IN THE COMMONWEALTH COURT OF PENNSYLVANIA

Mark Banfield, Sarah Beck, Joan Bergquist, Alan Brau, Lucia Dailey, Peter Deutsch, Constance Fewlass, Barbara Glassman, Marijo Highland, Janis Hobbs-Pellechio, Deborah Johnson, Andrew McDowell, James Michaels, J. Whyatt Mondesire, Mary Montresor, Rev. James Moore, Cathy Reed, Regina Schlitz, Alexander Sickert, Daniel Sleator, Susanna Staas, Stephen J. Strahs, Mary Vollero, Jeanne Zang, Petitioners	:	
v.	:	No. 442 M.D. 2006
	:	Argued: November 16, 2011
Carol Aichele, Secretary of the Commonwealth, Respondent	:	

BEFORE: **HONORABLE BONNIE BRIGANCE LEADBETTER,** President Judge
HONORABLE BERNARD L. McGINLEY, Judge
HONORABLE DAN PELLEGRINI, Judge
HONORABLE RENÉE COHN JUBELIRER, Judge
HONORABLE ROBERT SIMPSON, Judge
HONORABLE MARY HANNAH LEAVITT, Judge[1]
HONORABLE PATRICIA A. McCULLOUGH, Judge

OPINION BY
PRESIDENT JUDGE LEADBETTER[2] **FILED: August 29, 2012**

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[1] This case was argued before an en banc panel of the Court that included former Judge Johnny J. Butler. Because Judge Butler's term on the Court ended January 2, 2012, this matter was submitted on briefs to Judge Leavitt as a member of the en banc panel.

[2] This case was assigned to President Judge Leadbetter on or before January 6, 2012, when she completed her term as President Judge.

Petitioners, twenty-four individual voters,[3] move for partial summary judgment in this original jurisdiction matter filed against the Secretary of the Commonwealth (Secretary). For the reasons that follow, we deny the motion.[4]

In late 2006, Petitioners filed a ten-count petition for review against the Secretary, seeking declaratory relief and an order directing the Secretary to decertify the Direct Recording Electronic voting systems (DREs) used in Pennsylvania, establish uniform testing criteria that complies with the Pennsylvania Election Code,[5] and reexamine the DREs as previously requested. As noted in the petition, the Secretary certified various DREs for use in Pennsylvania elections.[6] DREs do not use a document/paper ballot in the vote process. Rather, DREs display ballots electronically on an interface screen and allow a voter to make choices with a push button, dial or touch screen and then cast his or her vote. DREs record each vote as digital markings in various forms of internal memory; they do not produce a contemporaneous external paper record of a voter's selections/vote. In addition, most of the DREs also store the vote records on

[3] Specifically, Petitioners are Mark Banfield, Sarah Beck, Joan Bergquist, Alan Brau, Lucia Dailey, Peter Deutsch, Constance Fewlass, Barbara Glassman, Marijo Highland, Janis Hobbs–Pellechio, Deborah Johnson, Andrew McDowell, James Michaels, J. Whyatt Mondesire, Mary Montresor, Rev. James Moore, Cathy Reed, Regina Schlitz, Alexander Sickert, Daniel Sleator, Susanna Staas, Stephen J. Strahs, Mary Vollero and Jeanne Zang.

[4] This is the second time this case is before us. Previously, we denied the Secretary's preliminary objections to the petition for review. *See Banfield v. Cortes*, 922 A.2d 36 (Pa. Cmwlth. 2007) (en banc).

[5] Act of June 3, 1937, P.L. 1333, *as amended*, 25 P.S. §§ 2600-3591.

[6] The Secretary has certified the following DREs: the AVC Edge II and the AVC Advantage, made by Sequoia Voting Systems, Inc.; the iVotronic, made by Elections Systems & Software, Inc.; the eSlate, made by Hart InterCivic, Inc.; the ELECTronic 1242, made by Danaher Industrial Controls; the AccuVote TSX, made by Diebold Election Systems, Inc.; and the WINvote, made by Advanced Voting Solutions. The WINvote was subsequently decertified. DREs have been used in Pennsylvania since 2006.

removable memory devices, such as flash drives or memory cards.[7] Finally, the DREs are capable of printing the stored vote data on paper; some systems print vote records on thermal paper, similar to that used for receipts, and others print on a full page. Pertinent to Petitioners' claims and the main concern underlying their legal arguments is that because the voting systems do not produce a contemporaneous paper record of each vote cast, voters cannot verify that their votes were recorded accurately and election officials have no independent physical record to use for auditing DRE vote counts. According to the petition for review, although Petitioners have satisfied the requirements set forth in the Election Code for the Secretary to reexamine the previously certified DREs, the Secretary has improperly denied multiple requests for reexamination.[8]

The Secretary filed preliminary objections to the petition, which were overruled by opinion and order of this court. *See Banfield v. Cortes,* 922 A.2d 36 (Pa. Cmwlth. 2007) (*en banc*), permission to appeal denied by Supreme Court order dated December 16, 2008 (70 MM 2007). Following responsive pleadings and discovery, Petitioners filed the present motion seeking judgment in their favor as to Counts I, IV, VI, IX, and X, primarily on the basis that, inasmuch as there is no dispute regarding certain technical attributes of the DREs, the DREs fail to

[7] To illustrate, according to Petitioners, the Danaher ELECTronic 1242 stores vote data in three separate RAM locations and on a memory cartridge containing "three distinct memories for storing data: one EPROM and two EEPROMS." Petitioners' memorandum of law in support of motion for partial summary judgment at 13.

