DECLARATION OF JEFFREY O'NEAL MARTIN

QUALIFICATIONS AND INTRODUCTION

1.

My name is Jeffrey O'Neal Martin. I graduated from public school in DeKalb County Georgia, hold a Bachelor's degree in Mathematics and Economics from Vanderbilt University and a Master's degree in Economics from the University of Chicago. I am employed as a consultant on jury pool analysis, a consultant on actuarial issues, and as a consultant to political campaigns on issues related to voting data and projections. My academic research and current work involves the use of computers and statistical procedures to analyze data including Census data and voter registration data. I have been qualified as an expert witness on the procedures used to produce jury pools in Superior Courts in Georgia and South Carolina and in Federal Courts in Georgia, Alabama and Michigan. I previously supplied a declaration in this case.

DATA

2.

I have been asked by counsel for Dzhokhar Tsarnaev to review data and documents concerning the Master, Supplemental and Qualified Jury Wheels in the Eastern Division of the District of Massachusetts that were used to summons potential Trial Jurors in this case.

3.

The data included statistical analyses of the jury wheels, data from the Office of the Jury Clerk, data on the jurors who comprise the Master and Supplemental Jury Wheels and data on the jurors who were summoned over the years 2014 and 2015. Personally identifiable information was not supplied in the data.

4.

The data was carefully organized and was made electronically accessible.

SUMMARY OF FINDINGS

5.

In the data supplied, the pool used to summons potential Trial Jurors in this case is pool "101150101". This pool is different from all other pools in the data in that a second ordering, or "re-ordering" number is supplied besides the original random pool sequence number. If the re-ordering merely re-ordered the potential jurors within groups of 200 or so without the introduction of any non-random factor such as arrival time, then, on average, there would not be any systematic effects on the randomness of the order. Some potential jurors would move up a few positions while others would move back a few positions causing the average move to even out to neither moving up nor moving back in position. However, certain potential jurors have moved from group to group causing the re-ordering to be non-random and the effect on cognizable groups to not be neutral.

6.

On average, the re-ordering has caused potential African-American jurors to move back 43 positions while potential White jurors have remained essentially the same by moving 3 positions up in order. Potential jurors from Boston have moved back 25 positions. Potential jurors who are younger than 30 have moved back 13 positions.

7.

Comparing the re-ordering to the original ordering, in the first 94 qualified jurors, there are zero potential African-American jurors in the re-ordering but there would have been 5 potential African-American jurors in the original ordering.

8.

The pool for potential Trial Jurors in this case has the highest rate of disqualification for all pools in the data for years 2014 and 2015 at 11.14% compared to the average in the other pools of 6.51%. Within the reasons for disqualification, this pool has the highest percentage of "Disqualified – Not Resident of Massachusetts" at 45.10% compared to the average in the other pools of 31.03%.

9.

The Plan for Random Selection of Jurors (Effective March 3, 2009) for the District of Massachusetts states in 8a that "For each summons returned by the United States Postal Service to the Court as "undeliverable," the Clerk shall draw at random from the Supplemental Jury Wheel the name of a resident who lives in the same zip code area to which the undeliverable summons had been sent and prepare and cause to be mailed to such resident a new one-step juror summons/qualification form." However, the jury pool which was used to summons Grand Jurors in this case had undeliverable summonses but no replacement summonses were mailed. Unlike the Grand Jury pool, in the Petit Jury pool for this case, most of the summonses which were undeliverable were replaced with another summons from the Supplemental Jury Wheel. In some cases the undeliverable summonses were replaced by another summons which was also undeliverable but which was again replaced by another summons. The use of replacement summonses as required by the jury plan increased the percentage of African-Americans in the group of potential jurors from 4.49% to 4.58%.

10.

In the most current Census data, African-Americans make up 6.14% of the Eastern Division jury eligible population. African-Americans make up 4.25% of the current Qualified Jury Wheel. The absolute disparity for African-Americans shows 1.89% under representation. The comparative disparity shows 30.73% under representation or that over a quarter of the African-Americans are missing from the Qualified Jury Wheel. The under representation of African-Americans is statistically significant.

11.

