

BOULDER COUNTY CLERK & RECORDER

2008 GENERAL ELECTION REPORT

SEPTEMBER 18, 2009



2008 General Election Report Summary

Boulder County Clerk & Recorder, Elections Division

OVERVIEW

During the 2008 General Election, Boulder County experienced a delay in processing ballots. The main cause of the problem was an incompatible computer file, specifically a driver file, located on the ballot processing system.

The incompatible file has been removed from the ballot processing system and testing has confirmed that the problem has been resolved by this correction.

BACKGROUND

Boulder County processes paper ballots by scanning them into images that are similar to a PDF. Many of the ballot images for the 2008 General Election had faint toner markings and dust appearing in the boxes of contests. Boulder County's ballot processing system interpreted some of these markings as votes. These false votes became known as phantom votes. It was clear when looking at the ballot images that these votes were not made by the voter. Because of those errors, all ballot images were visually inspected to ensure the accuracy of election results. This combined with a high rate of scanning rejections and system errors, delayed the final vote count for several days.

Boulder County election staff inspected about 688,000 ballot images during election week and resolved nearly 7,000 phantom votes. Boulder County verified the accuracy of its 2008 General Election results through the visual inspection of all ballot images and by conducting an extensive audit.

INVESTIGATION

Immediately following the election, Boulder County launched a comprehensive investigation to find the cause of those errors and to ensure they do not occur during future elections. The investigation took nine months and included the examination of ballot paper, printers, the process of mailing ballots, effect of folds in the ballot, as well as the software and equipment used to process ballots.

Boulder County worked with independent experts to examine these areas. Testing was also conducted by election software maker Hart InterCivic. The driver file incompatibility was identified during this process.

DRIVER FILE IDENTIFICATION

Officials from Boulder County and Hart InterCivic conducted further testing in June of 2009 on the ballot processing system which is composed of Hart InterCivic Ballot Now 6.0 software and Kodak i830 scanners. In July, a significant discovery was made in the investigation.

During testing, Hart InterCivic instructed Boulder County election officials to review software folders on the computers attached to each scanning station. In doing so, an incompatibility was discovered with the driver file that controls each station's scanner.

This "driver" is a program that controls the scanner and translates communications between the scanner and the Hart InterCivic software. The incompatible driver file was installed as part of the June 2008 Trusted Build process.

In 2007, Colorado State law required the Trusted Build. The Trusted Build is a process in which all voting system software and firmware is wiped away from the system to create a clean slate. A state certified trusted copy is then installed to ensure that no malicious code exists on the voting system.

Officials from the Colorado Secretary of State's Office and Boulder County removed and reinstalled the Trusted Build on all eight of Boulder County's ballot scanning stations to comply with the new law.

During the installation, it was discovered that the Scan Validation Tool, a software component of the Kodak scanner necessary for calibration, was not part of the Trusted Build. However, it was previously installed on Boulder County's ballot processing system. Officials from the Colorado Secretary of State's Office and Boulder County agreed to install the Scan Validation Tool.

During this process, the driver for the Scan Validation Tool replaced the driver file that was part of the Ballot Now 6.0 software. Officials from the Colorado Secretary of State's Office and Boulder County were not aware that this had occurred. Ballot Now 6.0 must operate with its driver file to function properly.

This new driver created an incompatibility that caused confusion within the system, resulting in ballot scanning rejections and other system errors. It also exacerbated the toner transfer and dust on ballot images, resulting in streaking, faint lines and speckle marks. This ultimately caused the phantom votes and the processing delays that occurred during the 2008 General Election. The correct driver file would have properly processed ballots that displayed toner transfer and dust markings.

Election officials from the Colorado Secretary of State's Office and Boulder County as well as Hart InterCivic removed the Scan Validation Tool and its driver file from each of the scanning station computers and reinstalled the Trusted Build, which included the correct driver file. The Scan Validation Tool was not reinstalled as it is not an official component of the Trusted Build.

TESTING

Boulder County conducted testing to confirm that the driver file incompatibility caused phantom votes and system errors. Testing was conducted with ballots that were in poor condition and those that were representative of an actual election.

Testing Timeline

December, 2008 – March, 2009:

Paper analysis conducted by
Lexmark International Inc.

March, 2009:

Postal testing conducted by Boulder
County election officials

March, 2009 – May, 2009:

System analysis conducted by
Applied Trust Engineering

May, 2009 – June, 2009:

System testing conducted by
Hart InterCivic

June, 2009:

System testing conducted by Boulder
County and Hart InterCivic

Early July, 2009:

Identification of driver file
incompatibility

Late July, 2009:

Reinstallation of Hart InterCivic
Ballot Now 6.0 and Trusted Build

Late July, 2009:

Correct driver file verification testing

Late July, 2009 – Early August, 2009:

2009 Coordinated Election
simulation testing

Late August, 2009:

Enhanced elections processes and
procedure development

September, 2009:

Report production and release

It is important to note that in an actual election, ballots that are in poor condition would be duplicated for quality purposes before being processed. Boulder County election officials chose to test these ballots in order to fully understand the impact of fold lines running through the boxes of contests and extreme toner transfer.

