EXPERT DECLARATION OF WALTER RICHARD MEBANE, JR. ON BEHALF OF PLAINTIFFS

I, Walter Richard Mebane, Jr., declare to the following under penalty of perjury at law in support of the Plaintiffs' lawsuit against election officials in the Commonwealth of Virginia.

A. Qualifications

1. My academic position is Professor, Department of Political Science and Department of Statistics, University of Michigan, Ann Arbor. I received my doctorate in Political Science from Yale University in 1985. I was an Associate Professor of Government at Cornell University from 1989 to 2003. I was promoted to Professor of Government at Cornell in 2003 and taught there until 2007. From 1985 to 1989 I was Assistant Professor in the Department of Political Science at University of Michigan, Ann Arbor. My full curriculum vitae is attached as Exhibit One.
2. My expertise lies in the areas of American National Institutions and Elections, Political Economy, Political Behavior; Methodology (Statistics, Computation, Research Design); Mathematical Modeling (Formal Theory, Dynamical Systems). I regularly teach courses to undergraduate and graduate students on those topics. As my curriculum vitae, attached as Exhibit A, shows I have published more than 25 scholarly articles and a few other occasional pieces such as book reviews, and I have written three statistical application packages that are widely distributed and used.

3. My recent work includes: Machine Errors and Undervotes in Florida 2006 Revisited (pdf) Prepared for the symposium How We Vote, Institute of Bill of Rights Law, William & Mary School of Law, Williamsburg, VA, March 14, 2008; Mebane, Walter R., Jr. 2008; Election Forensics: Outlier and Digit Tests in America and Russia (pdf); (postscript) Prepared for presentation at The American Electoral Process conference, Center for the Study of Democratic Politics, Princeton University, May 1--3, 2008; Herron, Michael C., Walter R. Mebane Jr. and Jonathan N. Wand. 2008 Voting Technology and the 2008 New Hampshire Primary (pdf)Working paper. Data and program files; Mebane, Walter R., Jr. 2007. Election Forensics: Statistical Interventions in Election Controversies (pdf); (postscript) Prepared for presentation at the 2007 Annual Meeting of the American Political Science Association, Chicago, Aug 30-Sep 2; Mebane, Walter R., Jr. 2007. Statistics for Digits (pdf); (postscript) Prepared for presentation at the 2007 Summer Meeting of the Political Methodology Society, Pennsylvania State University, July 18—21; Mebane, Walter R., Jr. 2007. Election Forensics: Statistics, Recounts and Fraud (pdf); (postscript) Prepared for presentation at the 2007 Annual Meeting of the Midwest Political Science Association, Chicago, IL, April 12—16; Mebane, Walter R., Jr. 2007; Evaluating Voting Systems To Improve and Verify Accuracy (pdf); (postscript) Prepared for presentation at the 2007 Annual Meeting of the American Association for the Advancement of Science, San Francisco, CA, February 16, 2007, and at the Bay Area Methods Meeting, Berkeley, CA, March 1, 2007; Mebane, Walter R., Jr., and David L. Dill. 2007. Factors Associated with the Excessive CD-13 Undervote in the 2006

General Election in Sarasota County, Florida (pdf). Draft of January 18, 2007; Mebane, Walter R., Jr. 2006. Election Forensics: The Second-digit Benford's Law Test and Recent American Presidential Elections (pdf); (postscript) Prepared for delivery at the Election Fraud Conference, Salt Lake City, Utah, September 29--30, 2006; Mebane, Walter R., Jr. 2006. Election Forensics: Vote Counts and Benford's Law (pdf); (postscript) Prepared for delivery at the 2006 Summer Meeting of the Political Methodology Society, UC-Davis, July 20-22; Mebane, Walter R., Jr. 2006. ` Detecting Attempted Election Theft: Vote Counts, Voting Machines and Benford's Law (pdf); (postscript) Prepared for delivery at the 2006 Annual Meeting of the Midwest Political Science Association, April 20-23, Palmer House, Chicago; Mebane, Walter R., Jr. 2005. `` Timing and Turnout in Ohio" TomPaine.com, 21 July 2005; Mebane, Walter R., Jr. 2005. ``Voting Machine Allocation in Franklin County, Ohio, 2004: Response to U.S. Department of Justice Letter of June 29, 2005."

