9/23/2021

Maricopa County Forensic Audit
Volume II: Operations & Methodology

Work Performed For:
Arizona State Senate
1700 W Washington St
Phoenix, AZ 85007

1 CONTACT DETAILS

Name	Title	Phone	E-mail
Doug Logan	Principal Consultant	941-364-6527	dlogan@CyberNinjas.com

2 REVISION HISTORY

Date	Revision	Notes	Updated By
	DRAFT		

3 TABLE OF CONTENTS

1 DOCUMENT OVERVIEW

The audit was designed to be a comprehensive review of the results from the Maricopa County 2020 General Election to confirm the effectiveness of existing legislation in governing elections, and to provide additional insights on possible areas of legislative reform that could ensure an even greater level of integrity and accuracy in how elections are conducted. This audit is the most comprehensive election audit that has been conducted. It involved reviewing everything from the voter history for the election, to retallying all 2.1 million ballots by hand, to performing forensic photography and review of the ballot paper, to conducting cyber forensic imaging and analysis of the provided voting equipment. This extensive process involved over 1,500 people who contributed a total of over 100,000 hours of time over the course more than 5 months from when setup began, to when this report is completed.

This volume of the report serves to outline details of the audit operations and the conduct of the audit in general; as well as cover the audit methodologies behind various actions performed during the audit.

2 AUDIT OPERATIONS

The audit was primarily conducted at the Arizona Veterans Memorial Coliseum on the Arizona State Fair Grounds in Phoenix, Arizona. On two separate occasions, everything related to the audit was moved to the Green Building on the Arizona State Fair Grounds during the course of the audit; the first time to temporarily store the ballots, voting machines, and audit equipment outside of the Coliseum while another event took place; and the second time to finish outstanding audit activities. Each of these moves represented substantial operational challenges that were successfully managed with the chain of custody of all ballots and devices fully maintained. The following sections outline the aspects required to be managed from an operational standpoint.

2.1 Facility Inspection and Setup

Health, safety and security were extremely important factors of the audit. Once the location of the facility was determined, a full inspection of the premises was conducted. This included an exterior and interior evaluation to identify logistics needed and any challenges that may arise. The primary focus was the health, safety, and security of the workers along with security of the ballots and voting machines.

Focus Points included:
- Security perimeter development and stationing, parking, entrance/check-in control and locating a first aid station
- Identifying, designing, and completing layout of meeting space, engineering space, counting and paper examination space and machine staging space
- Locker logistics, hospitality such as meals, snack, water stationing and an evacuation and reunification plan
- Training classroom location and setup, tally aggregation station setup and logistics, security and tactical operation room positioning and staging, administrative workstations, and ballot storage/security
- Technology workspace and monitoring, supply storage and central receiving for incoming shipments

2.1.1 AUDIT ENHANCEMENTS

The audit process had to take a break due to high school graduation ceremonies taking place in the arena. All equipment and tables had to be broken down and removed. However, the setup was reconfigured based on lessons learned after the break, which increased the counting and imaging productivity immensely.

Due to the number of volunteers, it became apparent that a building entry reconfiguration had to be done to ensure covid protocols were continually adhered to and security checks were of the highest standard. One major enhancement aside from traffic control panels was entrance scheduling, which was utilized by reporting times in fifteen-minute increments. Each counting/paper examination team entered at a different time to avoid long lines at the entry point.

During the course of the audit, improved signage and traffic control points were implemented to streamline the access control process. In order to avoid bottlenecks, pre-shift start staging areas were implemented for half of the teams reporting to enter from the west end of the arena. This greatly reduced foot traffic congestion that could pose an impediment to evacuation in case of emergency.

Please see Exhibit A for detailed information regarding the Health and Safety Plan.

2.2   Information Security (Technology and Data Storage)

The information security procedures followed CIS benchmarks of industry standards for the auditing process. Key components to the design included an air gapped system which is not internet linked, therefore no firewall was necessary. The air gapped design ensured the most secure means of integrity in protecting all aspects of video and data storage.

