02-E	1	Absentee	389	389	0
CLEVELAND HEIGHTS -03-B	1	Election Day	375	375	0
EUCLID -01-C	1	Election Day	379	379	0
EUCLID -06-B	1	Absentee	196	196	0
FAIRVIEW PARK -01-A	1	Absentee	291	291	0
GARFIELD HEIGHTS -01-B	1	Provisional	27	27	0
INDEPENDENCE -00-D	1	Election Day	469	469	1
LAKESIDE -01-D	1	Election Day	506	506	0
LAKESIDE -03-B	1	Election Day	515	515	0
LAKESIDE -03-I	1	Election Day	531	531	0
LYNDHURST -02-A	1	Election Day	540	540	0
MAYFIELD HEIGHTS -00-G	1	Election Day	447	447	0
MAYFIELD HEIGHTS -00-K	1	Absentee	263	263	0
MIDDLEBURG HEIGHTS -02-B	1	Absentee	218	218	0
NORTH OLMS TED -01-C	1	Election Day	571	571	0
NORTH ROYALTON -03-C	1	Election Day	428	428	0
PARMA -08-A	1	Election Day	524	524	0
PARMA -09-E	1	Election Day	422	422	0
SEVEN HILLS -04-B	1	Election Day	426	426	0

*Judge of the Court of Common Pleas (Domestic Relations Division) FTC 1/19/2017 Cont.*

PRECINCT NAME	NUMBER OF TIMES SELECTED	SELECTED BATCH TYPE	OFFICIAL BALLOTS CAST	AUDIT HAND COUNT	DIFFERENCE / DISCREPANCY
SOLON -01-A	1	Election Day	500	500	0
SOLON -04-B	1	Absentee	234	234	0
SOLON -06-B	1	Absentee	489	489	0
SOUTH EUCLID -01-A	1	Election Day	430	430	0
SOUTH EUCLID -01-C	1	Post Absentee	4	4	0
STRONGSVILLE -01-B	1	Election Day	335	335	0
WESTLAKE -02-C	1	Absentee	313	313	0
WESTLAKE -02-C	1	Election Day	406	406	0
<b>TOTAL</b>		-	<b>16,343</b>	<b>16,343</b>	<b>0</b>

- One vote changed from an under vote to a vote for the candidate Tonya R. Jones.

