# A taxonomy of audits and the 2021 New Hampshire root-cause audit

U.S. Election Assistance Commission Board of Advisors Meeting Washington, DC

Philip B. Stark

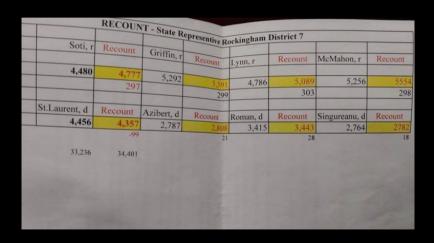
25 April 2023

University of California, Berkeley

## Categories of audits

- 1. Help provide affirmative evidence that reported winners really won, despite inevitable problems
  - compliance audits: establish whether vote record is trustworthy
  - risk-limiting audits: "risk" is the chance that the audit won't correct a wrong outcome
- 2. Root-cause analyses of observed problems
  - Rare, but done in 2021 in NH
- 3. Check for particular kinds of failures but can't provide affirmative evidence
  - applying RLA procedures to untrustworthy paper records
  - image audits
  - many statutory audits
- 4. Fishing expeditions

# New Hampshire State Representative, Rockingham District 7, 2021



### STATE OF NEW HAMPSHIRE

## In the Year of Our Lord Two Thousand Twenty One

AN ACT authorizing an audit of the Rockingham County district 7 state representative race.

Be it Enacted by the Senate and House of Representatives in General Court convened:

2:1 Purpose. Notwithstanding any provisions of law to the contrary, this act authorizes and directs an audit of the ballot counting machines and their memory cards and the hand tabulations of ballots regarding the general election on November 3, 2020 in Windham, New Hampshire of Rockingham County district 7 house of representatives for the purpose of determining the accuracy of the ballot counting



Audit was conducted in a stand-alone building located inside a military compound. The building was surrounded by an easy-to-monitor perimeter.

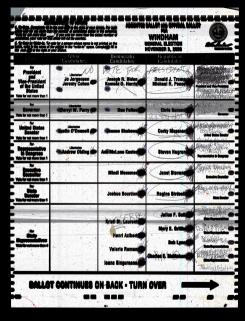
#### 2) Location, premises, chain of custody, and security transparency

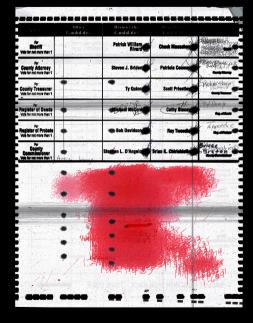
- The audit was conducted in a Regional Training Institute building located inside the New Hampshire Army National Guard Pembroke Readiness Center.
- Additional security support on the base gate and outside of the building was provided by New Hampshire State Police. The building perimeter was protected in person 24/7 by state troopers.
- Inside the building, additional security was provided by New Hampshire Department of Justice investigators.
- d) Building access control and monitoring systems were provided by the New Hampshire Army National Guard and programmed to permit access to the building by a limited number of access cards. All use of the access cards was logged by the National Guard.
- e) Security-sensitive materials, such as spare seals, were removed from the room each night and given to the State Trooper on duty for overnight safekeeping. The State Trooper on duty did not have an access card to enter the building, but had a complete view into the working room through large windows.
- A livestream of the room, with audio, was broadcast 24/7.4 Multiple physical clocks were positioned strategically in the room and visible in the livestreams.
- g) Security seals of voting equipment were publicly inspected multiple times during the audit; the inspections were livestreamed.
- Material under chain-of-custody was placed closest to the windows, allowing those outside of the room a clear view. In particular, the State Trooper on duty

- livestreamed 24/7 (two interruptions)
- live observers (outside "wire")
- only sworn election officials touch ballots/machines through retabulation
- inventory materials, log/check chain of custody, seal #s
- count ballots & write identifier on each (red/green ink)
- high-resolution image of every ballot
- tabulate all ballots on all 4 tabulators
- image memory cards and EPROMS, check for malware
- pollbook signatures, absentee ballot envelopes
- forensic examination of ballot paper
- fiber optic inspection of scanners for dust
- everything posted to web daily; data entry public

	Hand count		Machine count*					
			2020	2021				
candidate	2020	2021	diff		1	2	3	4
St. Laurent	4357	4355	-2	4456	4355	4349	4352	4367
Azibert	2808	2808	0	2787	2804	2805	2802	2800
Roman	3443	3442	-1	3415	3434	3436	3432	3432
Singureanu	2782	2782	0	2764	2777	2778	2776	2776
Soti	4777	4776	-1	4480	4742	4744	4727	4700
Griffin	5591	5591	0	5292	5558	5557	5540	5516
Lynn	5089	5089	0	4786	5055	5055	5037	5011
McMahon	5554	5554	0	5256	5520	5520	5502	5477
write in	n/a	34		41	41	41	41	41

	Machine 1	Machine 2	Machine 3	Machine 4
overvote/undervote rate in State Rep contest machine count, 2020	14.5%	19.3%	15.5%	16.0%