There were 33 servers and numerous network video recorders used during the course of the audit; 32 of these servers were utilized for data storage purposes to support the Paper Examination work, with additional backups stored on, Network Attached Storage (NAS), Solid State Drives (SSD).

All files were hashed as they were written to multiple locations to allow for tamper detection. Secure Digital (SD) cards were placed in each ballot box which contained all ballot images for each box. All aggregation data was stored on one server with a backup server being used to ensure a secondary means of data storage. See also 5.10.

2.2.1   AUDIT ENHANCEMENTS

Initial projections for required data storage were estimated at less than 50 terabytes. By the end of the audit, over two petabytes had been procured for storage, backups, and copies. The additional servers were required to meet the storage demands of higher quality imaging, the incorporation of additional security cameras and the overall duration of time to complete the audit.

Additional servers, Solid State Drives (SSD), Network Video Recorders (NVR)s and Secure Digital (SD) cards had to be procured for the expansion of storage. Also, an increased number of laptops had to be acquired for paper examination tables as well as microscopes and the rental of DSLR cameras.

Please see Exhibit B for detailed information regarding the information security policy.

2.3   Human Resource Acquisition

A chain of command was implemented to ensure the organizational structure was sound. The organizational chart included a CEO-Vice President model followed by management/technology leads along with pod and table managers. Leadership for the audit was identified and placed into strategic roles to ensure a stable management process. Qualifications of paid staff was extremely vital to ensure a solid chain of command and a well-managed operation.

Numerous people for this audit were needed. Therefore, a team was set up to on-board both paid and volunteer workers. Individuals were brought in from all over the country to include, but not limited to, Pennsylvania, Ohio, Florida, New York, New Jersey, New Mexico, Arizona, and Washington D.C.

Furthermore, staff were assigned to recruit volunteers and other potential employees to work the audit through a temporary employee agency or via online recruitment through the audit website. Political affiliation was not a requirement to work the audit and approximately 1200 volunteers and over 300 paid positions who successfully passed a background check and social media vetting were brought in.

Once an individual was identified to work, he or she was scheduled for Orientation/Training. Upon arrival and with only approved access from law enforcement checking the security list, individuals were covid screened, credentialed and processed. At this point, the individuals received a comprehensive orientation/training.

The occupations of the volunteers and paid positions brought about a wide range of experience to include a retired Air Force General, former District Attorney, recently retired FBI, IRS and Treasury Agents, and a County Manager. There were Professional Development Trainers, Election Investigators, Election Supervisors, Data Analysts, Election poll workers, CPA's, Fraud investigators, Forensic Specialists, Crime Scene Investigators, Police Officers and Firefighters. Others include a Heart Surgeon, College Professors, Nurses and an Aerospace Engineer. There were Psychologists, Military Service Members, Coaches, CEO's and Business Owners/Developers, Consultants, Cyber Security professionals, Accountants, Lawyers, Teachers, Real Estate Brokers, Software Developers, Investors, Engineers and several other occupations that comprised the team.

By the conclusion of the audit there were more than 1500 people that volunteered or were compensated for their work.

2.3.1 AUDIT ENHANCEMENTS

A few weeks into the audit, the background investigation process was streamlined to enable rapid applicant intake. Furthermore, it became important that a scheduling system called Zoom Shift be utilized to ensure that the appropriate staff was assigned to each shift based on their training and skill set.

Please see Exhibit C for additional information regarding Human Resources.

2.4 Orientation and Training

A comprehensive training program was set up and constantly upgraded throughout the duration of the audit. This program included an orientation of operational logistics and concentrated training in counting and paper examination. There was also supervised on-the-job training for positions moving into table management, aggregation, or in the ballot corral.

> **Commented [2]:** Is there some sort of diagram to refer to that shows what each of these areas are or where they had been located?

