United States Election Assistance Commission
Report of Investigation

Dominion Voting Systems D-Suite 5.5-B

Williamson County, Tennessee

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Introduction

In late 2002, Congress passed the Help America Vote Act of 2002 (HAVA), which created the U.S. Election Assistance Commission (EAC) and vested it with the responsibility of setting voting system standards and providing for the testing and certification of voting systems. This mandate represented the first time the Federal government provided for the voluntary testing, certification, and decertification of voting systems nationwide. In response to this HAVA requirement, the EAC has developed the Federal Voting System Testing and Certification Program.

The EAC's Testing and Certification Program includes several quality monitoring tools that help ensure that voting systems continue to meet the EAC's voting system standards as the systems are manufactured, delivered, and used in Federal elections. These aspects of the program enable the EAC to independently monitor the continued compliance of fielded voting systems. One of these tools is field anomaly reporting.

Election officials may submit notices of voting system anomalies directly to the EAC. An anomaly is defined as an irregular or inconsistent action or response from the voting system, or system component, which resulted in the system or component not functioning as intended or expected. Anomaly reports may indicate a voting system is not in compliance with the Voluntary Voting System Guidelines or the procedural requirements of this EAC Testing and Certification Program.

An informal inquiry is the first step taken when information of this nature is presented to the EAC. The sole purpose of the informal inquiry is to determine whether a formal investigation is warranted. The outcome of an informal inquiry is limited to a decision on referral for investigation. A formal investigation is an official investigation by the EAC to determine whether a voting system warrants decertification. The result of a formal investigation is a Report of Investigation.

Reported Anomaly

On November 3, 2021, the EAC received a report from the Tennessee Secretary of State's (TN SoS) office that they were planning an investigation into an anomaly observed in Williamson County, Tennessee during a municipal election held on October 26, 2021, regarding Dominion D-Suite 5.5-B ImageCast Precinct (ICP) tabulators. Close poll reports from 7 of the 18 ICP tabulators used during the election did not match the number of ballots scanned. Subsequent tabulation on the jurisdiction's ICC central count scanner provided the correct tally. The central count tabulation was confirmed via hand count of the paper ballot records on October 27, 2021.

Discussions with the TN SoS on December 17, 2021, and January 5, 2022, following their investigation, provided additional details to the EAC. The details of the anomaly were

confirmed and reproduced during the state investigation, though the root cause of the anomaly was not determined.

Formal Investigation

Based upon the information obtained from the TN SoS, the EAC initiated a formal investigation into the matter to determine the necessary actions to obtain the root cause and remedy the issue. The investigation was conducted at the Williamson County Elections Commission facility on January 19 through January 22, 2022. This analysis was performed by both EAC accredited Voting System Test Laboratories (VSTL), Pro V&V and SLI Compliance. The EAC, Williamson County staff, TN SoS, and Dominion staff were present during the analysis.

Testing and Analysis

The first step of the VSTL analysis was verification of the system configuration. Hashes of all components involved were collected and compared to the repository of hashes for the EAC certified system. It was discovered that the system was installed with outdated versions of two configuration files when the system was upgraded from D-Suite 5.5 to D-Suite 5.5-B in January of 2021.

Next, a copy of the election definition used on election day was used to make Compact Flash (CF) cards for the ImageCast Precinct (ICP) scanners and ImageCast X (ICX) ballot marking devices. This election definition was imported into the D-Suite 5.5-B system from a definition originally created on the D-Suite 5.5 system.

Ballots were printed from the ICX and tabulated through the ICP scanners. Multiple ICP scanners were used for tabulation including some that originally exhibited the anomaly during the election and some that did not. Following tabulation, close poll reports and audit logs from the ICP scanners were examined. Results showed that the anomaly was recreated on each of the ICP scanners. This process was repeated several times to understand and isolate the details of exactly when the anomaly occurred and circumstances that may have led to the anomaly occurring.

Analysis of audit log information revealed entries that coincided with the manifestation of the anomaly; a security error "QR code signature mismatch" and a warning message "Ballot format or id is unrecognizable" indicating a QR code misread occurred. When these events were logged, the ballot was rejected. Subsequent resetting of the ICP scanners and additional tabulation demonstrated that each instance of the anomaly coincided with the previously mentioned audit log entries, though not every instance of those audit log entries resulted in the anomaly.

Further analysis of the anomaly behavior showed that the scanners correctly tabulated all ballots until the anomaly was triggered. Following the anomaly, ballots successfully scanned

and tabulated by the ICP were not reflected in the close poll reports on the affected ICP scanners.

Additional iterations of testing were performed after updating the configuration files previously mentioned to the proper versions associated with the D-Suite 5.5-B system. The anomaly was recreated using the correct configuration files with the originally programmed election definition.

A final test was performed using an election definition recreated entirely on the D-Suite 5.5-B system with identical parameters to the definition used during the election and for prior testing. The anomaly was not observed during this test, and there were no instances of the security error "QR code signature mismatch" or warning message "Ballot format or id is unrecognizable" in the audit log.

Conclusion of Formal Investigation

The direct cause of the anomaly was inconclusive. Based on the investigation, it's reasonable to conclude that the anomaly is related to the imported D-Suite 5.5 election definition used on the D-Suite 5.5-B system.

On February 11, 2022, Dominion submitted a Root Cause Analysis (RCA) to the EAC. The report indicates that erroneous code is present in the EAC certified D-Suite 5.5-B and D-Suite 5.5-C systems. The RCA report states that when the anomaly occurs, it's due to a misread of the QR code. If the QR code misread affects a certain part of the QR code, the ICP scanner mistakenly interprets a bit in the code that marks the ballot as provisional. Once that misread happens, the provisional flag is not properly reset after that ballot's voting session. The result is that every ballot scanned and tabulated by the machine after that misread is marked as provisional and thus, not included in the tabulator's close poll report totals.

Dominion has submitted Engineering Change Orders (ECO)s for the ICP software in the D-Suite 5.5-B and D-Suite 5.5-C systems: ECO 100826 and ECO 100827. Modified ICP source code was submitted by Dominion that resets the provisional flag following each voting session. The ECO analysis included source code review to confirm the change to both systems and to ensure no other code is changed. A Trusted Build of the modified source code was performed to produce the updated ICP software. This software was then tested for accuracy by processing two thousand ballots printed by an ICX, utilizing the same election definition used in Williamson County, TN on October 26, 2021.

The analysis and testing of the ECOs has demonstrated that the anomaly was successfully fixed. No instance of the anomaly or the associated error or warning messages in the ICP audit logs were observed during the testing. The EAC has approved ECO 100826 and ECO 100827 on March 31, 2022.