The Plan for Random Selection of Jurors (Effective March 3, 2009) for the District of Massachusetts states in 9c that "The Clerk, upon individual request, shall excuse the following classes of persons: i. any person over the age of 70 years old..." Of the jurors who met the age 70 requirement and who were not disqualified, 94.31% or nearly all chose their personal preference to not serve in the years 2014 and 2015. Likewise, 95.96% of persons age 70 and over summoned as potential Trial Jurors in this case chose their personal preference to not serve. Persons over the age of 70

make up 14.60% of the population, while persons over age 70 who choose to serve make up 0.86% of the Qualified Jury Wheel. This represents under representation of persons age 70 and over of 13.67% on an absolute disparity basis and 93.63% on a comparative disparity basis.

12.

While Suffolk County is part of the Eastern Division, it is different demographically than the Eastern Division as a whole. The Eastern Division is 6.14% African-American while Suffolk County is 20.31% African-American.

13.

Persons who are members of the Millennial Generation, those born before 2000 but who are age 18, are under represented in the Qualified Jury Wheel. While the Millennial Generation makes up 25.59% of the Eastern Division, they make up 22.91% of the Qualified Jury Wheel for the years 2014 and 2015. This represents an absolute disparity under representation of 2.67% and a comparative disparity under representation of 10.45% meaning that a tenth of the group is missing.

STATISTICAL AND DATA ANALYSIS

14.

The data supplied included records of the summonses for 20 different pools. 3 of the pools were for Grand Juries and 17 of the pools were for Petit Juries including the potential Trial Jurors in this case. In total there were 20,908 summonses.

15.

Each summons was identified as "Completed", "Deferred", "Disqualified", "Excused", "Juror", "Panel", "Reassigned", "Responded", "Summoned" and "Undeliverable". Each summons identified if the summons was a replacement summons from the Supplemental Wheel and which "Undeliverable" summons it replaced.

16.

Each summons that is identified as "Excused" also includes a description of the excusal. One of the descriptions is "Over the age of 70". Since there were no complete dates associated with each pool in the data, persons over the age of 70 were defined to be persons born in 1944 or earlier. There were 2,849 persons over the age of 70 who were summoned in the years 2013 and 2014. Of the 2,849 persons, 2,354 were qualified as jurors. Of the 2,354 qualified jurors over the age of 70, 2,220 or 94.31% took the personal preference of not serving as a juror.

17.

The Petit Jury in this case is identified as pool "101150101" and includes 3,206 summonses. There were 488 summonses in this pool for persons age 70 or over. Of the 488 persons, 396 were qualified as jurors. Of the 396 qualified jurors over the age of 70, 380 or 95.96% of the persons over age 70 took the personal preference of not serving as a juror.

18.

The jury eligible population is defined to be the population that is age 18 years and older who are citizens of the United States. While there are other requirements to serve as a juror besides age and citizenship, this definition is standard for the analysis of jury lists. The 2010 decennial census is not updated annually and includes persons who are not United States citizens. Therefore, the Federal Courts use population numbers published by the United States Census Bureau under the American Community Survey (ACS). These population numbers are used on Form AO-12. The most current Census Bureau numbers are the American Community Survey (ACS) 5-Year estimates as of 2013.

19.

The most current American Community Survey (ACS) 5-Year estimates as of 2013 show the jury eligible population for the Eastern Division is 0.17% American Indian/Alaska Native, 4.30% Asian, 6.14% African-American, 1.65% Multi-Race, 0.02% Native Hawaiian/Pacific Island, 84.98% White and 2.74% of other races.

20.

The most current American Community Survey (ACS) 5-Year estimates as of 2013 show the jury eligible population for Suffolk County is 0.28% American Indian/Alaska Native, 6.44% Asian, 20.31% African-American, 3.04% Multi-Race, 0.03% Native Hawaiian/Pacific Island, 64.62% White and 5.28% of other races.

21.

The Pew Research Center has delineated generations for the purpose of studies of traits and attitudes. The generations used in this analysis are the Millennial Generation (those born before 2000 but in this analysis who are also over age 18), Generation X (born in 1965 through 1980), the Baby Boomer Generation (born in 1946 through 1964) and the Silent Generation (born before 1946).

22.