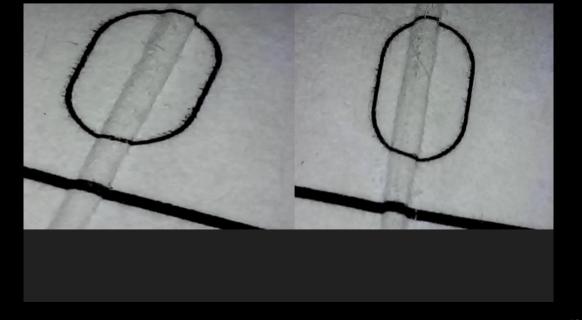




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Isn't your time too valuable to spend stuffing envelopes? Now the DS35 can do it for you, simply and efficiently. The Neopost DS35 Folder Inserter neatly prepares your documents for mailing with ease and accuracy. It's quiet. It's simple. And you'll wonder how you ever got along without it.

- · State-of-the-art full color touch screen
- 15 programmable jobs
- · 2 sheet and 1 insert/BRE feeders
- No. 10 up to 6 x 9.5 envelopes
- · secure'n feed double detection



Machine	head first face up	head first face down	foot first face up	foot first face down
2 (78355)	27	46	46	27
"school" (81365)	54	54	52	41

Number of erroneous overvotes on 75 ballots folded through Kristi St. Laurent's otherwise unmarked vote target when the State Representative contest was fully voted for all four Republican candidates. Poll tapes available at <a href="https://www.doj.nh.gov/sb43/documents/test-deck-poll-tapes.pdf">https://www.doj.nh.gov/sb43/documents/test-deck-poll-tapes.pdf</a> Test deck available at <a href="https://www.doj.nh.gov/sb43/documents/test-election-1-folded.pdf">https://www.doj.nh.gov/sb43/documents/test-election-1-folded.pdf</a> Test deck with no folds available at <a href="https://www.doj.nh.gov/sb43/documents/test-election-1-unfolded.pdf">https://www.doj.nh.gov/sb43/documents/test-election-1-unfolded.pdf</a>

Machine	head first face up		foot first face up	foot first face down
2 (78355)	25	24	27	15
"school" (81365)	43	32	37	24

Number of erroneous votes for St. Laurent on 75 ballots folded through Kristi St. Laurent's otherwise unmarked vote target when only one candidate in that contest was selected. Poll tapes available at <a href="https://www.doj.nh.gov/sb43/documents/test-deck-poll-tapes.pdf">https://www.doj.nh.gov/sb43/documents/test-deck-poll-tapes.pdf</a> Test deck available at <a href="https://www.doj.nh.gov/sb43/documents/test-election-2-folded.pdf">https://www.doj.nh.gov/sb43/documents/test-election-2-folded.pdf</a> Test <a href="https://www.doj.nh.gov/sb43/documents/test-election-2-unfolded.pdf">https://www.doj.nh.gov/sb43/documents/test-election-2-unfolded.pdf</a>

INSTRUCTIONS TO VICTORS ABSENTEE BALLOT AND OFFICIAL BALLOT EDB

Joseph R. Biden Kamala D. Harris

Dan Feltes

Jeanne Shaheen

**Ann McLane Kuster** 

Mindi Messmer

Joshua Bourdon

Kristi St. Laurent

Henri Azibert C

Valerie Roman

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**BALLOT CONTINUES ON BACK - TURN OVER** \_\_\_

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Vice-President

of the United States Valle for not more than 1 Governor

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Ubetele Jo Jorgensen

Jeremy Cohen

Darryl W. Perry

Justin O'Donnell

Andrew Olding

**GENERAL ELECTION** NOVEMBER 3, 2020

Donald J. Trump 
Michael R. Pence

Chris Sununu @

Corky Messner

Steven Negron

Janet Stevens

Regina Birdsell 👄

Julius F. Soti 👄

Mary E. Griffin 👄

Charles E. McMahon @

Rob Lynn 谷

WINDHAM Republican Candidates

Candidates	_
President and Vice-President	Ξ
	Ξ
Governo	Ξ
United States Servator	Ξ
Neprosentativo in Congress	Ξ
Executive Councilor	Ξ
trate Servator	Ξ
State Representations	Ξ
State Representatives	Ξ
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INSTRUCTIONS TO VOTERS ABSENTEE BALLOT AND OFFICIAL BALLOT To Bale. Completely SI in the out to the right of your choice. For each

