



COUNTY OF LOS ANGELES

**REGISTRAR-RECORDER/COUNTY CLERK**

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**CONNOR B. McCORMACK**  
Registrar-Recorder/County Clerk

December 4, 2006

TO: Each Supervisor

FROM: Conny B. McCormack, Registrar-Recorder/County Clerk

**NOVEMBER 2006 ELECTION REPORT: MANUAL TO MACHINE COUNT COMPARISON OF RANDOMLY SELECTED 5% ELECTRONIC TOUCHSCREEN VOTING UNITS**

At the Board meeting on October 24, 2006, upon motion by Supervisor Zev Yaroslavsky, your Board instructed the Registrar-Recorder/County Clerk (RR/CC) to:

1. Conduct an audit of votes cast on no fewer than 5% of the Direct Recording Electronic (DRE or "Touchscreen") devices used for early voting in the November 7, 2006 Gubernatorial General Election (November 2006 General) that includes comparing the votes recorded on the Voter-Verifiable Paper Audit Trail (VVPAT) with the votes recorded on DRE memory card vote tally system count for a random selection of contests; and
2. Report back to the Board with the findings of the manual count by December 5, 2006, the statutory deadline for the official election certification.

**Introduction**

The California Elections Code requires each local election official to conduct a manual count of all contests on ballots cast in a randomly selected 1% of the election day voting precincts in order to verify the accuracy of the machine count. This manual tally occurs during the 28-day vote canvassing period prior to official certification of election results and augments extensive pre-election testing activities to demonstrate the integrity of the vote tabulation system.

In addition to the manual count audit required by the State Elections Code as described above, and in the interest of enhancing public confidence in the County's multiple voting systems, your Board requested two additional manual to machine count audits in conjunction with the November 2006 Election. Additionally, the Registrar-Recorder/County Clerk (RR/CC) decided to conduct a third supplemental manual audit of a sampling of absentee by mail ballots. A chart of all four audits is found at Attachment 1 following the appendices.

This report addresses the manual to machine count comparison of a randomly selected 5% of the DRE or Touchscreen voting units deployed in conjunction with Early Voting during the November 2006 General Election. A separate report will be issued tomorrow to address the other Board-requested report with regard to "snap tally" precincts in conjunction with the November 2006 Election. A report of findings of the RR/CC's audit of absentee by mail ballots will be issued later this week.

## **Background**

Los Angeles County has been using Diebold DRE devices for Touchscreen Early Voting (TEV) in conjunction with all major elections since November 2000 without experiencing technical or security problems with the preparation, deployment and use of these devices to accurately tally votes cast. The TEV period typically begins the 2<sup>nd</sup> Wednesday before Election Day, and concludes ten (10) days later on the Friday before Election Day (the exception is RR/CC Norwalk headquarters where Touchscreen voting begins two weeks earlier and continues through Election Day to correspond with the entire period of availability of absentee voting).

Depending on anticipated voter turnout, the RR/CC establishes between 15 and 20 TEV sites throughout the County. Historically, approximately 1% to 2% of the County's voters avail themselves of the convenience of voting on DRE devices at their choice of location during the TEV period. For the November 2006 election, 24,686 or 1.2% of the 2,033,199 voters countywide cast their ballots using the DRE equipment.

Following the November 2004 Presidential Election, discussions about the accuracy and reliability of electronic voting equipment began to accelerate around the country. In response, State law was passed in 2005 requiring all electronic touchscreen voting equipment in California to be equipped with a voter-verifiable paper audit trail (VVPAT) beginning with elections in 2006.

Continual public concerns culminated in your Board's October 24, 2006 motion instructing the RR/CC to conduct a manual count using the VVPAT paper rolls and report back on a comparison of manual to machine counts on a randomly selected 5% of the 150 Diebold AccuVote-TSX with VVPAT devices used for TEV during the November 2006 General Election.