[8] For instance, according to the petition, Alan Brau, by letter dated March 7, 2006, asked the Secretary to reexamine one of the certified DREs. Brau enclosed a check in the requisite statutory amount of $450, and provided the statutorily-required signatures of ten qualified electors. According to the petition, the former Secretary denied Brau's request shortly thereafter, stating that he was not aware of any changes to the subject DRE. The petition avers that the Secretary received three other similar requests and all were denied for the same reason.

comply with specific provisions of the Election Code, thereby entitling Electors to judgment as a matter of law.[9] Specifically, Petitioners aver that: (1) the DREs fail to comply with Section 1101-A,[10] 25 P.S. § 3031.1 (defining "electronic voting system" as a system that, *inter alia*, "provides for a permanent physical record of each vote cast") (Count I); (2) the DREs fail to comply with Section 1117-A,[11] 25 P.S. § 3031.17 (requiring a statistical recount of random sample of ballots using "manual, mechanical or electronic devices of a type different" than those used for election) (Count IV); and (3) the Secretary's failure to reexamine the DREs upon request violates Section 1105-A,[12] 25 P.S. § 3031.5 (requiring Secretary to reexamine electronic voting system upon request) (Count VI). Petitioners further contend that the Secretary's certification of the specified DREs violates Article I, § 26 of the Pennsylvania Constitution (equal protection) (Count IX), and Article VII, § 6 of the Pennsylvania Constitution (uniformity) (Count X).[13]

Prior to addressing the arguments, it is helpful to note the relevant statutory provisions pertaining to electronic voting systems like the DREs at issue here. The Election Code defines an "electronic voting system" (or EVS) as "a system in which one or more voting devices are used to permit the registering or

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[9] The Secretary has filed her own application for summary relief. In scheduling argument on the instant application, the court directed that all other matters, including the Secretary's application, be held in abeyance. *See* order dated August 17, 2011.

[10] Added by the Act of July 11, 1980, P.L. 600.

[11] Added by the Act of July 11, 1980, P.L. 600.

[12] Added by the Act of July 11, 1980, P.L. 600.

[13] Summary judgment may be granted only in those cases "where the record clearly shows that there are no genuine issues of material fact and that the moving party is entitled to judgment as a matter of law." *P.J.S. v. Pa. State Ethics Comm'n*, 555 Pa. 149, 153, 723 A.2d 174, 176 (1999). Moreover, "[w]hen resolving a motion for summary judgment, the record must be viewed in the light most favorable to the opposing party, and all doubts as to the existence of a genuine issue of material fact must be resolved in favor of the nonmoving party." *Id.*

recording of votes and in which such votes are computed and tabulated by automatic tabulating equipment. The system shall provide for a *permanent physical record* of each vote cast." Section 1101-A (emphasis added). A "voting device" is defined, in turn, as "either an apparatus in which paper ballots or ballot cards are used in connection with an implement by which a voter registers his votes with ink or other substance or by punching, or an apparatus by which such *votes are registered electronically*, so that in either case the votes so registered may be computed and tabulated by means of automatic tabulating equipment." *Id.* (emphasis added). Finally, "automated tabulating equipment" is defined by the Code as "any apparatus which automatically examines and computes votes registered on paper ballots, ballot cards or district totals cards or votes registered electronically and which tabulates such votes." *Id.*

The Secretary must first examine and approve any EVS before any county board of elections may adopt it for use. Sections 1102-A, 1105-A, added by the Act of July 11, 1980, P.L. 600, 25 P.S. §§ 3031.2, 3031.5.[14] In addition, prior to approving an EVS, the Secretary must establish that the system meets the requirements set forth in Section 1107-A, added by the Act of July 11, 1980, P.L. 600, 25 P.S. § 3031.7.[15] The Secretary's approval signifies that "the system so

[14] In addition to Secretary examination and approval, the systems are also examined and approved by a federally recognized independent testing authority and must first meet any voting system performance and test standards established by the Federal Government. Section 1105-A(a).

[15] For instance, Section 1107-A requires, *inter alia*, that each EVS: (1) provides for voting in absolute secrecy; (2) permits each voter, at other than primary elections, to vote a straight political party ticket by one mark or act; (3) permits each voter, at other than primary elections, "to vote a ticket selected from the nominees of any and all political parties, from the nominees of any and all political bodies, and from any persons whose names are not in nomination and do not appear upon the official ballot;" (4) if of the type that registers votes electronically, "preclude[s] each voter from voting for more persons for any office than he is entitled to vote for or upon any

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examined can be safely used by voters at elections as provided [in the Election Code] and meets all of the requirements hereinafter set forth [in the Code]." Section 1105-A(b), 25 P.S. § 3031.5(b). Once a county board of elections purchases, leases or otherwise procures electronic voting systems for use in its election districts, the county board of elections provides all the elements of the voting system to the election districts and, among other things, appoints a custodian and deputy custodians, if necessary, to prepare the voting system and its components for use. *See* Sections 1104-A, 1110-A, added by the Act of July 11, 1980, P.L. 600, 25 P.S. §§ 3031.4, 3031.10. Relevant to the instant action, following an election, the county board of elections "as part of the computation and canvass of returns, shall conduct a statistical recount of a random sample of ballots after each election using *manual, mechanical or electronic devices of a type different* than those used for the specific election." Section 1117-A, 25 P.S. § 3031.17 (emphasis added).