Key training topics included:

- The mission of the audit, importance of the non-disclosure agreements, transparency, and integrity of the audit, along with the floor rules to include prohibited items on the floor.
- A review of all job descriptions with trainees as well as health and safety protocols, evacuation and re-unification processes, check-in, staging, scheduling, hospitality and dine-in services.
- A broad overview of the goals and expectations from management

Training classes were conducted two to five times a day with a wide range of class counts which was mandatory for any person working or observing on the floor.

All floor training provided workers with the necessary essential skills to enter the arena floor fully prepared to engage in the counting or paper examination process. *Specifically, all trainees were trained to understand the different types of ballots that they may come across and how to adjudicate ballots per the standards of Maricopa County and/or the Secretary of State's Office*. Video review training along with a hands-on counting training utilizing training ballots and tally sheets were used to provide all workers with a firsthand understanding of each of the processes. A training lab was also set up to display the counting and Paper Examination Process.

The ballot counting training utilized a set of training ballots and a tally sheet exercise to include tallying results and filling out all boxes with the vital information to ensure an understood process was mastered by trainees. Once every individual was finished with the training exercise, they were ready for deployment to the floor.

Paper Examination Training included video instruction and display of the process followed up with a hands-on lab experience that would enable the trainee to work directly with the technology including both the software and the operation of the Digital Single Lens Reflex (DSLR) camera and microscopes. During this training, the importance of image quality along with speed and accuracy of the process was emphasized.

New trainees being placed in an "Aggregation" role had to have prior experience in working with excel spreadsheets or have accounting or data entry experience. Individuals brought on to work in the secure ballot corral also went through the orientation/training program to understand both counting and paper examination. Any individual going to work in the corral received additional on-the-job training and was supervised by a corral manager prior to working independently. The same applied for individuals that were elevated to table management positions. Much of their training encompassed observation and supervised on-the-job floor training.

2.4.1 TRAINING ENHANCEMENTS DURING THE AUDIT

Training was constantly modified to match all floor operations. For example, if a form change was made on a Tally sheet, the training Tally sheet was as well. Other changes in training included:

- Evacuation/Reunification Planning education
- Tally Sheet Training Exercise Programs
- Counting Table mockup was added
- Paper Examination Training Labs were added
- Scheduling training for trainees was added.

4   Audit Methodology

The audit was designed to be a comprehensive review of the results from the Maricopa County 2020 General Election to confirm the effectiveness of existing legislation in governing elections, and to provide additional insights on possible areas of legislative reform that could ensure an even greater level of integrity and accuracy in how elections are conducted. For this reason, the audit focused on four main areas of the election process: voter history, paper ballots, voting machines, and the certified results. These four areas enabled the audit team to focus on factors that impact elections in order to highlight areas of concern.

2.5   Voter History

The focus of the Voter History Phase was to validate that those individuals who showed as voted was an accurate representation of who voted; and that only individuals who were properly qualified to vote did in fact vote in the election. This was originally designed to be conducted in two main phases, the Data Analysis Phase, and the Canvassing Phase. However, the Arizona Senate put the canvassing phase on indefinite hold and did not authorize it to be conducted. As a result, Cyber Ninjas was not able to perform any canvassing as part of the audit. However, since members of the volunteers we originally brought in to do the data analysis regularly canvassed as part of their own grass roots group; they chose to do canvassing to validate some of our results. We have integrated those results for the completeness of our report.

2.5.1   Data Analysis

During the Data Analysis, the Maricopa County voter rolls and voter participation official files were compared against historical data as well as various datasets to identify anomalies that might identify duplicate voters, voters that don't really exist, voters who moved, dead voters, and other classes that might disqualify a voter. This information was then originally planned to be utilized to target three entire precincts to fully canvass. This canvassing would allow the validation and confirmation that anomalies identified in the Data Analysis Phase represented real and legitimate issues.

With the canvassing officially on hold, these three precincts have not been canvassed; but a limited amount of the data has been able to be validated by Independent Canvassing conducted outside of the audit.