Fortunately, the RR/CC had some previous experience in this regard, having conducted a more limited post-election audit of votes cast on one (1) randomly selected Diebold TSX unit with VVPAT following the June 6, 2006 Gubernatorial Primary Election. Experience gained from that citizen-observed audit of one TEV unit formed the basis for the development of the necessary procedures for comparing the votes cast and recorded on the more expanded 5% audit of TSX memory cards with the VVPAT, including a methodology for resolving any differences between totals due to VVPAT printer problems. Following public notification, the 5% audit was performed on November 13<sup>th</sup> and 14<sup>th</sup>, 2006 in the presence of a number of citizen observers. Supervisor Yaroslavsky joined the observation process for several hours on November 13<sup>th</sup>.

## **The 5% TSX Random Audit Process**

For the November 2006 General Election, 150 AccuVote-TSX devices with VVPAT were deployed to 17 locations, including 22 devices at RR/CC headquarters in Norwalk and 8 devices in each of the 16 remote sites. The devices in all 16 remote sites were available for voting between October 25<sup>th</sup> until November 3<sup>rd</sup>. The devices in Norwalk were available from October 11<sup>th</sup> through Election Day, November 7<sup>th</sup>.

Given the total of 150 DRE devices used during the November 2006 General Election, the 5% target equated to auditing eight (8) devices. These 8 devices were selected randomly by citizen observers from folded slips of paper in a transparent container at RR/CC Norwalk headquarters on the morning of November 13<sup>th</sup>. Each slip contained the TEV Site Name and the DRE Machine Number for that site. The list of all TEV sites and machine numbers is provided in Appendix B of this document.

The parameters of the audit entailed selecting four (4) contests listed on the ballot, in recognition of the time and costs required to carry out the manual audit while simultaneously

demonstrating the accuracy of the DRE devices. Two (2) contests were selected for audit on the first 4 of the 8 devices randomly selected. The other 2 contests were selected for audit on the remaining 4 devices. The selection of these 4 contests was partly deliberate and partly random. The RR/CC deliberately included the races for Governor and Secretary of State, as those contests garnered significant public interest.

The remaining 2 contests were selected randomly by drawing two (2) slips from a transparent container of folded paper slips representing all countywide contests and propositions, excluding judicial contests. Selecting countywide contests guaranteed that the contest would appear on every ballot regardless of the voter’s residence. Judicial contests were excluded due to historically high under-voting (no selection made) in such contests. The 2 contests that were randomly selected by the citizen observers present were the contest for U.S. Senate and statewide ballot measure Proposition 86.

The complete description of the procedures used for the 5% random audit are found at Appendix A.

The results of the machine and contest selection and pairing are presented in the table below:

TEV Site	Machine No.	Contests Examined
AC Bilbrew	3	<ul style="list-style-type: none"> <li>▪ Governor</li> <li>▪ U.S. Senate</li> </ul>
Calabasas	2	
Carson	4	
Pasadena	1	
AC Bilbrew	7	<ul style="list-style-type: none"> <li>▪ Secretary of State</li> <li>▪ Proposition 86</li> </ul>
East L.A. Library	1	
Lakewood	6	
Pasadena	7	

Once the devices and the contests were selected, citizen observers accompanied RR/CC staff to the 3<sup>rd</sup> Floor MTS Room where the memory cards and VVPAT security canisters are securely stored. The memory cards and canisters used in each selected machine were retrieved from locked storage cabinets containing numbered and logged seals. The memory cards and canisters were then taken to the 7<sup>th</sup> Floor Conference Room, where two (2) AccuVote-TSX units were used to print election summary reports from each of the 8 units’ memory cards. The selected contests for each machine were isolated and then cut out from each of the election summary reports and attached to separate manual tally sheets used for the manual count comparison. Several observers attended the manual to machine count comparison throughout the entire day on November 13<sup>th</sup>.

The manual count comparison involved reading each ballot printed on the VVPAT paper roll(s) from each selected machine, identifying the desired contest on the ballot and then tallying which candidate or yes/no (for ballot proposition) position received the vote. Once all the ballots on all the randomly selected VVPAT paper rolls were reviewed, the manual tally scores were totaled and compared to the totals from the election summary tapes. Slight variances between the manual tallies and the election summary tapes occurred due to one of two causes:

1. The VVPAT paper roll had a printer problem that caused one or more ballots on the roll to be illegible and therefore uncountable; or

2. Staff made an error in the manual tally, either by scoring the vote for the wrong candidate, inadvertently reading votes from a provisional or rejected ballot, losing track of ballots read, or some other human error.