We begin with the contention that the DREs fail to "provide for" a permanent physical record of each vote cast. While there is no dispute that the DREs are capable of printing a paper record of the votes cast (discussed more fully below), Petitioners argue that the systems fail to "provide for" the requisite records because they do not automatically create a contemporaneous paper record when

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question more than once;" (5) if of the type that registers votes electronically, "permits each voter to change his vote for any candidate or upon any question appearing on the official ballot up to the time that he takes the final step to register his vote and to have his vote computed;" (6) "*[p]rovides acceptable ballot security procedures and impoundment of ballots to prevent tampering with or substitution of any ballots or ballot cards*;" and (7) when operated properly, "*records correctly and computes and tabulates accurately every valid vote registered*." (emphasis added).

each vote is cast. According to Petitioners, the printed vote records that the machines will provide are only generated, if at all, at the close of voting or days later. Petitioners cite to a plethora of dictionary definitions to support their construction that the phrase "provide for" requires the actual provision of the needed item, as opposed to the ability to provide the item at a later time upon request.[16]

The Secretary, on the other hand, relying on her own dictionary references, construes "provide for" to require only the capability of providing the specified item upon demand if needed. Thus, if a DRE can provide the requisite permanent physical records when specifically requested, it qualifies as an EVS as defined by the Election Code. While we do not find the phrase ambiguous, we note that we agree with the Secretary's construction that "provide for" denotes the ability to generate or supply the required records on demand; it does not mean that such records must be generated automatically with each vote cast.[17] If the phrase is

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[16] As a general rule of statutory construction, "[w]ords and phrases shall be construed according to rules of grammar and according to their common and approved usage…." Section 3 of the Statutory Construction Act of 1972, 1 Pa. C.S. § 1903. Moreover, we note that: "Whenever possible each word in a statutory provision is to be given meaning and not to be treated as surplusage." *Matter of Employees of Student Services, Inc.,* 495 Pa. 42, 52, 432 A.2d 189, 195 (1981). Finally, when statutory language is ambiguous, construction of the language by the administrative body charged with its execution and application is entitled to great weight and deference and will not be disregarded unless clearly erroneous. *In re Thompson*, 896 A.2d 659, 669 (Pa. Cmwlth. 2006).

[17] *See generally*, Webster's Third New International Dictionary at 1827 (1993) (defining "provide" as an intransitive verb as: "**1a**: to take precautionary measures: make provision – used with *against* or *for* . . . < ~ for the common defense – *U.S. Constitution* >);" Oxford Dictionaries Online at http://oxforddictionaries.com/definition/provide?region=us&q=provide+for [defining "provide" as a verb with and without an object, in pertinent part, as: "**2** [no object] (provide for) make adequate preparation for (a possible event); *new qualifications must provide for changes in technology* . . . (of a law) enable or allow (something to be done)];" MacMillan Dictionary at http://www.macmillandictionary.com/dictionary/british/provide-for (defining "provide for" as a

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construed as Petitioners advocate, the word "for" in the phrase "provide for" becomes superfluous.

Next, we must determine whether the DREs create "permanent physical records" of "each vote cast." It is undisputed that the DREs automatically create electronic records of each vote cast and can generate a paper record of each vote cast upon request. The latter records are created using the DRE's cast vote record or ballot image retention (BIR) function; a ballot image of each recorded vote is created and stored in the DRE's electronic memory and can be printed at the close of the election.[18] Respondent's Exhibit (Ex.) 9, Report of Michael I. Shamos, Ph.D., J.D., at ¶ 47; Ex. 25, Permanent Manual Audit Capacity Documentation for Certified DRE Voting Systems, dated April 11, 2006; Petitioners' Ex. 11, Report of Daniel Lopresti, Ph.D. at 4-5; Ex. 7, Report of Douglas W. Jones, Ph.D., at ¶ 34, 35. As noted, the electronic records are stored both on the machines themselves and on removable media, such as flash drives or memory cards.

According to Petitioners, neither the electronic records nor the printed paper records satisfy the requirements of the Code. Construing the permanency specification to mandate a record which remains forever unalterable, Petitioners

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transitive phrasal verb, in relevant part, as "**2**[•] **provide for something** to make it possible for something to happen in the future *The budget provides for a salary increase after one year.*);" Cambridge Dictionary at http://dictionary.org/dictionary/british/provide-for-sth?q=provide+for+sth (defining "provide for [something]" as "• to make plans in order to deal with a possible event in the future . . . • FORMAL if a law or agreement provides for something, it allows it to happen or exist").

[18] The BIR function is somewhat of a misnomer. Apparently, neither a ballot image nor a reproduction of the visual screen image is actually provided. Rather, "a record of what votes the machine collected from that voter" is provided. *See* Petitioners' Ex. 7*,* Report of Douglas Jones, Ph.D., at ¶ 56.

first contend that the electronic vote records are not permanent because they are continually subject to change or at risk of alteration, either intentional or unintentional. In support, they note the opinion of their computer science and engineering expert, Daniel Lopresti, Ph.D. According to Dr. Lopresti:

> [DREs] employ computer memory technology to create an "electronic record" which is, by its very nature, freely alterable during the election in ways that are undetectable after-the-fact.
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> . . . .
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> [T]he accuracy or permanence of the data stored electronically cannot be guaranteed due to the inherent characteristics of electronic computer memory. All of the forms of computer memory used in the DRE voting system . . . are freely writable under software control for the period of time that the election is taking place. Computer memory can be written or rewritten with incorrect data unintentionally (as a result of software and/or hardware and/or human error) or intentionally (as a result of a malicious attempt to alter the results of an election). Moreover, the act of writing computer memory is in principle undetectable; it leaves behind no physical evidence. This is true even for flash memory modules that contain a manually activated switch or fuse to disable their rewritability at the end of the election; until writability is disabled, typically at the end of the election, the contents of the flash memory may be altered in arbitrary ways. Since even the initial writing of a record into computer memory is accomplished through the use of software and hardware intermediaries, there is no way for a human observer to confirm that what is written is in fact an accurate record of his/her vote.

Petitioners' Ex. 11 at 2-3, 4-5.[19]

[19] Petitioners further note in their reply brief that: "[T]he data is freely alterable during the entire course of an election while DREs are operating, meaning that the data purporting to represent the vote of an elector who cast a ballot in the morning is in an alterable (and, thus, impermanent) state until the polls close . . . The proper focus is not on how long data could be or **(Footnote continued on next page…)**

Petitioners also contend that, even assuming that the data is not altered during the course of the election and that the data on electronic media can be retained for years if stored under proper conditions, "there is nothing in the record to suggest that anyone actually **does** that." Petitioners' memorandum of law in support of motion for partial summary judgment at 34 (emphasis in original). According to Petitioners, "the record suggests that counties reuse the same 'removable' memory cards over and over in each election and in doing so destroy any data that may have been stored on them from prior elections." *Id.*[20] Thus, Petitioners' primary concerns are that (1) electronically recorded vote data can be altered during the election without detection,[21] and (2) in practice, the vote records are not permanent because they are not retained.