B. Background

4. On October 21, 2008, I was contacted by Jim Freeman of Advancement Project and Maria Blanco of the Earl Warren Institute at UC Berkeley Law School to determine if I would like to analyze and testify about the allocation of voting machines and poll workers in Norfolk, Richmond, and Virginia Beach, Virginia. I am being paid $200 per hour for my work on this case, plus expenses. I have reviewed the following documents provided to me by Jim Freeman and Maria Blanco:

a. October 6, 2008 Letter to Nancy Rodrigues, Secretary State Board of Elections from Advancement Project and other non-profit organizations concerning the disparity in voting machines and poll worker allocations in Virginia Beach, Richmond and Norfolk, Virginia;

b. 2008 voter registration files for Virginia Beach, Richmond, and Norfolk, Virginia;

c. 2004 General Election voter registration and voter turnout files for Virginia Beach, Richmond, and Norfolk, Virginia;

d. Documents provided by the registrars of Virginia Beach, Richmond, and Norfolk, Virginia showing the projected allocation of voting machines and poll workers, by precinct, for the November 4, 2008 General Election;

e. Documents provided by the registrars of Virginia Beach, Richmond, and Norfolk, Virginia showing the actual allocation of voting machines and poll workers, by precinct, for the 2004 General Election;

f. News reports documenting lines at the polls in Virginia Beach, Richmond, and Norfolk, Virginia for the 2004 General Election;

g. Sample ballots and candidate lists indicating the number of races at issue in Virginia Beach, Richmond, and Norfolk, Virginia for the 2008 General Election;

h. Documents indicating the 2008 General Election turnout projected by election officials in jurisdictions throughout the Commonwealth of Virginia;

i. A data set prepared by Karin MacDonald and Nicole Boyle of Q2 Data and Research, LLC showing the racial composition of all the 2008 precincts in Virginia Beach, Richmond and Norfolk, Virginia.

C. Research on Effects of Resource Allocations on Voter Participation

5. My research into the effects of polling place resource allocations on voter participation indicates that mis-allocating polling place resources can lead to mass disenfranchisement. More specifically, having fewer machines and poll workers per registered voter leads to a greater likelihood of long lines to vote and "lost" voters. In other words, having fewer resources increases the chance of long lines forming at polling places, and the knowledge of the long lines, the sight of long lines upon arriving at their polling places, or simply having to wait in line for an extended period of time, deters voters from casting a ballot.

6. For example, I conducted a study of the 2004 General Election in Ohio and found serious problems with the administration of that election. I found a clear relationship between precincts having higher ratios of registered voters to machines and long lines when the polls were supposed to close. Also, not providing a sufficient number of voting machines in each precinct was associated with roughly a three percent reduction in voter participation, presumably due to delays that deterred many people from voting.

7. In a study just of Franklin County, Ohio, I found the allocation of voting machines was clearly biased against voters in precincts with high proportions of African-Americans. My research indicated that the allocation of voting machines

there reduced voter participation more among African American voters than among White voters.

8. A field of mathematical analysis called queueing theory has been demonstrated to help understand the implications of insufficient election resource provision. Queueing theory suggests what to expect from having an increasing number of voters for each voting machine. In general, if the rate at which voters arrive at the polls is much less than the rate at which voters successfully finish voting, then there may be a line of people waiting to vote but the line will tend to be short. If more people arrive during each unit of time than finish voting during that time, then the line length and waiting times grow without bound. Facing very long lines, the proportion of voters who cannot wait increases, and consequently voter participation declines.

D. Allocation of Resources Across Precincts in Norfolk, Richmond, and Virginia Beach

9. I have conducted a similar analysis of the resource allocation plans in Norfolk, Richmond, and Virginia Beach, Virginia for the 2004 and 2008 General Elections. I have analyzed the distribution of voting machines and poll workers across precincts for those two elections, including how that distribution affects precincts with high proportions of African-Americans. I have also analyzed the impact of voting machine allocation on voter participation in the 2004 election, and the potential impact of current machine allocations on the November 2008 election. The tables and graphs with my findings are attached at Exhibit Two.

10. In looking at the allocation of voting machines across precincts in these three cities, I found substantial variances across precincts in the number of registered voters per machine. In other words, some precincts have many more registered voters per machine than others. The differences, as measured by standard deviation and interquartile range, are of the magnitude that can cause voters in different precincts to have very different experiences when they try to cast their votes: some precincts will be crowded and others will not.

11. Similarly, in examining the allocation of poll workers across precincts, I found substantial differences of the magnitude that could result in qualitative differences in the administration of the election across precincts.

12. I also found that, in looking at both 2004 and 2008 allocations of voting machines, the average level of registered voters per machine is similar in both Norfolk and Virginia Beach. That is particularly concerning because news reports indicate that there were long lines in both cities in 2004, and voter participation is expected by Virginia elections officials to be far greater this year, suggesting that the lines to vote could be far worse than they were in 2004 and large numbers of voters could be deterred from casting a ballot.

E. Impact of Machine Allocations on African-Americans

13. I also found that the distribution of machines in both Richmond and Virginia Beach for the upcoming election is clearly biased against voters in precincts with high proportions of African-Americans. In other words, precincts with high proportions of African-Americans have substantially more registered voters per

allocated machine than precincts with fewer African-Americans. There were similar relationships in the allocation of voting machines in 2004.