Five (5) of the 8 selected devices showed exactly matching tallies between the manual tally and the election summary tape on the first manual tally from the VVPAT paper rolls. Two (2) of the 8 selected devices, i.e. those containing the largest number of votes, required several manual tally attempts prior to arriving at matching totals. This corresponds with past experience in manual tallies of all types of ballots (punch card and optical scan), i.e. a correlation between larger ballot counts which yields higher rates of human error in reading and manually tallying votes.

One machine had a VVPAT paper roll with two (2) partially illegible ballots and one (1) completely illegible ballot due to paper jams in the VVPAT. However, by printing out all of the ballot images from this machine and comparing those to the ballots on the VVPAT paper roll, it was possible to deduce which ballot images belonged to the illegible ballots and to arrive at an exact match tally for that machine.

The audit demonstrated that printer jams can and do occur which can cause all or part of a printed ballot to be illegible on the VVPAT paper roll. It also demonstrated that by using a printout of ballots cast generated from the TSX database it is possible to accurately deduce which ballots were undecipherable on the VVPAT paper roll due to a printer jam.

The table on the following page summarizes the data and findings of the manual count comparison for each of the 8 selected devices:

**Results of the Manual Count Comparison**

TEV Site	Machine No.	VVPAT Rolls	Ballots Cast	First Tally Matched	Cause of Discrepancy	Resolution
AC Bilbrew	3	1	19	Yes		
Calabasas	2	2	44	Yes		
Carson	4	1	139	Yes		
Pasadena	1	2	29	Yes		
AC Bilbrew	7	1	20	Yes		
East L.A. Library	1	1	26	No	Printer Jam /Illegible Ballots	Obtained Ballot Images For Illegible Ballots
Lakewood	6	2	181	No	Human Error	Matched After Multiple Manual Tally Attempts
Pasadena	7	3	285	No	Human Error	Matched After Multiple Manual Tally Attempts

Data on the number of votes cast for each candidate in the selected contests by machine is detailed in Appendix C of this document.

**Conclusion**

The manual count audit of the 8 randomly selected TSX devices used in the November 2006 General Election confirmed the accuracy of the computerized vote totals compiled by the Diebold's AccuVote-TSX machines in use in Los Angeles County. However, given the susceptibility of all printer technologies to occasional paper jams, the audit raised serious concerns about the wisdom of the designation of the VVPAT as the *official* record of votes cast (which is now State law in the event of a recount of a closely contested race). Relying on the VVPAT for official tallies during recounts poses the considerable risk of resulting in the unintended consequence of disenfranchising some voters whose VVPAT jammed especially when those voters' ballots can clearly be confirmed by accessing the electronic images. Additionally, the experience with this audit confirms the experience of many election administrators that, as the volume of ballots increases, manual counting of votes by humans becomes increasingly less reliable due to the tendency for human error in performing simple, repetitive tasks on a large scale.

## Appendix A

### ***Procedures for 5% Random Audit of AccuVote TSX Devices Used in the November 7, 2006 Gubernatorial General Election***

**November 13, 2006**

1. Welcome and Introduction
2. Brief description of the random audit process.
  - a. Observers will randomly select eight TSX devices by drawing paper slips from a group of slips representing devices used in Touchscreen Early Voting for the general election. Eight devices represent over 5% of devices deployed for the election.
  - b. Audited contests will include the contests for Governor and Secretary of State, as well as two other countywide contests randomly selected by drawing paper slips prepared for all other non-judicial countywide contests.
  - c. Two contests will be audited on four of the TSX devices, while the other two contests will be audited on the remaining four devices.
3. Audit Coordinator will retrieve the memory cards and Voter Verified Paper Audit Trail (VVPAT) security canister(s) for each selected device from secure storage in the Micro-Tally Systems (MTS) room.
4. For each memory card, staff will insert cards into one of eight AccuVote-TSX devices located in the audit area and power up each of the devices.
5. Staff will perform the following steps operating the AccuVote-TSX post-election interface on each device:
  - a. Press "Print Election Results" button. Press "OK".
  - b. "Print Summary Totals Only" button. Press "Yes".
  - c. "Print write-in candidates" button. Press "Yes"
  - d. "Print Long Report" button. Press "No"
  - e. "Another copy?" button. Press "No"
6. When the Election Results Summary Report completes printing, staff will scroll through the report and identify the selected contests to be audited for that device.
7. For each contest, results from the report will be cut out and stapled to a pre-printed manual tally sheet.
8. For each selected contest, audit team members will be instructed to take the following actions:
  - a. One clerk will scroll through the VVPAT (from the end of the roll to the beginning) looking for votes on each ballot cast for the contest in question. If a ballot is marked as rejected, the clerk will skip over the ballot.
  - b. Each identified vote will be called out and a second clerk will record the vote on the manual tally sheet for that contest. If the ballot is provisional, the second clerk will mark the vote in a separate total and will not include the provisional vote in the regular vote tally.