The Secretary asserts, however, that "permanent" denotes a state of being that is "continuing or enduring without fundamental or marked change," or

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should be retained, but on whether it is subject to alteration." Petitioners' reply brief at 6 (footnote omitted).

[20] In support, Petitioners note that in the past, the Secretary has directed counties as follows:

> A county board of elections may reuse memory cards for the next election if the county maintains either a printed or electronic copy of the ballot images contained in the system. For Federal elections, a county board of elections must retain these ballot images for 22 months from the date of the election. 42 U.S.C. § 1974. For municipal elections, the county board of elections must retain the ballot images for a [sic] least 20 days, unless ordered otherwise by a court as provided at Section 1230 of the Election Code, 25 P.S. § 3070.

Petitioners' Ex. 42, Directive Concerning the Use, Implementation and Operation of Electronic Voting Systems by the County Board of Elections, dated September 3, 2008, at 5.

[21] Petitioners do not appear to be alone in this regard. In addition to their experts, others have articulated this same concern. *See generally* www.commoncause.org (nonpartisan citizens organization commenting on electronic voting systems).

"stable; that is, it will not change unless some other force acts upon it." Respondent's brief at 24 (quoting in part from the Merriam-Webster Dictionary at www.merriam-webster.com/dictionary/permanent). The Secretary also contends that "permanent" cannot be construed to require a record that is capable of lasting forever in a constant state or one that is immune from alteration or loss as a result of outside actions or forces because such construction would defy reality and is impossible to achieve.

First, we disagree with Petitioners' contention that use of the term "permanent" requires an electronic record that is immune from wrongful or malevolent alteration or destruction or even alteration or destruction resulting from unintentional human error or mishap. As the Secretary notes, any record, whether paper or electronic, is subject to destruction, loss, tampering or wear. We agree with the Secretary that the term must be construed in a manner which serves the purposes of the Election Code.[22] Accordingly, we conclude that a permanent record is one that will remain stable or intact and be available for an indefinite period of time, but at a minimum, twenty days for purposes of recounts, recanvasses,

[22] Section 301 of the Civil Rights Act of 1960, 42 U.S.C. § 1974, requires, in pertinent part, that: "Every officer of election shall retain and preserve, for a period of twenty-two months from the date of any general, special, or primary election of which candidates for the office of President, Vice President, presidential elector, Member of the Senate . . . are voted for, all records and papers which come into his possession relating to any application, registration . . . or other act requisite to voting in such election . . . ."

The Election Code, on the other hand, requires that vote records be retained for a shorter minimum period of time. *See, e.g.*, Section 1230, 25 P.S. § 3070 (providing that "voting machines shall remain locked against voting for the period of twenty days next following each primary and election, and as much longer as may be necessary or advisable because of any existing or threatened contest over the result . . . ." Section 1702(c), 25 P.S. § 3262(c) (requiring in pertinent part that, "[v]oting machines may be recanvassed . . . at any time within twenty days after the date of the primary or election at which they were used.").

litigation, etc., in state-related contests and twenty-two months in federal-related election matters.[23] Immunity from intentional election fraud or unintentional loss or destruction is not a common and approved understanding of the word, nor is it a construction which is necessary to serve the purposes of the Election Code.

Second, to construe "permanent" to denote a vote record immune from human alteration, mishap or loss, renders Section 1107-(A)(11), (12) and (13), 25 P.S. § 3031.7(11), (12), and (13), redundant. Those sections provide, respectively, that in order to be approved by the Secretary, the EVS: "is safely and efficiently useable in the conduct of elections and, with respect to the counting of ballots cast . . . is suitably designed and equipped to be capable of absolute accuracy, which accuracy shall be demonstrated to the Secretary[;]" "[p]rovides acceptable ballot security procedures and impoundment of ballots to prevent tampering with or substitution of any ballots or ballot cards[;]" and "[w]hen properly operated, records correctly and computes and tabulates accurately every valid vote registered." Here, Petitioners' memorandum of law does not point to any undisputed record evidence that demonstrates that an electronic record, which has been created by a EVS meeting all requirements for certification, cannot be accurately retained for time periods mandated by law.

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[23] "Permanent" has been defined as (1) "continuing or enduring (as in the same state, status or place) without fundamental or marked change: not subject to fluctuation or alteration: fixed or intended to be fixed: lasting, stable," *see* Webster's Third New International Dictionary at 1683; (2) "existing or intended to exist for an indefinite period [*e.g.*,] a permanent structure" or "not expected to change for an indefinite time; not temporary [*e.g.*,] a permanent condition," *see* Collins English Dictionary online at www.collinsdictionary.com/dictionary/english/permanent; and (3) "existing perpetually; everlasting, especially without significant change[,]" or "intended to exist or function for a long, indefinite period without regard to unforeseeable conditions: *a permanent employee; the permanent headquarters of the United Nations*[,]" or "long-lasting or nonfading:[ ] *permanent ink*[,]" *see* Dictionary.com at dictionary.reference.com/browse/permanent?s=t.

We also note that the prospect that some counties may actually reuse the electronic storage media in subsequent elections without preserving a printed copy of the vote data or another electronic copy does not command a different conclusion. The dispositive question is whether the DREs certified by the Secretary provide a permanent record of each vote cast, not whether the machines are being used properly or whether the county boards of elections are properly performing their duties under the Code.

