VOTING PROCESS RISK ASSESSMENT

DOWN-BALLET RACES ARE AT ESPECIALLY HIGH PROCESS RISK

PROCESS RISK = DEGREE OF SEVERITY (S) * PROBABILITY OF OCCURRENCE (O) * ABILITY TO DETECT (D)

Paul Berndt- Anoka County Election Integrity Team (ACEIT)

Process Risk = Degree of Severity (S) * Probability of Occurrence (O) * Ability to Detect (D)

Contents:

Voting Process Risk

*Process Risk = Degree of Severity to the voters (Consequences of the Election) * Probability of Occurrence (Post Election Review) * Ability to Detect (Transparency)*

Pre-Voting Process Risk → Remedy

- Registered voters list not accurate → Perform post election canvasing on sorted suspects. Prosecute violations. This is the primary risk with digital machine voting.
- No Voter ID for signatures → Initiate Voter ID. Name and address must match.
- Modems for Preliminary Voting Results → discontinue and remove the modems. These can't be hooked up to any scanner/tabulator for any reason.
- Public Accuracy Test (PAT) Deck uses repeat sample sizes between races. → The ballot should be the basic unit with no repeat sample sizes for all races including write-in's. Programing errors not caught for certain.
- The machines being selected for the PAT are not randomly selected. → All Machines should be PAT tested and the PAT Test Deck should be publicly available for review before and after the election.
- No on demand hand counts allowed by election judges → Allow election judges to demand select hand counts if fraud suspected by 2 or more.

Scanner Tabulator Machine

Post-Voting Process Risk → Remedy

- No Cast Vote Records for Public review → Release entire database of CVR by precinct, in voting order by machine immediately after election at no charge to the public.
- No Down ballot Post Election Reviews. → All races should have a PER.
- Not all ballot versions are Post Election Reviewed → All ballot versions should be Post Election Sample Reviewed
- Candidate Rotation not evenly distributed → Ballot candidate rotation should be validated by audit for even distribution by 1. precinct, 2.mail in and 3. early voting during PER of all races.
- Testing log history for each machine is not available from the county. → All machines used in the county should be traceable and have available by machine, at no charge to the public the testing history for each, for PAT, Precinct used in, and PER for each election.

Process Risk = Impact Severity (S) * Probability of Occurrence (O) * Ability to Detect (D)

- **Impact Severity → Extremely High... Life, Security, Economic, Cultural, Environmental**
- **Accepted error rate 1 in 400 (PER) for President, Congressional and Senate Races only**
- **Accepted Occurrence rate for down ballet is 100% acceptance. No audits performed (Public or Private).**
- **Likelihood of detection is 0% detection for down ballet races.**

Summary: Overall Process Risk Rating is Very High

Insufficient Preliminary and Public Accuracy Test (PAT) Machine Validation for All Races on All Machines
(Test Deck uses repeated sample sizes across entire ballot)

- Preliminary Testing is performed on 100% of machines with the Insufficient Test Deck.
- Only a small (non-random) sample of machines are tested for the Public Accuracy Test using the same Insufficient Test Deck

Ballot Board Error
Ballot Board Error
Ballot Board Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error
Precinct Machine Error

Candidate Rotation on Ballots may be Inadequate for mail in, early voting, and day of voting (Creating Bias)
Canvasing has shown that the Registered Voter Data Base used is inaccurate

Ballot Board Machine Error + Candidate Ballot Rotation Bias

Precinct Machine Error + Candidate Rotation Bias

Small Post Election Review (PER) for President, Governor and Congressional Races
Zero % Post Election Review for rest of the Down Ballet Races

Zero % likelihood of Error Detection for all Down Ballet Races

*** VOTING RESULT REPORT ***

Anoka County, MN
State General Election Ballot 2022
Election Date: November 8, 2022

Ballot Style: Andover P-10
Type-Sequence-Split: 01-0012-01

Total Paper Sheets: 39

United States Representative District 6	PM	OB	OB 2	OB 3	OB 4	OB 5	OB 6	OB 7	Totals
Number to Vote For: 1	1 to 39								
GOP Tom Emmer	3	1							4
DFL Jeanne Hendricks	2		1						3
write-in, if any	1			1					2
Overvotes	2								2
Undervotes	31				1	1	1	1	35

Total Votes	39								46

State Senator District 35	PM	OB	OB 2	OB 3	OB 4	OB 5	OB 6	OB 7	Totals
Number to Vote For: 1	1 to 39								
GOP Jim Abeler	4	1							5
DFL Kari Rehrauer	3		1						4
write-in, if any	2			1					3
Overvotes	2								2
Undervotes	28				1	1	1	1	32

