



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON D.C. 20548

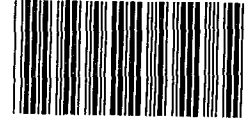
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AUG 31 1979

B-115369

The Honorable Frank Thompson, Jr.  
Chairman, Committee on House  
Administration  
House of Representatives

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Dear Mr. Chairman:

This is in reply to your August 7 request that we provide technical assistance to identify any electronic or mechanical problem with the House of Representatives' computerized Electronic Voting System. You specifically mentioned those technical problems that might explain the reported voting anomalies of July 30, 1979, and related questions raised about the system's accuracy and technical integrity.

In our opinion, the chance of any electronic or mechanical problem or hardware or software penetration causing the reported situation is so infinitesimally small as to be beyond any reasonable probability. To reach this opinion, we (1) inspected the system's equipment and its environment and evaluated its hardware and software, (2) reviewed the information developed by the House Information Systems staff regarding potential technical problems with the system, (3) reviewed the system's documentation, (4) evaluated the operational procedures used to insure system reliability, (5) reviewed controls over the production and issuance of identification cards to Members of the House, and (6) reviewed security and operational controls of the computer center.

In addition, we tested and validated the system's equipment in operation, analyzed control reports provided by the voting system, and obtained information from officials responsible for operating the voting system, controlling admission to the House Chamber, and assuring orderly and proper conduct of the House's affairs. We made our review between August 13 and August 29.

Before discussing the technical aspects of our work I would like to comment that all roll call votes, except notice quorums, are a matter of public information and reported daily in the Congressional Record and elsewhere. They are available for the close scrutiny of every Member. Therefore, any aberration in the system is subject to early discovery and immediate

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investigation. While no system can claim total security, and a determined and skilled individual may be able to penetrate this system, such malicious acts should only have a temporary effect since these votes are public knowledge. Aside from individual satisfaction from successfully penetrating the system, little or nothing is to be gained from breaching the House's voting system unless legislative outcomes can be influenced, which we do not believe to be the case.

As to the technical aspects, on July 30, all 44 voting stations registered Members' votes. Voting stations connect to 4 concentrators, with 11 stations connected to each concentrator. The concentrators direct signals to the voting system computer. Each of the concentrators received one or two of the six questionable votes, which were recorded as being made by the same Member at five different voting stations in the House. These five stations registered votes on the same roll call for as many as 27 other Members.

The voting system's control reports indicate that no unusual problems were experienced at these voting stations on July 30, and our analysis of the computer voting transaction log shows that for all of the questioned votes, cards have been inserted into the voting station within 30 seconds of a prior voting transaction. In fact, two of these cards were inserted only 3 seconds after another Member's vote transaction was registered at the station, and one questioned vote was registered 3 seconds before another Member's card insertion took place. No problems have been reported with any of those adjacent votes or any other votes registered on July 30.

Our tests of the House voting system have shown that:

- All 44 voting stations are properly recognized by the computer and appear to have been functioning properly on July 30.
- Our subsequent review of data signals to and from the voting stations and the computer showed no irregularities, and signal and noise levels were satisfactory.
- Hardware and software controls provided an appropriate level of technical security.

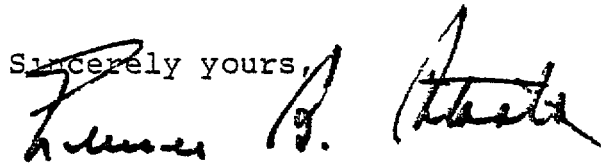
We found no indication that any of the voting system equipment was malfunctioning on July 30. Added assurance that the system was operating properly on that date is that no response has been received to your August 2 request for individual Members to report any July 30 voting problem or difficulty.

We evaluated the possibility that votes were recorded as a result of someone either injecting false signals into the computer system or manipulating the computer program. The former approach would require a detailed knowledge of the relationship between the voting stations and the computer and the precise timings involved, as well as of applicable programming techniques. Manipulating the computer program would require access to the system's specifications, the current voting system programs, and Member's identification numbers. In addition, that person would need to be extremely knowledgeable about a rather specialized computer programming language as well as the itineraries of individual Members. Because (1) the voting system is complex, with many interrelationships between the software and hardware, (2) available computer memory is very limited, and (3) two or more programs would have to be modified, we do not believe that either of these means of system intrusion explain the questioned votes that were registered on July 30.

Counterfeiting a voting card is possible, but controls over access to the House Chambers and use of the voting stations are expected to prevent use of such a card.

In summary, we believe that the Electronic Voting System is basically well designed and incorporates appropriate safeguards. We appreciate the courtesies and excellent cooperation accorded our staff by all parties with whom we dealt on this assignment, and we look forward to discussing details of our work with you.

Sincerely yours,

A handwritten signature in black ink, appearing to read "James A. Abate". The signature is written in a cursive style with a large initial "A".

Comptroller General  
of the United States