Petitioners also take issue with the permanency of the printed vote records that the DREs can produce.[24] According to Petitioners, many of the DREs print the ballot images and vote records on "receipt-grade, ribbon-like thermal paper," which Petitioners suggest is fragile and prone to fading and deterioration, and, therefore, cannot be considered as a permanent record.[25] In support, they point to, *inter alia*, the opinion of their computer expert, Dr. Jones, who opined as follows:

> Thermal printer paper is notorious for not being very permanent. Anyone who routinely collects cash-register or ATM receipts has probably noticed that they sometimes become unreadable in a matter of weeks. The ESI study of the Voter Verified Paper Audit Trail (VVPAT) records produced by the TS[X] machines in Cuyahoga County, Ohio showed a large fraction of them were unreadable. While Pennsylvania does not use VVPAT's, the same thermal printer is used to print the totals tape which Dr. Shamos appears to be suggesting could be used to comply with the permanent physical record requirement of the Pennsylvania Election Code.

[24] Obviously, there is no dispute that the printed vote records constitute a "physical record."

[25] While both parties agree that some of the DREs print vote records using other, more stable types of ink and paper, neither party has identified the specific machines that do so. Clearly, though, not all machines suffer from the alleged defect.

Petitioners' Ex. 7 at ¶ 36. While Petitioners acknowledge the opinion of the Secretary's expert, Dr. Shamos,[26] that, if thermal paper is kept away from direct exposure to heat, its legibility will exceed the federal twenty-two month ballot retention period, they argue that nothing in the record suggests that "busy election workers, without direction or even suggestion from the Secretary, are taking it upon themselves to store [cast vote records] in climate controlled containers." Petitioners' memorandum of law at 42.

Obviously, with respect to the electronic voting machines that do not print vote records on thermal paper, there is no issue as to the permanency of the paper records. As to the unspecified machines which allegedly use thermal paper, Dr. Jones' opinion regarding the permanency of thermal paper is too vague and non-specific to declare as a matter of law that vote records printed on thermal paper are not permanent. In addition, as we noted above, the possibility that vote records printed on thermal paper may not be treated properly to ensure their stability and longevity does not require a declaration that the machines cannot provide a permanent record.

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[26] Dr. Shamos opined in his report that:

> [D]r. Jones declares, without citation, that "the same thermal printer is used to print the totals tape which Dr. Shamos appears to be suggesting could be used to comply with the permanent physical record requirement of the Pennsylvania Election Code." While that may be true of some of the printers used in Pennsylvania, it is not true of all of them, and Dr. Jones has not identified which ones he believes use thermal paper. It is true that thermal paper must be kept away from direct exposure to heat in order to remain readable. However, if this is done, thermal paper far exceeds the 22-minth [sic] ballot retention requirement. I personally possess thermal totals tapes from examinations that occurred more than 10 years ago that are still readable.

Respondent's Ex. 30 at ¶ 41(footnote omitted)

Next, while Petitioners do not dispute that the printed (paper) vote records satisfy the requirement for a "physical record," they contend that the electronic vote records do not.

> Although courts have struggled with the nature of electronic data in other contexts, ultimately the answer turns on what the General Assembly intended. In this context, the General Assembly cannot have intended electrons – subatomic particles so small that they cannot be observed with the naked eye – to satisfy the Election Code. *See*, *e.g.*, Jones Report ¶ 38 ("the electrons uses [sic] to record data . . . cannot be observed without the aid of complex technology such as an electron microscope or a computer.)"
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> If the General Assembly truly intended that purely electronic data would be sufficient, it could have required that [electronic voting systems] provide for a "permanent electronic record."

Petitioners' memorandum of law at 36 (footnote omitted). Whether the General Assembly intended or considered vote records stored on electronic media to satisfy the requirement for a "permanent physical record," while an interesting question, is not one that needs to be resolved in light of the undisputed fact that every certified DRE at issue in this lawsuit can provide vote records printed on paper.

Finally, Petitioners contend that the electronic vote records, including the cast vote records or ballot images from which the printed records stem, cannot be deemed a "record of each vote cast" because there is no way to certify that the records accurately represent each vote cast. According to Petitioners, the vote records are "software dependent" and, therefore, are vulnerable to all the various undetectable maladies plaguing computers and computer software. Specifically, Petitioners argue:

> [E]ven if the data that is stored electronically on DREs were both "permanent" and "physical," there is no way

for the Secretary (or anyone else) to certify that it is a "record of each vote cast." Say what you will about paper ballots and the ability to alter them after they have been cast, the systems that incorporate paper ballots will always create an actual record of the actions as expressed by a voter. Even if they are altered after that, that does not change that there was at one time an actual, accurate record of the voter's actions.

The same cannot be said of DRE systems. . . . [E]ven the initial writing of data in a computer's memory is dependent on and affected by the software the computer runs, and if that software is flawed or corrupted, the initial data – and any subsequent copies of it – will not reflect the voter's interaction with the ballot interface. And as there was never a physical ballot to fall back on, the system in such a situation would never create any actual "record" of any actual vote. *See*, *e.g.*, Lopresti Report at 5 ("Since even the initial writing of a record into computer memory is accomplished through the use of software and hardware intermediaries, there is no way for a human observer to confirm that what is written is in fact an accurate record of his/her vote.") (Ex. 11); . . . [Jones] ¶ 42 (stating that voting data is "the product of complex computer software working from information retained from the time the voters cast their ballots" and discussing the "long chain of translation and copying that intervenes between the voter's act of casting a ballot and the creation of a permanent record of that act. We have no way of knowing, at each step along this chain of translation and copying, that the information conveyed correctly records each vote cast."). In short, whereas optical scan systems[27] use voter-created records, DREs generate software-created data that is no more reliable than the software itself. And when for whatever reason the software is not reliable, there is no "record" of the vote at all.

[27] With an optical scan voting system, the voter marks a paper ballot, which is then fed into an optical scanner to be read and tallied.

Petitioners' memorandum of law at 39-40 (footnote added). Petitioners' concerns, while understandable from a policy standpoint, do not entitle them to relief as a matter of law.