2.5.2   Independent Canvassing

A grassroots selection of individuals led by Liz Harris has been canvassing in Maricopa County since late November 2020. These efforts have focused on validating that voter roll data is accurate and identifying individuals on the voter rolls who don't appear to exist at the addresses listed. Individuals were asked if they voted in the 2020 General Election in Maricopa County, and if so, what method of voting was utilized — whether that be mail-in, early voting, or election day voting. Confirmation was also made on who at the residence was currently registered to vote.

> **Commented [DL3]:** This needs to be fixed.

2.6 Paper Ballots

The focus of the Paper Ballots Phase was to hand-count the federal races for all the 2.1 million ballots, as well as to capture digital imagery of each ballot to allow a review of the paper while maintaining chain-of-custody documentation and a high level of transparency. The end-goal was an accurate and transparent count with a high-level of accountability.

2.6.1 BALLOT STORAGE AND CHAIN OF CUSTODY

Ballot security and maintaining the chain of custody was paramount to everything that was done during the Paper Ballots Phase. For this reason, ballot boxes that were not actively being processed were always stored within a ballot corral, and a ballot box never left that corral without the proper chain-of-custody forms being signed putting the box in the care of a single individual.

The ballot corrals were made of 6' security fence material and were constantly under both 24/7 video surveillance; and 24/7 view of a law enforcement officer. While counting or paper inspection was taking place, the corral gates would be open with corral workers in there to handle the transfer of chain of custody. But the remainder of the time the ballot corral gates were closed and under lock and key.

There were two secured areas that had three sections for storage of ballots. The unprocessed and the in-progress ballot pallets were both housed in the same corral. The other corral was for special ballots that included large print, braille, or damaged ballots.

Security access to the ballot corral(s) were limited to trained corral personnel, the floor attorney, state senate and Cyber Ninjas' designee(s).

Staging tables for ballot check in/check out were positioned strategically and only two keys existed for locking and unlocking the ballot corral. Those keys were held by a corral manager and the attorney.

2.6.2 VOTE TALLYING

The Vote Tallying process comprised three main components: tallying, aggregation, and quality control. These procedures allowed the accurate counting of ballots, the aggregation of those counts into the final numbers, as well as helping ensure quality and consistency was held through the process.

2.6.2.1 TALLYING PROCEDURES

The tallying process was set up with the use of round tables that each had a ballot pedestal spinning system, like a lazy Susan. Other rectangular tables were used to stage ballots for placing ballots on the pedestal and removing ballots off the pedestal.

A last out, first in method was used when it came to handling ballots. The last ballot out of the box was the first ballot back into the box. This ensured that the ballots would be returned the same way they were received by Maricopa County.

A team color coding method was used that encompassed a comprehensive process of identifying workers in each pod. Corresponding colored paper that matched the pod was used to provide a distinct identity of what pod and even table number did the counting for a particular box of ballots. It was important to ensure individuals were designated to their work environment which also served the purpose for shift reporting times and ultimately start times. Pod colors included red, blue, yellow, and green.

Each table had three counters versus a two-person team the state of Arizona required. Each counter independently counted every individual ballot at the table as the ballot went past him or her on the ballot pedestal, marking the tallies on a tally sheet. These tally sheets from the three counters were then compared by the Table Manager roughly every 50 ballots to validate the results. A successful tally was a match as long as two of the three counters had identical ballot/vote counts, and the third counter could not be off by a calculation of more than two votes for every 100 ballots counted in a race.

If a successful tally didn't happen, the Tally sheets were designed in a manner where all tallies were done in groups of 5 ballots. As a result, the Table Manager would identify which group(s) of 5 ballots needed to be re-tallied; and would rerun these through the table with the same three counters. The counters would then utilize a red pen to fix any mistakes they had made on their tally sheet, rather than the green pens they utilized for the original tallying. This process would be repeated as needed until a successful tally had occurred. As a result, there was no speed in tallying without accuracy.