Total Votes	39								46

State Representative District 35B	PM	OB	OB 2	OB 3	OB 4	OB 5	OB 6	OB 7	Totals
Number to Vote For: 1	1 to 39								
GOP Polly Matteson	5	1							6
DFL Jerry Newton	4		1						5
write-in, if any	3			1					4
Overvotes	2								2
Undervotes	25				1	1	1	1	29

Total Votes	39								46

Governor and Lieutenant Governor Minnesota	PM	OB	OB 2	OB 3	OB 4	OB 5	OB 6	OB 7	Totals
Number to Vote For: 1	1 to 39								
GLC Steve Patterson and Matt Huff	7	1							8
LMN James McCaskel and David Sandbeck	6		1						7
GOP Scott Jensen and Matt Birk	5			1					6
DFL Tim Walz and Peggy Flanagan	4				1				5
INA Hugh McTavish and Mike Winter	3					1			4
SWO Gabrielle M. Prosser and Kevin A. Dwire	2						1		3
write-in, if any	1							1	2
Overvotes	2								2
Undervotes	9								9

Total Votes	39								46

Andover Public Accuracy Test (PAT) Voting Result Report:

(Actual Andover Report provided under Data Request By Jason Stover. Partial report provided to the right)

- Actual ballot sample size = 39. *46 votes for each contest including over/under votes.*
- *37 Races*
- Ballot opportunities including write-ins = 93
- Found many repeats for sample size on a ballot:

Sample # used	1	2	3	4	5	6	7	8	9	10
Repeats	11	13	14	14	12	9	9	8	2	1

Repeats make it difficult to be certain that the entirety of the ballot is programmed correctly. No repeat sample sizes should occur on each ballot.

- Could not validate the candidate ballot rotation as the test deck was not provided due to SOS rules.

Risk based Assessment Brief- (Used in FDA, Government, and Industrial sample size calculations based on Risk Priority Number (RPN)

Process Risk= Process Failure Mode Effects Analysis (pFMEA)
Machine Risk = Design Failure Mode Effects Analysis (dFMEA)

320 to 700 RPN = Degree Severity (10) X Occurrence Probability (6) x Ability to Detect(10)

RPN Rating	Degree of Severity (Election Consequences)	Probability of occurrence (PER)		Ability to Detect (Transparency)	
			Frequency (1 in ...)		Detection Certainty
1	The Voter will not notice the adverse effects, or it is insignificant due to legislation	Likelihood of vote error is remote	1,000,000	Sure that the voting errors will be found or prevented before election certification	100%
2	Voter will probably experience slight annoyance due to legislation	Reasonably low vote error rate	20,000	Almost certain that the potential voting errors will be found or prevented before election certification	99%
3	Voter will experience annoyance due to legislation changes	Low vote error rate without supporting documentation	5,000	Low likelihood that the potential voting errors will be undetected	95%
4	Voter dissatisfaction due to reduced performance due to legislation changes	Occasional vote failures	2,000	Controls may detect or prevent the potential voting errors from be included in the vote totals prior to election certification	90%
5	Voter is made uncomfortable, or their productivity is reduced by the continued degradation of the legislation	Relatively moderate vote error rate (Current PER rate for Pres. Gov and Congressional)	500	Moderate likelihood that the potential voting errors will be included in the election certification	85%
6	Voter satisfaction is significant and suffering financial losses	Moderate vote error rate based on lack of pre-vote transparency	100	Controls are unlikely to detect or prevent the potential voting errors	80%
7	High degree of voter dissatisfaction due societal changes due to legislation. Severe economic and societal impact.	Relatively high vote error rate based on lack of pre-vote transparency	50	Poor likelihood that the potential voting errors will be detected or prevented	70%
8	Very high degree of dissatisfaction due to the loss of societal morals, personal and financial freedoms. Endangerment to person and property to lack of safety enforcement.	High vote error rate based on lack of pre-vote transparency and programing errors	20	Very poor likelihood that the potential voting errors will be detected or prevented before reaching election certification	60%
9	Voter, their family and communities are endangered due to the adverse effects of legislative performance and immoral legislation impacts.	Vote error is almost certain based on lack of pre-vote transparency and programing errors	10	Current controls probably will not detect the potential voting errors	50%
10	Voter's life, family, savings, jobs, culture and the environment endangered due to the adverse effects of Legislative overreach and the overall immoral change in normal society.	Assured of failure based on data	2	Absolute certainty that the current controls will not detect the potential voting errors (No PER).Transparency is very limited	<50%

Risk Priority Number (RPN) is a number based on the multiplication calculation of the Severity, Occurrence, and Detection indices.