First, the Election Code was amended in 1980 to authorize the use of electronic voting systems. Electronic voting systems, as designed and defined, register votes electronically, without the need for use of paper ballots or "voter-created" records.[28] *A fortiori*, without software, we would not have electronic voting systems; software is necessary to register, create and store the voter's action in electronic format. Not only does the Code not require that vote records be software independent, but such a construction would be absurd, completely incongruous to the amendments defining and authorizing the use of such devices and inconsistent with the state of technology in 1980.[29] Second, while Petitioners

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[28] *See* Section 1101-A (defining "voting device" to include an apparatus by which *votes are registered electronically*). *See also* Section 1118-A, added by the Act of July 11, 1980, P.L. 600, 25 P.S. § 3031.18 (pertaining to recounts and differentiating between electronic voting systems that utilize paper ballots and those that do not).

[29] When the Election Code was amended in 1980 to authorize the use of electronic voting systems, computer equipment and programs were not only an established and accepted technology and business commodity, but were beginning to be marketed to consumers for personal use. *See generally Computer Print Systems, Inc. v. Lewis*, 422 A.2d 148 (Pa. Super. 1980) (addressing, *inter alia*, whether computer programs were type of property which would qualify as trade secrets); *In re Data General Corp. Antitrust Litigation*, 490 F. Supp. 1089 (N.D. Ca. 1980) (addressing, *inter alia*, claim that Data General tied licensing of its software to sale of its central processing units in violation of federal antitrust laws); History of Computers at http://homepage.cs.uri.edu/faculty/wolfe/book/Readings/Reading03.htm; Computer History Museum-Timeline of Computer History at http://www.computerhistory.org/timeline/?category=cmptr. *See also* Legislative Journal-House, No. 55 of 1980 (July 2, 1980) at 2041, Petitioners' Exhibit 46 (Rep. Taddonio stating that: "Right now there are a lot of advances being made [in the computer industry]. We read in the papers that Radio Shack has computers for $500. . . . It will not be long until it becomes economically feasible to have individual computers at the field site where we can have counting at the precinct level and decentralize the election . . . .").

are obviously concerned with the vulnerability of the DREs to "malicious or mistaken code, or . . . [a highjack] through a 'man-in-the-middle' attack, or [human error],"[30] the certification and approval process is designed to provide security from such occurrences.[31] In addition, according to Dr. Shamos:

> [I]t is possible to determine easily whether a system is recording, computing and tabulating votes accurately. One casts a known set of ballots that have been previously tabulated manually. A totals report is then produced and the machine totals are compared with those reported by the machine. This is done on a large scale by the [Independent Test Authority] and on a small scale during certification exams.

Petitioners' Ex. 2, Shamos Report at ¶ 259 (responding to interrogatories). Dr. Shamos also noted that machines are tested before each election to verify that they are recognizing votes correctly. *Id.* at ¶ 423. Accordingly, we deny Petitioners' motion for summary judgment as to Count I.

Next, Petitioners contend that they are entitled to summary judgment with respect to Count IV because the DREs do not permit a statistical recount using a device of a type different than that used for the specific election as required by Section 1117-A. Section 1117-A provides:

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[30] Petitioners' Reply at 8.

[31] *See* Section 1107-A, 25 P.S. § 3031.7 (pertaining to requirements of electronic voting systems). *See also* Petitioners' Ex. 2, Shamos Report at ¶ 64 (discussing ITA [Independent Test Authority] testing and Secretary's certification and noting in pertinent part: "[A] review is made to determine whether there are security vulnerabilities that could feasibly be exploited by a person who gains access to the system during the election process, and a check is made to determine the degree to which the system resists attempts to alter its records."); and at ¶ 246 (noting that federal testing includes, *inter alia*, "system security"). Dr. Shamos also opined that electronic records use mechanisms that protect from and detect alterations." *Id.* at ¶¶ 113, 116. Obviously, human error cannot be addressed with design specifications but can be minimized with proper and thorough training.

> The county board of elections, as part of the computation and canvass[32] of returns, shall conduct a statistical recount of a random sample of ballots after each election using manual, mechanical or electronic devices of a type different than those used for the specific election. The sample shall include at least two (2) per centum of the votes cast or two thousand (2,000) votes whichever is lesser [footnote added].

There is no dispute that the certified DREs can provide printed copies of the electronically recorded vote records (ballot images) and that these records can be counted manually. Nor does there appear to be any dispute that the removable electronic media containing the vote records can be removed and inserted into a different type of machine, read and tabulated separately. *See generally* Respondent's Ex. 9, Shamos Report at ¶¶ 120, 169; Petitioners' Ex. 7, Jones Report at ¶¶ 58-63. Petitioners contend, however, that these alternate means of conducting a recount fail to satisfy Section 1117-A because the same hardware and software used to create and save/store the vote records is used to retrieve the saved data and print it out for manual counting. According to Petitioners, "it is impossible to generate any record of election results, electronic or paper, without using the same software that collected the data and wrote it to memory in the first instance." Petitioners' memorandum of law at 55. In Petitioners' view, the lack of a software-independent vote record precludes a recount by a device of a different

[32] Section 102 of the Election Code defines "canvass" to "include[ ] gathering the ballots after the election and counting, computing and tallying the votes." 25 P.S. § 2601. For purposes of Article XI-A of the Code (Electronic Voting Systems), "ballot" is defined to mean: "ballot cards or paper ballots upon which a voter registers or records his vote *or the apparatus by which the voter registers his vote electronically* and shall include any ballot envelope, paper or other material on which a vote is recorded for persons whose names do not appear on the ballot labels." 25 P.S. § 3031.1 (emphasis added). Although not relevant here, "ballot card," "ballot label" and "paper ballot" are all statutorily defined.

type. According to Petitioners, only voting systems employing a physical ballot, such as punch-card ballots, which are read by a card reader, and voter-marked paper ballots, which are optically scanned, satisfy this provision. We disagree.