- c. After all ballots on the VVPAT have been reviewed and all votes have been called out and recorded, the manually tallied votes will be compared to the vote total from the Election Results Summary Report.
  - d. The clerks will roll up the VVPAT for use on other selected contests.
9. If the VVPAT paper roll for a particular device has any paper jams or other print errors that result in the ballot printout being illegible, the following steps will be employed:
- a. From the TSX central tabulation system, the audit coordinator will print all stored ballot images for that device.
  - b. Each ballot image printed will be matched to a ballot on the VVPAT roll.

Through a process of review and deduction, staff will identify which ballots printed represent the ballots that did not print correctly on the VVPAT roll.

**Appendix B**

***List of All Devices at Touchscreen Early Voting Sites***

<b>TEV Site</b>	<b>Machine No.</b>
Central	1
Central	2
Central	3
Central	4
Central	5
Central	6
Central	7
Central	8
Calabasas	1
Calabasas	2
Calabasas	3
Calabasas	4
Calabasas	5
Calabasas	6
Calabasas	7
Calabasas	8
Lakewood	1
Lakewood	2
Lakewood	3
Lakewood	4
Lakewood	5
Lakewood	6
Lakewood	7
Lakewood	8
Pasadena	1
Pasadena	2
Pasadena	3
Pasadena	4
Pasadena	5
Pasadena	6
Pasadena	7
Pasadena	8
West Covina	1
West Covina	2
West Covina	3
West Covina	4
West Covina	5
West Covina	6
West Covina	7

<b>TEV Site</b>	<b>Machine No.</b>
West Covina	8
AC Bilbrew	1
AC Bilbrew	2
AC Bilbrew	3
AC Bilbrew	4
AC Bilbrew	5
AC Bilbrew	6
AC Bilbrew	7
AC Bilbrew	8
Beverly Hills	1
Beverly Hills	2
Beverly Hills	3
Beverly Hills	4
Beverly Hills	5
Beverly Hills	6
Beverly Hills	7
Beverly Hills	8
Braille	1
Braille	2
Braille	3
Braille	4
Braille	5
Braille	6
Braille	7
Braille	8
ELA Library	1
ELA Library	2
ELA Library	3
ELA Library	4
ELA Library	5
ELA Library	6
ELA Library	7
ELA Library	8
Carson	1
Carson	2
Carson	3
Carson	4
Carson	5
Carson	6
Carson	7
Carson	8
Monterey	1

<b>TEV Site</b>	<b>Machine No.</b>
Park	
Monterey Park	2
Monterey Park	3
Monterey Park	4
Monterey Park	5
Monterey Park	6
Monterey Park	7
Monterey Park	8
Redondo Beach	1
Redondo Beach	2
Redondo Beach	3
Redondo Beach	4
Redondo Beach	5
Redondo Beach	6
Redondo Beach	7
Redondo Beach	8
Norwalk	1
Norwalk	2
Norwalk	3
Norwalk	4
Norwalk	5
Norwalk	6
Norwalk	7
Norwalk	8
Norwalk	9
Norwalk	10
Norwalk	11
Norwalk	12
Norwalk	13
Norwalk	14
Norwalk	15
Norwalk	16
Norwalk	17