Earlier testing conducted with the wrong version of the driver file and ballots representative of the 2008 General Election found an error rate of 3.02 percent when phantom votes were not corrected.

Testing conducted with the correct driver file and ballots in poor quality reduced the error rate to 0.0371 percent. Scanning rejections were also eliminated.

Testing conducted with the correct driver file, ballots that are representative of an actual election and calibrated ballot processing settings reduced the error rate to 0 percent. The issue of scanning rejections remained eliminated.

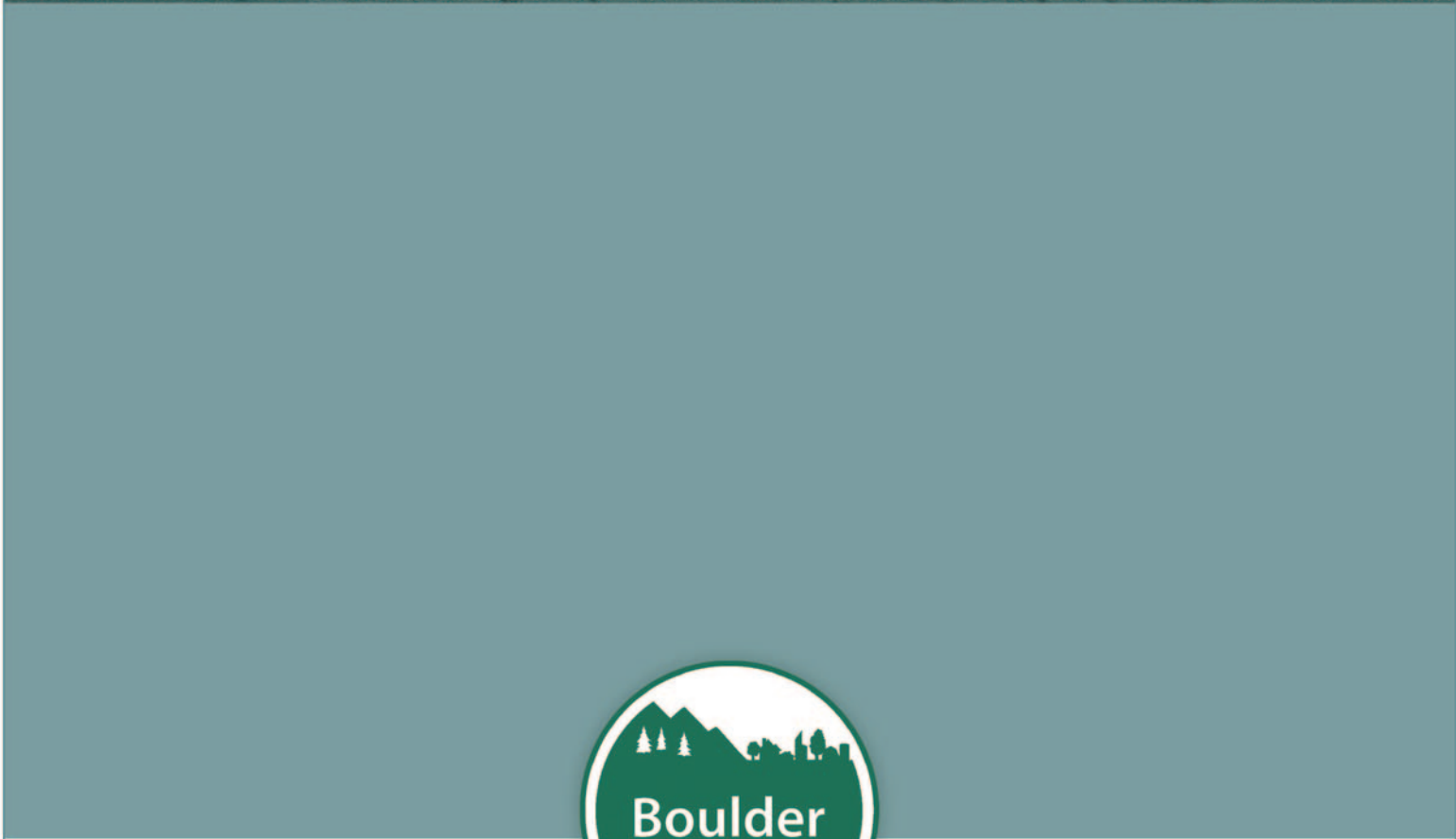
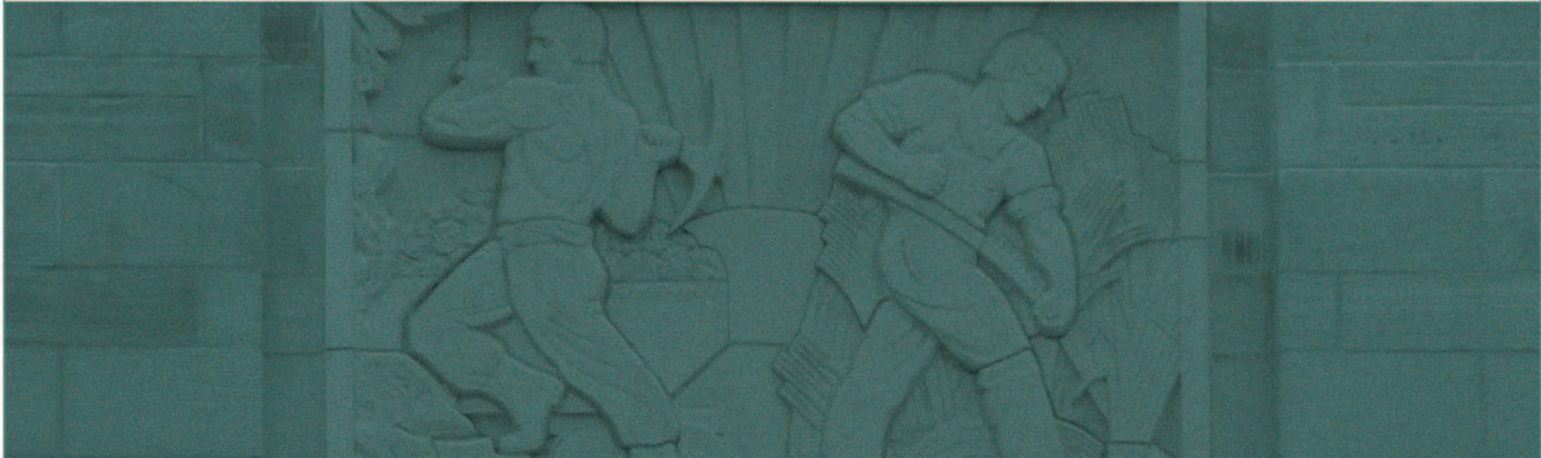
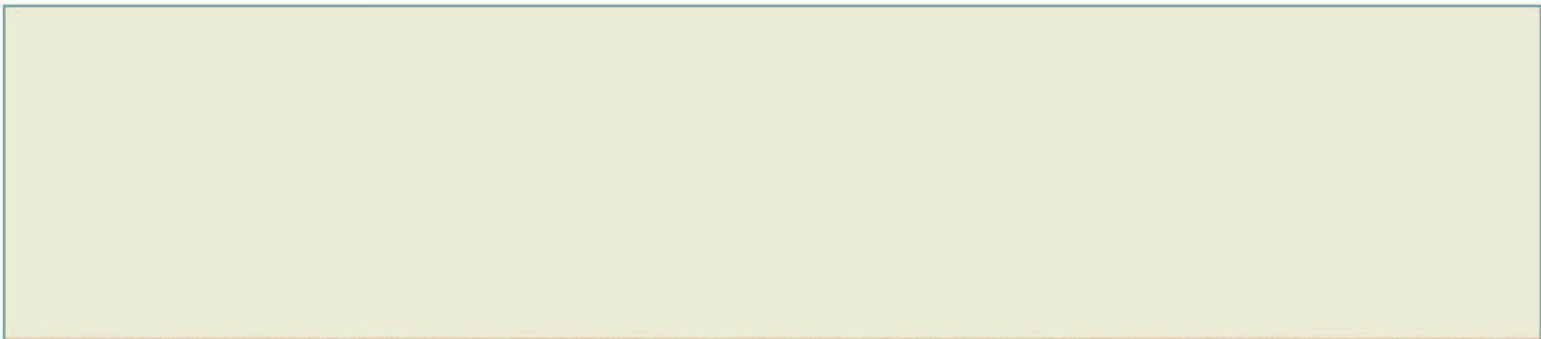
The testing verifies that the problem that occurred during the 2008 General Election was caused by the incompatible driver file installed on the ballot processing system.

CONCLUSION

The incompatible driver file issue has impressed upon Boulder County the significance of ensuring that correct software versions are installed on the ballot processing system. Boulder County has developed several new processes and procedures as a result of this investigation that will ensure the problem does not occur during future elections:

- *Software versions will be verified against an official system checklist after servicing and before the start of each election to ensure the Trusted Build is still properly installed*
- *Adoption of a formal change management process to ensure all changes are approved and tested.*
- *Ballot scanning stations will be checked for proper software, firmware and all other components after any servicing and before the start of each election.*
- *The user administrator password will be placed in an electronic vault and will be changed after each use. This process will track administrative changes to the system more effectively.*

This investigation has allowed Boulder County to completely review its elections system, processes and procedures. This has resulted in an improved knowledge of the ballot processing system, and the necessary checks and balances that need to be in place for elections. Boulder County election officials are confident that the changes made as a result of this investigation will improve the efficiency of ballot processing and continue to ensure accurate election results.



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