In addition to counters and Table Managers, tables also had a ballot placer/picker. Table counts ranged from 900 ballots to 2200 ballots in a single 5-hr shift. At its peak setup, there were 44 counting tables.

All Tally sheets that were completed had to be approved and signed off for delivery to the aggregation station for data entry. All Tally sheet movement followed a strict chain of custody process.

2.6.2.1.1 Audit Enhancements

On day one, prior to counting starting, it was determined that the pen color would need to be changed from blue to green when using the marking device on a Tally sheet. This change was instituted after determining the ballots in Maricopa County allowed the use of blue ink, and before any ballots were out on the floor.

> **Commented [DL4]:** Highlight for review

To enhance speed and increase quality, a couple of weeks into the audit, changes were made separating out the imaging process from counting which resulted in the two initiatives becoming two independent processes.

> **Commented [DL5]:** Fix as well

Counting Tally sheets were changed and reformatted to make the Tally sheet more user friendly which enabled the counter to add more quickly and consistently.

2.6.2.2 AGGREGATION

The aggregation group was responsible for collecting the Tally sheets from the counting tables, validating that the Tally sheets met the criteria for a successful tally, entering those Tally sheets into a spreadsheet to aggregate the numbers, and scanning the Tally sheets for a digital record. All of this is done while maintaining a strict chain of custody over the Tally sheets that tracked with their own chain of custody forms, with many layers of validation. Any problems with unclear tallies were sent back to the associated Table Manager for correction before the tallies were processed.

The aggregation data entry forms were built in Excel and had built-in checks to catch common typos, validate that proper tallies occurred, and track who was performing the data-entry. Periodically, these Excel sheets would be rolled up utilizing a program in order to create a master aggregation of all of the data.

2.6.2.2.1 Audit Enhancements

There were a lot of enhancements to the processes and Excel sheets utilized to consolidate the aggregation results over time. These enhancements were so significant and beneficial, that all Tally sheets originally aggregated in the first three weeks of counting were re-entered in the new forms.

> **Commented [6]:** Perhaps a sample image

The Tally sheets were also originally organized by the color and table that had performed the counting; but was later shifted over to be organized by pallet, box, and batch; to more easily facilitate validation and quality control.

Commented [DL7]: Review again.

2.6.2.3 QUALITY CONTROL

Quality Control (QC) was an essential aspect of the Vote Tallying process to ensure the highest quality of the final results. Various QC activities took place during the Paper Ballot Phase, but the majority of these operations were conducted in the latter half of Paper Ballot Phase. Activities labeled Quality Control (QC), went above the normal safeguards and checks built into the process in order to identify issues. For example, part of the aggregation process was for someone besides the individual who entered the Tally sheet data to validate that the data did not have typos in it and were correct. While this maintained quality, it did not follow under this section as "Quality Control".

QC operations were focused on areas where there were clear discrepancies among the various distinct numbers that were received. There were total ballot counts from Maricopa County, total ballot counts from the tallying tables, and image counts from the Paper Examination operations. When these numbers were not in agreement, the corresponding Tally sheets and data entries would be reviewed; and depending on the questions presented this would kick off a Quality Control Count (QCC), a Quality Control Tally (QCT), or a Quality Control Paper Examination (QCPE).

QCCs involved counting the number of ballots in a batch or a box to see if the total count of the number of ballots was correct.

QCT's involved re-tallying the entire batch or box following the normal Tallying Procedures.

QCPE involved redoing the images for an entire batch or box because there were not enough images relative to how many ballots that were within that batch or box.

2.6.3 PAPER EXAMINATION

During the Paper Examination phase all ballots were fully imaged utilizing DSLR cameras, and images were captured from a series of microscopes. The goal of this phase was to capture critical information that could be utilized with Kinematic Artifact Detection to identify and categorize the types and nature of the paper utilized in the ballots and the way they were filled out, as confirmed by paper experts.