<b>TEV Site</b>	<b>Machine No.</b>
Norwalk	18
Norwalk	19
Norwalk	20
Norwalk	21
Norwalk	22
Culver City	1
Culver City	2
Culver City	3
Culver City	4
Culver City	5
Culver City	6
Culver City	7
Culver City	8
Lancaster	1
Lancaster	2
Lancaster	3
Lancaster	4
Lancaster	5
Lancaster	6
Lancaster	7
Lancaster	8
Valencia	1
Valencia	2
Valencia	3
Valencia	4
Valencia	5
Valencia	6
Valencia	7
Valencia	8
North Hills	1
North Hills	2
North Hills	3
North Hills	4
North Hills	5
North Hills	6
North Hills	7
North Hills	8

## Appendix C

### *Votes Cast By Contest, Candidate for Selected Devices in the 5% TSX Manual Count Comparison*

(Note: under votes, votes on provisional ballots, and write-in votes were not scored in the audit, so in some cases the total votes cast are lower than the total ballots cast.)

Contest	AC Bilbrew 3	Calabasas 2	Carson 4	Pasadena 1
<b>Governor</b>				
Olivier	0	2	0	0
Jordan	0	0	0	0
Camejo	0	1	1	1
Noonan	0	0	0	2
Angelides	14	20	73	8
Schwarzenegger	5	21	60	15
<b>Total Votes Cast</b>	<b>19</b>	<b>44</b>	<b>134</b>	<b>26</b>
<b>U. S. Senator</b>				
Grundmann	0	0	1	1
Mountjoy	1	7	39	8
Metti	0	1	1	1
Chretien	0	1	2	0
Feinland	0	0	3	1
Feinstein	18	35	89	17
<b>Total Votes Cast</b>	<b>19</b>	<b>44</b>	<b>139</b>	<b>28</b>
<b>Secretary of State</b>				
Hill	0	0	4	6
Bowen	14	20	87	165
McMillon	0	0	1	1
McPherson	3	5	76	95
Lightfoot	3	0	4	4
Akin	0	0	2	3
<b>Total Votes Cast</b>	<b>20</b>	<b>25</b>	<b>174</b>	<b>274</b>
<b>Proposition 86</b>				
Yes	13	14	80	157
No	7	9	98	119
<b>Total Votes Cast</b>	<b>20</b>	<b>23</b>	<b>178</b>	<b>276</b>

**Attachment 1**



**VOTING SYSTEM INTEGRITY ACTIVITIES IN L.A. COUNTY**  
November 7, 2006 GENERAL ELECTION

The California Elections Code requires each local election official to conduct a manual count of ballots cast in a randomly selected 1% of the voting precincts in order to verify the accuracy of the machine count. This manual tally occurs during the vote canvass period prior to official certification of election results. This 1% manual count augments pre-election testing activities in demonstrating the integrity of the tabulation system. In addition to this legal requirement – and in the interest of enhancing public confidence in our voting systems – the Los Angeles County Board of Supervisors together with the Registrar-Recorder/County Clerk have established three additional activities to demonstrate the integrity and transparency of Los Angeles County’s voting systems.

The activities listed below will be conducted prior to certification of the November 7, 2006 General Election results.

**All proceedings are open for public observation.**

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**PRECINCT BALLOTS**

**Manual Count of BALLOTS FROM 1% OF Precincts**

**(all contests; polling place ballots)**

*Random selection of precincts will take place on Wednesday, November 8, 2006 at 3:00 p.m. in the Registrar’s Executive Conference Room, 7<sup>th</sup> floor, Norwalk headquarters.*

<p><b>Dates:</b> Begins Saturday, November 11, 2006 and continues daily until completed.</p> <p><b>Time:</b> 8:30 a.m. – 4:00 p.m. on Saturdays and Sundays; 8:30 a.m. – 6:30 p.m. weekdays</p> <p><b>Location:</b> Registrar-Recorder/County Clerk headquarters, 12400 Imperial Highway, Norwalk; 7<sup>th</sup> Floor Executive Conference Room</p> <p><b>Coordinator(s):</b> Alex Olvera &amp; Cynthia Taylor</p>	<p><b>Authority:</b> California Elections Code (E.C.) Section 15360</p> <p><b>Description:</b> E.C. 15360 states: “During the official canvass of every election in which a voting system is used, the official conducting the election shall conduct a public manual tally of the ballots tabulated by those devices cast in 1% of the precincts chosen at random by the elections official. In addition to the 1% count, the elections official shall, for each race not included in the initial group of precincts, count one additional precinct. The manual tally shall apply only to the race not previously counted. Additional precincts for the manual tally may be selected at the discretion of the elections official.”</p>
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**TOUCH SCREEN EARLY VOTING  
MANUAL COUNT COMPARISON OF RANDOMLY SELECTED 5% OF VOTING  
UNITS  
(randomly selected contests)**