First, as already noted, the Election Code does not require software-independent vote records. *See* Section 1107-A (mandatory specifications established for electronic voting systems; production of software-independent vote records not included). Indeed, in addition to authorizing voting devices employing ballot cards and punch cards, the Code specifically authorizes systems which only register votes electronically. *See* Section 1101-A (defining "voting device"); Section 1404(e)(4), 25 P.S. § 3154(e)(4) (pertaining to recount or recanvass of votes in districts using electronic voting systems); Section 1702, 25 P.S. § 3262 (pertaining to recanvassing voting machines, including electronic voting systems that do not utilize paper ballots).

Second, as noted by the Secretary, Section 1117-A provides only that the statistical sample of ballots must be *counted* using a different method or device; there is no requirement that the ballots included in the recount must be produced using a separate device. Thus, the DREs, capable of producing vote records which can be manually counted, satisfy the requirements of Section 1117-A.

In reaching this conclusion, we reject Petitioners' contention that one of the purposes of Section 1117-A is to verify whether the EVS correctly captured voter intent.[33] Petitioners maintain:

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[33] According to Petitioners, Section 1117-A requires more than a simple retally of votes. Rather, looking to other recount provisions of the Election Code, specifically Section 1701, 25 P.S. § 3261 (pertaining to the opening of ballot boxes upon petition), Petitioners contend that the General Assembly intended Section 1117-A to serve as an audit. Petitioners believe that unlike punch card and optical scan systems, which generate a permanent physical record of each vote **(Footnote continued on next page…)**

> [I]n order to perform this mandatory verification, it is necessary to have captured the voter's intention, that is, the record of the voter's choices on the original ballot, separately and distinctly from the software that wrote the selections onto electronic memory and then counted the electronic memory. [Here, with the certified DREs,] the county elections board has no record of the voter's intent, it is impossible to verify whether the DRE captured it correctly, and therefore impossible to determine whether the computer counted correctly.

Petitioners' memorandum of law at 52 (footnote omitted).

We agree with the Secretary that Section 1117-A contemplates nothing more than a recount or retally of a specified number of ballots recorded during an election. Inasmuch as the Code clearly authorizes voting systems that record votes electronically without use of a physical ballot, and that the recount

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(continued…)

cast that can later be compared with the election results, the DREs do not provide a "record of the voter's intent, [so] it is impossible to verify whether the DRE captured it correctly, and therefore impossible to determine whether the computer counted correctly." Petitioners' memorandum at 52 (footnote omitted).

Section 1701 is simply not applicable. That section provides, *inter alia*, that upon petition of electors alleging that they believe fraud or error was committed in the computation of votes, marking of ballots or otherwise in connection with such ballots, the court shall *open the ballot box* and cause the entire vote of the election district to be correctly counted. Section 1701 applies, however, only if the election district uses electronic voting systems utilizing paper ballots. *See* Section 1118-A(1), added by the Act of July 11, 1980, P.L. 600, 25 P.S. § 3031.18(1). If a recount is ordered in a district that uses any other type of EVS, the recount shall by conducted under Section 1702, 25 P.S. § 3262 (pertaining to recanvassing voting machines upon petition). Section 1702 provides for the recount of all votes cast on a voting machine(s). Unlike Section 1701, however, Section 1702 makes no mention of opening the ballot box or error or fraud in connection with marking of ballots because obviously, paper ballots were not used. Rather, Section 1702 provides that the court shall make visible the registering counters of the voting machine(s) and "recanvass the vote cast therein" based upon a petition alleging fraud or error in the canvassing of votes cast. Since Section 1702 applies when the voting machine does not utilize any type of ballot card, verification of voter-intent via a comparison of recorded electronic data with some other indicia of voter intent is neither contemplated nor provided for.

provision applicable to such systems when an allegation of fraud or error is made does not require comparison of electronic records with physical records demonstrating voter intent, Section 1117-A, which requires only an automatic recount of a statistical sample, cannot be construed as Petitioners suggest.[34]

Finally, Petitioners have requested summary judgment with respect to Count VI, pertaining to the reexamination of previously certified electronic voting systems pursuant to Section 1105-A, 24 P.S. § 3031.5. Pursuant to Section 1105-A(a), the Secretary is required to reexamine such voting systems upon proper request by ten or more qualified registered electors who have paid the requisite fee. Essentially, Petitioners ask this Court to issue a writ of mandamus against the Secretary, directing her to conduct the requested reexaminations.[35] There is no dispute that valid requests for reexamination were made and that they were initially denied by the prior Secretary. The Secretary's duty to re-examine the machines upon proper request is mandatory.

The Secretary contends, however, that this matter is now moot, averring in her brief: "On July, 25, 2011, the Secretary . . . acknowledged that her office had a duty under section 3031.5 and, therefore, determined that a re-

[34] Petitioners have also requested judgment in their favor with respect to Counts IX and X on the ground that the Secretary's allegedly improper certification of the DREs at issue resulted in constitutional violations as well. Because we have concluded that Petitioners have not demonstrated that the certifications were illegal thereby entitling them to judgment as a matter of law, we also deny Petitioners' motion for judgment regarding Counts IX and X.

[35] "It is settled beyond question … that mandamus, an extraordinary writ, is not granted as a matter of right but as a matter within the sound discretion of the court…." *Bobick v. Fitzgerald*, 416 Pa. 588, 591-92, 207 A.2d 878, 880 (1965) (citations and quotation marks omitted). Moreover, "so drastic a procedure can, and only should, be permitted when the complaining person has a clear, legal right . . . and the defendant has a clear, legal duty *which he has refused to perform*." *Zaccagnini v. Borough of Vandergrift*, 395 Pa. 285, 289, 150 A.2d 538, 540 (1959) (emphasis added).

examination of the three DREs would be appropriate. . . . The Secretary directed her staff to arrange those re-examinations, which will likely be completed before the 2012 primary elections." Respondent's brief at 66 (citing to Respondent's Ex. 4).