The Paper Examination setup utilized custom designed tables and DSLR mounts to allow a consistent and simple workflow when capturing the digital imagery. This setup was built for every paper examination station and when fully optimized, there were 64 tables in operation.

Microscopes were mounted to a single plate in locations that enabled the ballot to be imaged looking at specific areas. Once the ballot was placed onto the back lit plate, only one microscope needed adjustment, which is positioned on a sliding jig to ensure the proper image will be taken once lined up over the marked presidential oval.

Commented [DL8]: Add more about various microscopes utilized

The paper examination process captured the following images on every ballot:

- Front and back side DSLR images
- The Presidential oval mark
- An evaluation of the fiber of the paper
- The print alignment
- Color versus black and white print

2.6.3.1 Audit Enhancements

Originally the paper examination process was attached to the same as the counting tables. However, it became apparent that, to fully optimize the two initiatives, there would be a need to separate out each of the processes. Therefore, the paper examination stations were set up in a separate location on the arena floor.

In addition, the need for further optimizing the software and enhancing the microscope and camera technology became apparent so the paper examination tables were reconfigured and retrofitted with the best possible technology for acquiring images.

Document cameras were originally utilized but due to the need for a higher quality image, DSLR cameras and digital microscopes were added which drove up the demand for more equipment and memory. See 5.2 and 5.10 for more information.

Please see Exhibit G for a more detailed summary of the Paper Examination Process.

2.6.4 Transparency & Accountability

Transparency and accountability have been at the center of how all things with the audit were designed. For this reason, it was imperative to have high-definition streaming 24/7 of all audit operations, as well as having observers present to watch things as they happened. Camera technology and regular people observers were involved in the entire process.

2.6.4.1 Cameras & Live Streaming

Technological transparency for this audit was unlike any other recount or audit ever conducted. There were nine live streaming cameras also recording that were operating 24 hours a day 7 days a week throughout the entire audit. Ballots did not move without a live camera and additional security cameras operating to ensure the chain of custody was adhered to. This even included situations when the ballots had to be transported to other buildings.

In addition, there were over 100 cameras used for security, and recording was stored via the use of Network Video Recorders (NVR). This included all counting activity and aggregation data entry. Each counting table had two cameras assigned. A top view camera observed the counting personnel and a ballot closeup camera recorded all ballot information to include the voter's selection. Cameras were all assigned a designated use even down to a table number in each pod. Cameras recording all ballots on the ballot pedestal at the identifying table number and color can be researched by its file identifier to include date and time stamp. *All camera recording can be crossed checked with the results of the tally sheet and verification of recorded video. This was important to ensure the integrity of the process and that there is irrefutable proof that no tampering of any ballot ever took place while in the care and custody of audit staff.*

A series of cameras were also set up in the aggregation data entry area. The primary function of these cameras was to ensure that the data taken from all tally sheets and input into the system, would demonstrate irrefutable evidence that the data entered was accurate and could be cross checked via recorded video.

Several other cameras were set up in key locations to ensure that the servers and computer technology on the floor was not tampered with. All security cameras (excluding streaming cameras) were set up on a separate air gap platform physically segmented from any other network.

> **Commented [DL9]:** Information about court order abou viewing ballots.

2.6.4.1.1 Audit Enhancements

As the number of counting tables expanded so too did the number of cameras needed to ensure all transparency was addressed. Up to 40 additional cameras were purchased and brought online to handle the expansion of counting tables and aggregation data entry stations.

Additional memory had to be acquired for the expansion of the additional cameras.