*Random selection of voting units will take place on Monday, November 13, 2006 at 11:00 a.m. in the Registrar's Conference Room, 7<sup>th</sup> floor, Norwalk headquarters.*

<p><b>Date:</b> Begins on Monday, November 13, 2006</p> <p><b>Time:</b> 11:00 a.m. to 5:00 p.m. Continuing Tuesday, November 14, 2006 at 9:00 a.m. until completed.</p> <p><b>Location:</b> Registrar-Recorder/County Clerk headquarters, 12400 Imperial Highway, Norwalk; 7<sup>th</sup> Floor, Registrar's Conference Room</p> <p><b>Coordinator:</b> Kenneth Bennett</p>	<p><b>Authority:</b> By motion of the Los Angeles County Board of Supervisors adopted October 24, 2006</p> <p><b>Description:</b> The Registrar-Recorder/County Clerk conducts an audit of votes cast on no fewer than 5% of the Direct Recording Electronic (DRE or "Touchscreen") machines used for early voting. The DRE units and contests to be audited are randomly selected. A comparison is made of the votes recorded on the Voter-Verifiable Paper Audit Trail (VVPAT) with the centralized vote tally system count. In the event of a VVPAT paper jam, ballot images will be printed from the equipment for use in the vote comparison.</p>
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**SNAP TALLY**  
Manual count Comparison of randomly selected 5% of "Snap Tally" Precincts  
(snap tally contests selected by media)

*Random selection of precincts will take place on Monday, November 13, 2006 at 9:00 a.m. in the Registrar's Conference Room, 7<sup>th</sup> floor, Norwalk headquarters.*

<p><b>Date:</b> Tuesday, November 14, 2006</p> <p><b>Time:</b> 1:00 p.m. to 5 p.m. (or until completed)</p> <p><b>Location:</b> Registrar-Recorder/County Clerk, 12400 Imperial Highway, Norwalk; 7<sup>th</sup> Floor, Registrar's Conference Room</p> <p><b>Coordinator:</b> Deborah Wright</p>	<p><b>Authority:</b> By motion of the Los Angeles County Board of Supervisors adopted October 24, 2006; California Elections Code Sections 14440, 14443 describe "snap tallies"</p> <p><b>Description:</b> The Registrar-Recorder/County Clerk randomly selects no fewer than 5% of the designated snap tally precincts to be manually counted and compared to the snap tally results produced on election night and the centralized vote tally system count for these precincts.</p>
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## **ABSENTEE BALLOTS**

### **MANUAL COUNT COMPARISON OF BALLOTS FROM 1% OF ABSENTEE BALLOTS TABULATED ON ELECTION DAY (randomly selected contests)**

*Random selection of ballot groups and contests will take place on Monday, November 13, 2006 at 9:00 a.m. in the Registrar's Conference Room, 7<sup>th</sup> floor, Norwalk headquarters.*

<p><b>Date:</b> Begins on Monday, November 20, 2006</p> <p><b>Time:</b> 9:00 a.m. – 4:00 p.m. Continues daily until completed.</p> <p><b>Location:</b> Registrar-Recorder/County Clerk, 12400 Imperial Highway – Norwalk – 3<sup>rd</sup> Floor MTS Room &amp; 7<sup>th</sup> Floor Registrar's Conference Room</p> <p><b>Coordinator:</b> Kenneth Bennett</p>	<p><b>Authority:</b> Registrar-Recorder/County Clerk Policy adopted October 30, 2006</p> <p><b>Description:</b> The Registrar-Recorder/County Clerk conducts a random audit of votes cast by absentee/mail ballots. The random audit will include no fewer than 1% of the absentee ballots cast and tabulated on Election Day in a sampling of electoral contests. Manual count will be compared to the totals produced for the same contests on the county's centralized vote tally system.</p>
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