RPN = Severity x Occurance x Detection

Max RPN = Severity (10) x Occurrence (10) x Detection (10) = 1000

Based on the RPN #, the following samples sizes are required to reach the corresponding Confidence/Reliability intervals (as defined by Minitab - see below):

RPN #	Sample Size	Confidence	Reliability
1-80	22	90	90
81-280	29	95	90
281-600	59	95	95
601-1000	299	95	99

90/90 (Confidence/Reliability)

Test and CI for One Proportion
Test of p = 0.9 vs p > 0.9

Sample	X	N	Sample p	90% Lower Bound	Exact P-Value
1	22	22	1.000000	0.900628	0.098

95/90 (Confidence/Reliability)

Test and CI for One Proportion
Test of p = 0.9 vs p > 0.9

Sample	X	N	Sample p	95% Lower Bound	Exact P-Value
1	29	29	1.000000	0.901855	0.047

95/95 (Confidence/Reliability)

Test and CI for One Proportion
Test of p = 0.95 vs p > 0.95

Sample	X	N	Sample p	95% Lower Bound	Exact P-Value
1	59	59	1.000000	0.950492	0.048

95/99 (Confidence/Reliability)

Test and CI for One Proportion
Test of p = 0.99 vs p > 0.99

Sample	X	N	Sample p	99% Lower Bound	Exact P-Value
1	299	299	1.000000	0.990031	0.050

Andover 10 Precinct Example
Escape Prone Process for 34 of 37 Critical Races in the 2022 General Election

Preliminary Testing
(100% of Scanner/Tabulators) using the Test Deck

↓

Public-Accuracy-Test (PAT)
(**Very small sample** of Scanner/Tabulators) using the Test Deck
(**randomization not required**)

↓

Post-Election-Review (PER)
President or Governor; U.S. Senator; and U.S. Representative in at **least three precincts**

Result: For the Andover Race: *(Estimates based on Information available)*

- 3 of 10 Precincts were likely PAT tested. (70%)
- 34 of 37 races on the ballot were not post election reviewed. (92%) (only governor, SOS and congressional).
- There we zero (0%) down ballot races Post election reviewed.

Andover Public Accuracy Test (PAT) Deck Sample Concerns:

- **Potential Escapes/Elevated Risk.** All races not reviewed by hand count during the PER depend 100% on the accuracy of the Scanner Tabulator preliminary testing and the PAT test deck accuracy if the PAT test was even performed.

- The test deck sample size of 39 is not adequate in sample size and its creation to 1) reduce the risk of programming error or 2) meet risk level attribute testing norms.

- Typically, the Attribute Data (Good vs Bad) sample size is based on Machine or Process risk assessments. These indicate a much higher risk then the 39 ballots used in the 2022 PAT testing. The Risk Priority Number (RPN) roughly calculated from a Process Failure Mode Effects Analysis (pFMEA) are likely much higher, something like 320-700, in order to achieve the expected 95% Confidence and 99% Reliability requirements of the PER. Risks are extremely high for the down ballot races such as the School Boards, City/County leadership, the State legislature, judges, sheriffs and county attorneys. A sample size or 59-299 is listed for the PAT testing.

- The even distribution of candidate rotations, ballot insertion direction and flips are not verifiable on PAT test report.

Recommendations:

Anoka County Commissioner's can make most of if not all these decisions.

1. Consider removal of the scanner/tabulator and any other related machines that digitize the voting process or become serious about reducing the inherent risks in this process. The voting process is extremely consequential to all aspects of a citizen's life.
2. Increase the accuracy of the registered voter rolls. Perform regular post election canvassing. Prosecute those violating the law. This significantly impacts the tight down ballet elections. Require voter ID with current address.
3. Increase the test deck size to use a unique number of ballots for all ballot races, candidates, write ins and referendums to be voted on. *(This validates that the entire ballot which is the basic sample unit has been programmed correctly. A larger sample size will be required for the programming check.)*
4. Perform Public Accuracy Testing (PAT) on all Scanners/Tabulators. Any changes including programing require a new PAT.
5. Perform Post Election Review (PER) on all races using randomly selected precincts for all ballot types used.
6. Ensure that all ballots in the county used for mail-in and early voting have an evenly distributed candidate rotation so as not to favor any candidate.
7. Ensure that the ballot packets include an evenly distributed candidate rotation for precinct use.
8. PAT Test Deck availability. Make Available for the public before and after the election.
9. Public Ballot package random sample reviews for Mail in, early voting and in person at the precincts. *(confirmation of even distribution of candidate rotation)*
10. Cast Vote Record availability (CVR). Immediate release to the public after election.
11. Maintain the history for each scanner tabulator in a centralized county location for public accessibility. Tracked for each election would be the PAT, PER and voting precinct it was used and if CVR data is available.
12. Remove or disable all modems in all scanner/tabulators **or** make available to the public the audit logs for all county and precinct scanner/tabulators to validate that no external interactions occurred with the voting process.