2.6.4.2 OBSERVERS

Another element of transparency was the observer process. This initiative went far beyond the normal observer access because it allowed observers to be up close to evaluate the counting, paper examination, aggregation, and chain of custody process. Observers were utilized throughout the entire audit to ensure accountability, provide feedback on any irregularity that may have occurred and to serve as additional support to ensure that the overall operation held itself to standards with the highest of integrity, accountability, and transparency. The observers selected included a multipartisan group of individuals. Potential observation volunteers must have applied using an official application form found on Arizona Audit website. Upon completion of the application the standard process involved:

- Data was retrieved from the website and the applicant's name, contact information and availability was logged in centralized spreadsheet
- A background check was conducted
- Applicants were required to provide a voter ID card and 3 letters of reference, or be referred by observation leads
- Applicants were required to read and agree to terms and conditions of their expectations and hours
- If any documents or information was missing, the clearance coordinator contacted the applicant for missing documentation

> **Commented [DL10]:** Validate this with Shelby and could this be testified with court.

There were two sets of observer groups to include authorization from one group commissioned by the State Senate and a second group authorized by the Secretary of State.

2.6.5 AUDIT ENHANCEMENTS

Early into the audit process, all observers were provided the option to attend a training session. However, it was determined that an orientation and training would be of great benefit to observers, so it became mandatory that all observers attend orientation and training. This requirement served the purpose of providing a better understanding of operational expectations and logistics. It also alleviated many questions that in some cases were a distraction to the floor personnel or the attorney for the audit. The training provided a clear understanding on the counting and paper examination process as well as the purpose for aggregation and ballot corral procedures. It also placed a heavy emphasis on the chain of custody.

2.7   Voting Machines

The focus of the Voting Machine phase was to evaluate the physical voting machines to see if there was any indication of outside manipulation, connections to the internet, or other activities that could influence the outcome of the elections. This work comprised three main phases: Digital Acquisition, Operating System Analysis and Application Analysis.

2.7.1   DIGITAL ACQUISITION

During the Digital Acquisition phase all voting machine and digital related items were received from Maricopa County, cataloged and secured; and then each one was forensically imaged. These forensic images were captured utilizing industry best practices which includes the use of "write blocker" technology so that it is physically impossible for any drive contents to ever be changed. All later analysis was only done on copies of these original forensic images.

For more details about the handling of the voting machines or the policies and procedures governing the acquisition of the forensic images; please see CyFIR's Digital Evidence Handling Policies, and the corresponding AZ Audit Evidence Handling Memo. These can be found as Appendix XXXX.

All operations during the Digital Acquisition phase were fully covered under 24/7 livestreamed cameras, and a law enforcement officer was always stationed outside of the evidence lockers to be sure no devices were ever tampered with.

In addition, notice was sent to Maricopa County to invite Dominion Voting Systems to have an observer during this phase; but Dominion chose not to send a representative.

2.7.2   OPERATING SYSTEM ANALYSIS

During the Operating System Analysis all forensic images were reviewed for any indications of network activity, malware, or other suspicious or malicious activities. This involved reviewing configuration files, log files, windows event logs, unallocated disk space; and other resources to determine what activities had been done on the machines and how they were configured.

2.7.3   APPLICATION ANALYSIS

During the Application Analysis, the voting machine software as well as all databases, logs and media associated with it were reviewed to validate the data on them were consistent with what was reported, and that there were no indications of suspicious or otherwise malicious behavior.

2.8   Certified Results

During the Certified Results phase, all of the results from the prior phases, and the resulting counts, tallies and other details; were compared with the official results to identify if there were any discrepancies or other problems that could indicate an issue.

> **Commented [11]:** Fill out when assigned an appendix.

> **Commented [12]:** Really need to revisit this when this is done and give a tone more details.

3 About Cyber Ninjas

Cyber Ninjas is an application security consulting company specializing in ethical hacking, training, and security program development. Our staff represents over 20 years of experience in a variety of areas including application support, development, product management, and application security. This experience across all areas of the software development life cycle gives us a unique perspective on how to build security into your existing processes. We can help you build a software security program, expand the capabilities of your existing staff, or simply perform a security assessment of your software or your company. With everything we do, our goal is to build the knowledge within your organization. We strongly believe that "Security comes with knowledge."; and that it is our job as Cyber Ninjas to train and teach through every engagement to build up capabilities within your organization.