We disagree that the matter is moot because it is not clear whether the examinations have been completed. However, because the Secretary has agreed to conduct the reexaminations and the process has clearly started, we decline to issue a writ of mandamus against the Secretary of the Commonwealth at this time. Rather, we direct the parties to file a status report regarding whether the requested reexaminations have been completed within 15 days of the filing date of our opinion and order.

Based upon the foregoing, Petitioners' motion for partial summary judgment is denied.

BONNIE BRIGANCE LEADBETTER,
President Judge

Judge Brobson did not participate in the decision in this case.

IN THE COMMONWEALTH COURT OF PENNSYLVANIA

Mark Banfield, Sarah Beck, Joan Bergquist, Alan Brau, Lucia Dailey, Peter Deutsch, Constance Fewlass, Barbara Glassman, Marijo Highland, Janis Hobbs-Pellechio, Deborah Johnson, Andrew McDowell, James Michaels, J. Whyatt Mondesire, Mary Montresor, Rev. James Moore, Cathy Reed, Regina Schlitz, Alexander Sickert, Daniel Sleator, Susanna Staas, Stephen J. Strahs, Mary Vollero, Jeanne Zang, Petitioners	:	
v.	:	No. 442 M.D. 2006
	:	Argued: November 16, 2011
Carol Aichele, Secretary of the Commonwealth, Respondent	:	

O R D E R

AND NOW, this 29th day of August, 2012, Petitioners' Motion for Partial Summary Judgment is denied. Furthermore, in accordance with the foregoing opinion, the parties shall file a status report with the Court within 15 days of this Order.

BONNIE BRIGANCE LEADBETTER,
President Judge

IN THE COMMONWEALTH COURT OF PENNSYLVANIA

Mark Banfield, Sarah Beck, Joan Bergquist, Alan Brau, Lucia Dailey, Peter Deutsch, Constance Fewlass, Barbara Glassman, Marijo Highland, Janis Hobbs-Pellechio, Deborah Johnson, Andrew McDowell, James Michaels, J. Whyatt Mondesire, Mary Montresor, Rev. James Moore, Cathy Reed, Regina Schlitz, Alexander Sickert, Daniel Sleator, Susanna Staas, Stephen J. Strahs, Mary Vollero, Jeanne Zang, Petitioners	:	
	:	No. 442 M.D. 2006
v.	:	
	:	Argued: November 16, 2011
Carol Aichele, Secretary of the Commonwealth, Respondent	:	

BEFORE: HONORABLE BONNIE BRIGANCE LEADBETTER, President Judge
HONORABLE BERNARD L. McGINLEY, Judge
HONORABLE DAN PELLEGRINI, Judge
HONORABLE RENÉE COHN JUBELIRER, Judge
HONORABLE ROBERT SIMPSON, Judge
HONORABLE MARY HANNAH LEAVITT, Judge
HONORABLE PATRICIA A. McCULLOUGH, Judge

CONCURRING AND DISSENTING
OPINION BY JUDGE McCULLOUGH FILED: August 29, 2012

I concur with the Majority's disposition of Counts IV, VI, IX, and X. However, I would grant Petitioners' motion for summary judgment on Count I

because the Direct Recording Electronic Voting Systems (DREs) fail to "provide for a permanent physical record of each vote cast."

Section 1101-A of the Pennsylvania Election Code (Code),[1] defines "Electronic voting system" as:

> a system in which one or more voting devices are used to permit the registering or recording of votes and in which such votes are computed and tabulated by automatic tabulating equipment. The system shall provide for a permanent physical record of each vote cast.

(Emphasis added.)

Petitioners' motion for summary judgment on Count I avers that there is no genuine issue of material fact that DREs fail to, "provide for a permanent physical record of each vote cast." In my view, based on the record and clear statutory language, the electronic data stored in DREs is neither "permanent," nor "physical."

The experts' analysis of the electronic data itself would render the data stored electronically on DREs as not "permanent" and subject to intentional and unintentional alteration which can occur in ways that are undetectable. Making "print-outs" of each vote does not constitute a "permanent physical record." Respondent's expert testified at his deposition that vote receipts could be printed out on receipt-grade, ribbon-like thermal paper but acknowledged that thermal paper can become unreadable in a matter of weeks. Such paper is simply

[1] Act of June 3, 1937, P.L. 1333, as amended, added by the Act of July 11, 1980, P.L. 600, 25 P.S. §3031.1.

not "permanent." See Lopresti Report at 4-5 (Ex. 11); see also Jones Report ¶ 30-32 (Ex. 7). [2]

In addition to not being permanent, the data stored electronically on DREs is not physical. If the General Assembly intended electronic data to be considered "physical," section 1101-A of the Code would have required DREs to provide for a "permanent electronic record" (emphasis added) rather than a "permanent physical record." While a memory card or computer chip containing electronic data is "physical," it is not the "record of each vote cast," which is the clear language of the statute.

Accordingly, I would grant Petitioners' motion for summary judgment on Count I.

PATRICIA A. McCULLOUGH, Judge

Judge Pellegrini joins.

[2] As Dr. Lopresti explained, electronic data cannot be considered "permanent" because by its very nature it is subject to alteration and change:

> Computer memory can be written or rewritten with incorrect data intentionally (as a result of software and/or hardware and/or human error) or unintentionally (as a result of a malicious attempt to alter the results of an election). Moreover, the act of writing computer memory is in principle undetectable; it leaves behind no physical evidence…. Since even the initial writing of a record into computer memory is accomplished through the use of software and hardware intermediaries, there is no way for a human observer to confirm that what is written is in fact an accurate record of his/her vote.

Lopresti Report at 4-5 (Ex. 11); see also Jones Report ¶ 30-32 (Ex. 7).