14. One way to quantify these disparities is to separate precincts into groups based the proportion of the voting age population in each precinct that is Black. I define quartiles of this race measure for the set of precincts in all three counties, which is to say I find the values that put one-quarter of the precincts into each group. The first quartile includes precincts with less than 11.5 percent Black and the third quartile includes precincts with between 22.8 and 56.3 percent Black. The fourth quartile has an upper bound of 97.3 percent Black. In Richmond, the mean number of registered voters per allocated machine is 232 in the first quartile, 274 in the third quartile and 308 in the fourth quartile. Virginia Beach has only one precinct in the fourth quartile, so I look at the mean in the first three. These means increase as one moves from the first to the third quartile: from 310 to 328 to 354 registered voters per allocated machine. In both Richmond and Virginia Beach, as the proportion of the voting age population that is African-American increases, the mean number of registered voters per voting machine also increases.

F. Effects of Machine Allocations on Voter Participation in Norfolk, Richmond, and Virginia Beach

15. In examining the registration, turnout, and machine allocation data from the 2004 election, I found that higher ratios of registered voters per machine were associated with lower levels of voter participation in Norfolk, Richmond, and Virginia Beach. This indicates that voters in those precincts with relatively many voters for each

machine were more likely to be deterred from voting than voters in precincts with fewer voters for each machine.

16. I estimated a set of statistical models to try to isolate the effects of higher ratios of registered voters per machine on voter participation. The models suggest that in Norfolk, voter participation rapidly declines as the ratio increases in precincts with more than about 300 to 350 registered voters per machine. In Richmond, there are rapid declines in voter participation for ratios greater than about 400 registered voters per machine. In Virginia Beach, voter participation declines steadily throughout the range of ratios observed in the city. The magnitude of the declines is substantial: from the peak value to the lowest the decrease in voter participation is on the order of five to ten percent.

17. When I applied the findings from 2004 to the 2008 resource allocations and assumed that the same percentage of registered voters will attempt to vote, I found that the 2008 allocations are likely to lead to the same effects as in 2004 in both Norfolk and Virginia Beach, meaning that even at current resource levels voter participation is likely to be depressed in precincts with high ratios of registered voters per machine.

18. I have also applied the findings from 2004 to an analysis that predicts a surge in voter participation, reflecting the projections of election officials across Virginia. I considered a surge from 70 percent turnout up to 85 percent turnout, a level I understand election officials in several Virginia counties have stated is what they expect. Such a surge in the number of registered voters who present on Election Day to vote will create an even greater probability that voter participation will be depressed by long lines and "lost" voters in Norfolk, Richmond, and Virginia Beach.

19. Because of the maldistribution of voting machines that disadvantages precincts with high proportions of African-Americans in Richmond and Virginia Beach, the deterrence of voters due to insufficient resources is more likely to affect African-American voters in these cities. In other words, precincts in Richmond and Virginia Beach that have high proportions of African-Americans face a higher likelihood of long lines and "lost" voters on Election Day than precincts with more White voters.

G. Addressing the Maldistribution of Resources in Norfolk, Richmond, and Virginia Beach

20. Re-allocating voting machines and poll workers in a more equitable fashion would address some of the problems identified above. In particular, remedying the racial disparities in machine allocation is advisable for reasons of both fundamental fairness and the likelihood that voter participation patterns in the upcoming election are likely to be quite different than previous elections, with more African-American voters likely to turn out.

21. However, my analysis indicates that even if Norfolk, Richmond, and Virginia Beach were to re-allocate their resources in a more equitable fashion, there is still a substantial likelihood that voters will be deterred from voting by long lines at the polls. In other words, re-allocation by itself may not be enough to prevent disenfranchisement of voters due to excessive lines at the polls, thus indicating that additional remedies are needed to ensure eligible voters who present to vote are able to cast a ballot in a timely fashion. Three possible solutions are (a) providing additional machines to relatively under-resourced precincts; (b) offering paper ballots to voters when lines have formed at machines; and (c) extending polling place hours.

All would have the effect of reducing congestion at the polls, and would likely lead to more voters being able to cast a ballot on Election Day.

H. Conclusion

22. The evidence I have examined indicates that unless election officials address the administrative failure described above, there could be substantial disenfranchisement in Norfolk, Richmond, and Virginia Beach on November 4, 2008, particularly of African-American voters.

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Based on my extensive experience studying the allocation of polling place resources in elections, I declare under penalty of perjury pursuant to 28 U.S.C. § 1746 that the statements in this document are true and correct.

Signed _____ Executed on 27 October 2008