



SCHOOL OF INFORMATION
102 SOUTH HALL # 4600
BERKELEY, CALIFORNIA 94720-4600
(510) 642-1464
(510) 642-5814 Fax

Joseph Lorenzo Hall
Center for Information Technology Policy
Sherrerd Hall, 3rd Floor
Princeton University
Princeton, NJ 08544
p: 609.258.2266
f: 815.301.3881

joehall@berkeley.edu
<http://josephhall.org/>

February 13, 2009

Barbara Paget
Bureau of State Audits
555 Capitol Mall, Suite 300
Sacramento, CA 95814

Dear Ms. Paget:

In response to your Notice of Interested Persons Meetings advisory and request for input on implementation of the Voters First Act ("Act"),¹ I would like to submit the following comments.

I am a postdoctoral researcher jointly affiliated with the University of California at Berkeley School of Information and the Princeton University Center for Information Technology Policy. My research involves government transparency policy, and I recently completed my Ph.D. dissertation on the subject of transparency in voting technology.²

In the advisory, you requested comments on, among other things:

1. "The creation of the Applicant Review Panel to screen Commission applicants as discussed in Section 8252(b) of the California Government Code."
2. "The random selection of eight members of the Commission as discussed in Section 8252(f) of the California Government Code."

Random selection plays an obvious, important roll in the implementation of the Act. A properly conducted random drawing can remove bias and, equally important, the appearance of bias from selecting candidates for both the review panel ("Panel") and the redistricting commission ("Commission").

Both of the statutes cited above require random selection (emphasis added):

¹ See: <http://www.bsa.ca.gov/bsa/prop11.php>

² My curriculum vitae is available here: <http://josephhall.org/HallJosephResume.pdf>.

“... The State Auditor shall *randomly draw* the names of three qualified independent auditors [to serve on the Panel] from a pool consisting of all auditors employed by the state and licensed by the California Board of Accountancy at the time of the drawing. ...”³

“No later than November 20 in 2010, and in each year ending in the number zero thereafter, the State Auditor shall *randomly draw* eight names from the remaining pool of applicants [to serve on the Commission] ... ”⁴

Both the Panel and Commission have critical duties. The three-member Panel’s duty is to whittle the universe of all applicants down into a smaller pool of 60 applicants. The Commission’s duty is to first elect the remaining six members of the Commission—for a total of fourteen members—and then begin the work of the redistricting process outlined by the Act. Given the small number (three) of Panel members to be drawn and the role the Panel plays to create the pool of 60, the selection of Panel members must be free from undue influence. With such a small set of applicants to choose from to form the Commission, the final random drawing need also be free from bias or undue influence.⁵ If these goals are not met, the actions of both these bodies could be tainted. As recognized by the Act, random selection of these individuals can help to achieve these goals.

In cases like these, the random selection should also be conducted in a manner that is demonstrably free from bias. Specific, careful attention to the details of the process used for conducting the random selection is important to ensure a high integrity selection and, by extension, lend legitimacy to both the Panel and Commission. Equally as important, these selections should be conducted in public and in a manner that the public can easily understand. If the selection is not public nor provably random, there will be little recourse if the selection was indeed conducted with a high level of integrity but unselected applicants are not convinced they were legitimately excluded.

Publicly observable, random selection processes have been used with success in other applications in California government. The Fair Political Practices Commission (FPPC) conducts public random selection of entities to audit per California’s campaign finance regulations.⁶ The California Secretary of State conducts random alphabet drawings to determine the order of candidate names on ballots in state and federal elections.⁷ Finally, all counties in California conduct public random selections of precincts for the manual tally audit in which paper records of ballots are

³CA GOV. CODE § 8252(b).

⁴CA GOV. CODE § 8252(f).

⁵After the various processes to reduce the applicant pool are complete, each political subpool of applicants will have anywhere between twelve and twenty members. The steps for reducing the universe of applicants to a pool of 60 are outlined in CA GOV. CODE §§ 8252(c)-(e). For example, per CA GOV. CODE § 8252(e) each of the four state legislative leaders have the opportunity to strike two names from each pool.

⁶For a description of the Fair Political Practices Commission audit program, See: <http://www.fppc.ca.gov/index.html?id=324>. A phone conversation with one of the FPPC staff auditors confirmed that they use a lottery drawing with ping pong balls and a rotating hopper—very similar to the procedure proposed below (page 3)—to conduct their random selection.

⁷For example, See: The Office of The California Secretary of State, Press Release, “Secretary of State Bowen Announces Results Of Randomized Alphabet Drawing For Candidate Order on Ballots in 26th Senate District Special Election”, (February 10, 2009) available at: <http://www.sos.ca.gov/admin/press-releases/2009/db09-005.pdf>.

compared to electronic election results.⁸ Each of the applications I list above share a number of features: they're processes that seek to minimize selection bias and do so in a context where malicious adversaries or unnoticed errors could frustrate the integrity of the resulting sample.

Computerized random number generators do not meet the requirements of public comprehensibility, an element crucial for sensitive selection processes. Computers are, by their nature, opaque and it is generally difficult for experts to ensure that a computer program that generates random numbers is free of bias. Computers by definition can only produce pseudorandom numbers as they only run deterministic (i.e., non-random) processes. In addition, because computer-mediated random selection is the domain of computers and complicated logic, a physical source of randomness with a simple, clear process is much more accessible to those that might not be comfortable with these technologies. In the context of choosing precincts to audit in elections, researchers with our NSF ACCURATE center have developed a few random selection methods, now in use, that do not depend on computerized random number generators.⁹ These methods use rolls of numbered dice or mixing of numbered balls to achieve simple, physical randomness.