Relevant Background Information:

1. Test Decks
    - Preliminary testing
    - Public Accuracy Testing
2. Post Election Review

Current Testing and Test Decks Key notes:

- Prior to every election in which an electronic voting system is used, the election jurisdiction must conduct both preliminary testing and a public accuracy test of its electronic voting systems to verify that the equipment and programming function properly. The equipment that must be tested includes all ballot counters (precinct and central count) and all assistive voting devices (AVDs) that will be used in the election. (M.S. 206.83)
- The test deck is a set of ballots for each precinct that has been marked with a predetermined variety of votes for each position in each office and question on the ballot. (M.R. 8220.1050)
- When testing ballot counters, ballots marked by hand should be marked with a variety of pens, including those that will be used at precincts. Ballots should also be marked in a variety of ways. For example, targets might be filled in a sloppy or partially, using Xs, etc. If a target is mostly filled in, results should be consistent.
- Preliminary testing takes place before the Public Accuracy Test, any time after ballots are received. It is intended to prove that the ballot counter will accurately count votes and provide the voter an opportunity to correct their ballot if it is improperly marked. Each ballot position, each ballot type and each precinct should be tested on all equipment used in each election. Every piece of equipment used in counting absentee ballots must be tested for all ballot styles that will be counted on them. (M.R. 8220.1350)
- The total valid votes for each ballot position in an office or question should be unique (i.e. candidate A has one vote, candidate B has two votes, candidate C has three and so on), so it is easier to identify if a vote is not being assigned to the correct candidate. The total number of valid write-ins for a multi-seat office should also be a unique number for each write-in position.
- Each office and question must have at least one overvote. Each ballot style test deck is required to have at least one totally blank ballot. Candidate rotation is correct. Use reporting from your ballot programmer or software.

Current Public-Accuracy-Test (PAT) notes:

- The purpose of the Public Accuracy Test (PAT) is to demonstrate the accuracy of the computer program and voting system to be used at the election to the public. The test must be conducted in accordance with Minnesota Statutes 206.83.
- In election jurisdictions with three or fewer precincts, all precincts must be tested.
- If there are more than three precincts, at least three precincts must be tested, including one precinct from each congressional district, legislative district, county commissioner district, ward, and school district on the ballot. The official conducting the election will select the precincts to be tested.

Current POST-ELECTION REVIEW (PER) notes:

- The post-election equipment review or post-election review (PER) is a manual recount (or “audit”) of the paper ballots of randomly-selected precincts for specific offices following each state general election. The review compares the hand count of the ballots with the results from the electronic voting system to determine if the counting accuracy of the voting system meets a defined standard (see section 6.0).
- The PER is mandated for the offices of President or Governor, United States Senator, and United States Representative.
- The PER official may conduct a post-election review of the votes cast for additional offices as well. *M.S. 206.89, subd. 2a; 206.89, subd. 3*
- For the PER, at least four precincts must be selected within each congressional district statewide.
- The ballots to be reviewed for a precinct must include both the ballots counted at the precinct’s polling place and the absentee ballots counted centrally by a ballot board for that precinct.
- The results of the post-election review cannot differ from the electronic voting system count by more than the following thresholds:
    - no more than two votes in a precinct where fewer than 1,200 voters cast ballots (<=.1667%)
    - no more than three votes in a precinct where between 1,200 and 1,599 voters cast ballots (<= .1876%)
    - no more than four votes in a precinct where between 1,600 and 1,999 voters cast ballots (<= .2001%)
    - no more than five votes in a precinct where 2,000 or more voters cast ballots. (<= .2500%)
- There are additional levels required if failure occurs in the first PER. See M.S. 206.89, subd. 4,