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			NOVEMBER 3, 2020	BORNE P DES	
Offices	Other Candidates	Democratic Candidates	Republican Candidates	Write-in Candidates	
President and Vice-President of the United States  Vote for not more than 1	Jo Jorgensen Jeremy Cohen	Joseph R. Biden Kamala D. Harris	Donald J. Trump Michael R. Pence	President and Vice-President	
For Governor Vale for not more than 1	Darryl W. Perry	Dan Feltes 🔾	Chris Sununu 👄	Grenor	
United States Senator Vote for not more than 1	Justin O'Donnell	Jeanne Shaheen 🝩	Corky Messner	inted States Serutor .	
Representative in Congress Vite for not more than 1	Andrew Olding	Ann McLane Kuster	Steven Negron 🔾	Prepresentative in Congress	
Executive Councilor Value for not more than 1		Mindi Messmer 👄	Janet Stevens	Georgie Causalor	
State Senator Vale for not more than 1		Joshua Bourdon 🖚	Regina Birdselli 🔾	State Servator	
For State Representatives Vote for not more than 4		Kristi St. Laurent   Henri Azibert   Valerie Roman   loana Singareanu	Jelles F. Soli   Mary E. Griffin   Bob Lynn   Charles E. McMahon	State Representatives  Date Representatives  State Representatives	
BALLOT CONTINUES ON BACK - TURN OVER					

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Offices	Other Candidates	Democratic Candidates	Republican Candidates	Write-in Candidates		
President and Vice-President of the United States	Jo Jorgensen Jeremy Cohen	Joseph R. Biden Kamala D. Harris	Donald J. Trump Michael R. Pence	President and Vice-President		
Governor Vale for not more than 1	Darryl W. Perry	Dan Feltes 🗆	Chris Sununu 👄	Governor		
United States Senator  Vyle for not more than 1	Justin O'Donnell	Jeanne Shaheen 👄	Corky Messner	United States Senator		
Representative in Congress  Vyle for not more than 1	Andrew Olding	Ann McLane Kuster 👄	Steven Negran 🗆	Representative in Congress		
Executive Councilor Vyte for not more than 1		Mindi Messmer 🜤	Janet Stevens	Executive Councilor		
State Senator Vyte for not more than 1		Joshua Bourdon 🖚	Regina Birdsell 🗆	State Servator		
		Kristi St. Laurent	Julius F. Soti 🗆	Otata Papresentatives		
- for State		Henri Azibert	Mary E. Griffin	Data Representatives		
Representatives Value for national than 4		Valerie Roman	Bob Lynn 🗆	Data Representatives		
		Ioana Singureanu 🗆	Charles E. McMahon	Otata Propresentatives		
BALLOT CONTINUES ON BACK - TURN OVER						

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1. To Vivi. Completely fill in the committee of the control of the





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Offices	Other Candidates	Democratic Candidates	Republican Candidates	Write-in Candidates		
President and Vice-President of the United States	Je Jorgensen Jeremy Cohen	Joseph R. Biden Kamala D. Harris	Donald J. Trump Michael R. Pence	President and Vice-President		
Governor Vote for not more than 1	Darryl W. Perry	Dan Feltes 🔾	Chris Sununu @	Governor		
United States Senator Vote for not more than 1	Justin O'Donnell (	Jeanne Shaheen 😂	Corky Messner	United States Senator		
Representative in Congress Vote for not more than 1	Andrew Olding	Ann McLane Kuster @	Steven Negron 🔾	Representation in Compress		
Executive Councilor Vote for not more than 1		Mindi Messmer 🗆	Janet Stevens	Securive Councilor		
State Senator Vote far not more than 1		Joshua Bourdon —	Regina Birdsell 🗆	State Senator		
State Representatives		Kristi St. Laurent @ Henri Azibert	Julius F. Soti	State Progressor datives		
Vote for not more than 4		Valerie Roman C	Charles E. McMahon 🕾	Data Representatives  Data Representatives		
BALLOT CONTINUES ON BACK - TURN OVER						

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INSTRUCTIONS TO VOTERS ABSENTEE BALLOT AND OFFICIAL BALLOT 1. To Yate. Completely Mi in the real to the split of your choice. For each office vote for not more than the number of candidates stated in the sentence—vide for not more than if if you vote for more than the stated number of candidates, your vote for that office will not be counted. cne WINDHAM conditions, year wisk for that office will not be course.

2. To Vale by Methew. To vote for a person whose regree is not privide on the balancy size of the same of the person in the "write-in" space. Completely till in the love of the train of the person in the "write-in" space. Completely till in the love of the right of your director. GENERAL ELECTION NOVEMBER 3, 2020 Write-in Candidates Offices President and Vice-President Libertaries Donald J. Trump Michael R. Pence Jo Jorpensen Jeremy Cohen Kamala D. Harris of the United President and Vice-President States Darryl W. Perry Governor Dan Feltes die Chris Sununu (Innerw Vote for not more from \$ United States Justin O'Donnell Jeanne Shaheen 👄 Corky Messner Senator Debut States Sensor Vota for not more than 1 Representative Andrew Olding Ann McLane Kuster 👄 Steven Negron in Congress Representative in Compress Vote for not reare than 1 Executive Mindi Messmer 30 Janet Stevens Councilor Franchise Stranslier State Joshua Bourdon Regina Birdsell Senator Days Sensor ota for natireare than 1 Julius F. Sati Date Representatives Kristi St. Laurent 🐡 Mary E. Griffin Date Representatives State Henri Aribert (2) Regresentatives Bob Lynn C Date Representatives Valerie Roman Charles E. McMahon Date Europeristion loana Singureanu **BALLOT CONTINUES ON BACK - TURN OVER** 

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