Given these considerations, we recommend a lottery-style random selection. We'll give first a broad outline of such a procedure and then more detailed procedural steps.¹⁰

Outline: An official of the State Auditor would use a rotating bin to select two (2) or three (3) numbered ping pong balls (depending on the political subpool). Each ball would have a number from one (1) to twenty (20) on it. When a ball is chosen, a second official would write the chosen number down on a large piece of paper, under a heading for which pool the draw corresponded to. The selection event should be advertised publicly seven (7) business days before the event and the procedures and numbered subpool lists (see below) for random selection should be published at the same time.

Procedure:

1. *Assemble Materials (before selection day):*

- (a) *Create subpool lists:* Three numbered lists should be created listing each applicant that has survived the various processes outlined in CA GOV. CODE §§ 8252(a)–(e). The numbering should start at one (1) and end with the number of applicants in the subpool (minimum of twelve (12) and maximum of twenty (20)).
- (b) *Finalize procedures:* The exact, step-by-step procedures for performing the random selection—similar to this enumerated list—should be published. If already available in published regulations, they should be clearly identified.
- (c) *Announce selection:* A public announcement of the random selection event should be published widely so that all interested parties in California can make arrangements

⁸CA ELEC. CODE § 15360.

⁹Arel Cordero, David Wagner, and David Dill. “The Role of Dice in Election Audits—Extended Abstract”. In: *IAVoSS Workshop on Trustworthy Elections 2006 (WOTE 2006)* (June 2006). URL: <http://www.cs.berkeley.edu/~daw/papers/dice-wote06.pdf>.

¹⁰Note that we limit the subsequent outline and procedures to a method suited for selecting Commission members from the three subpools of applicants. This method can be extended quite easily for use in the case of selecting Panel members from the pool of state auditors. Since that pool will be undoubtedly very large and since it would be impractical to find a large enough hopper for thousands of ping pong balls, we suggest instead using ten (10) ping pong balls numbered from zero (0) to nine (9). We can provide further comments on this at your request.

to attend. This should be done at least seven (7) business days before the event to allow for interested individuals to make travel arrangements, if needed. At this time, the subpool lists and procedures should also be made publicly available and should remain unchanged.

(d) *Procure items:* The State Auditor should purchase:

- a **rotating hopper** or bin for the selection;¹¹
- a set of at least 20–30 standard **ping pong balls**. These should remain in their original packaging and under a secure chain of custody from purchase to use.¹²
- a large **pad of paper**;
- an **easel** for the pad to sit on; and,
- **markers** for writing on the pad of paper.

2. *Prepare for Selection (on selection day):*

- (a) Place the hopper and packaged ping pong balls on a large table.
- (b) Place the easel with paper pad and pens nearby.
- (c) Announce that the selection will begin shortly and briefly outline the process.
- (d) Remove the ping pong balls from their packaging and number them from one (1) to twenty (20) in full view of the public.
- (e) Ask a member of the public or anyone else interested to examine the hopper to ensure that it is empty and rotates regularly. They must not, however, be allowed to touch the numbered ping pong balls.

3. *Perform Selection (on selection day):*

- (a) Announce the pool being selected from, the number of applicants in the pool and the number of applicants to draw for the current pool.
- (b) Based on the number of applicants in the pool, place the ping pong balls in the hopper, but only up to the number of applicants in the pool. (E.g., if there are 12 applicants in the pool, ping pong balls one (1) through twelve (12) should be placed in the hopper.) Each ping pong ball should be shown to the public and its number announced aloud before being placed inside the hopper.
- (c) An official should then shut the door on the hopper, spin it an arbitrary number of times and allow it to come to rest.
- (d) Without looking at the hopper directly, the official should open the hopper door and reach in to pull out one ball.¹³
- (e) The official should announce the number on this ball and show it to the public and then set it in full view on the table.
- (f) A second official should record the drawn number on the paper pad and announce

¹¹Note that it might be preferable to borrow this piece of equipment from the Secretary of State or the FPPC.

¹²The risk here is that defects among the ping pong balls, either introduced in their manufacture or introduced after purchase but before use, might inject bias into the selection process. There is a relatively famous case from California, for which a citation escapes me, where an individual would place a ping pong ball in the freezer for a few hours before a random selection drawing. It was trivial then for that individual to determine merely by feel which ping pong ball they had doctored.

¹³It is important that the person doing the drawing not look into the hopper before drawing as they might see some of the numbers and consciously or unconsciously bias the draw.

the selected applicant that corresponds to the number drawn.

- (g) The chosen ball should be placed aside,¹⁴ minimizing the amount of time touching the ball, and the door closed.
- (h) This process should be repeated as many times as necessary to choose applicants for each pool.

I believe this procedure would help ensure that the random selection process for creating the Commission under the Act meets the goals of public trust and transparency: it is accessible, accountable, and easily comprehensible.

Thank you for your consideration of these comments. Experts such as myself are available for consultation. I would be happy to answer any questions you might have about my comments.

Sincerely,
/s/

Joseph Lorenzo Hall, Ph.D.

¹⁴The ball can be placed back inside the hopper but if it is chosen again, the rules should clearly indicate that this person is not “chosen twice”.