While the Census Bureau does not provide jury eligible population numbers for single ages that would allow the calculation of the population in each generation, the Census Bureau does provide single age population numbers in the 2010 decennial census that include non-United States citizens. The Millennial Generation makes up 25.59% of the population of the Eastern Division, Generation X makes up 26.25%, the Baby Boomer Generation makes up 31.43% and the Silent Generation makes up 16.74%. Most of the persons in the Silent Generation are age 70 and over. Persons age 70 and over make up 14.60% of the population.

23.

There are six standard statistical analyses used to determine the under representation of a distinctive group. The most common and easiest to calculate is the Absolute Disparity. The other standard statistical analyses are Comparative Disparity, Standard Deviations from Expected, Impact Analysis, and Disparity of Risk on an Absolute and Comparative basis.

24.

Absolute Disparity is simply the arithmetic difference between the percentage of a distinctive group on the jury list and the percentage of the same distinctive group in the population. In this analysis, the Absolute Disparity for African-Americans on the Qualified Jury Wheel is 1.89% (the difference between 6.14% and 4.25%).

25.

While there is no scientific basis for a particular threshold of acceptable Absolute Disparity other than more disparity means worse representation, a threshold of 10% has been put forth as a standard. The facts of this analysis points out the main objections to the sole use of a set threshold such as 10% for Absolute Disparity. In the Eastern Division, African-Americans can be entirely excluded and the Absolute Disparity would still be below 10%. In short, a 10% threshold for acceptable Absolute Disparity is much harsher on smaller populations than on larger populations. Indeed if Absolute Disparities of up to 10.00% were acceptable, then there would be no need to include any African-Americans in the Qualified Jury Wheel for the Eastern Division.

26.

In response to the limitations of relying solely on Absolute Disparity, statisticians have also considered Comparative Disparity. Comparative Disparity by formula is the Absolute Disparity for a distinctive group divided by the population percentage of that distinctive group. Note that, mathematically, since the population percentage of a distinctive group can never be greater than 100% or 1.00, Comparative Disparity which is divided by something less than or equal to 1.00, will always be greater than Absolute Disparity. In this analysis the Comparative Disparity for African-Americans reflects 30.73% under representation.

27.

Unlike Absolute Disparity, Comparative Disparity is mathematically a rate. That is, Comparative Disparity shows the rate at which a distinctive group is represented. In this way, Comparative Disparity means the same thing for a larger group than it does for a smaller group. A 50% Comparative Disparity means that half of the distinctive group expected is excluded whether that group is 85% of the population or 6% of the population. In this analysis, the

Comparative Disparity of 30.73% means that something more than a quarter of the African-Americans we would have expected to be represented on the jury list are missing.

28.

Once again, while there is no scientific basis for a particular threshold of acceptable Comparative Disparity, a Comparative Disparity of over a quarter is a sizeable part of the African-American potential jurors.

29.

As a statistician, given the limitations of both Absolute Disparity and Comparative Disparity, it has been recommended that the disparity analysis should not rely solely on either Absolute Disparity or Comparative Disparity but with regards to the two in combination. In this analysis, the combination of Absolute Disparity and Comparative Disparity describes under representation of African-Americans as a proportionately sizeable under representation of a relatively smaller group of potential jurors.

30.

Standard Deviation analysis allows statisticians to determine if the under representation of a distinctive group is statistically significant or not. That is, in any group drawn from the population such as a jury list, there are random factors that mean that the demographics of the jury list drawn from the population will not match the population demographics exactly because of "luck of the draw". However, standard deviations allow statisticians to scientifically determine whether the demographics of the jury list diverge substantially enough from the population demographics that the difference is not the product of chance but is systematic. Statisticians use a standard of 2 or 3 standard deviations to determine statistical significance. If there is no systematic under or over representation of a distinctive group, the divergence of demographics should exceed 2 standard deviations only approximately 5% of the time while the divergence of demographics should exceed 3 standard deviations only approximately 0.5% of the time.

31.

In this analysis, the percent of African-Americans on the Qualified Jury Wheel differs from the percent of African-Americans in the population by 9 standard deviations. The difference of 9 standard deviations is statistically significant. In other words, the under representation of African-Americans on the Qualified Jury Wheel is not the result of random factors or luck, but is the result of a systematic process that under represents African-Americans.

32.

Comparing the expected number of African-Americans that would be drawn from the Qualified Jury Wheel in a draw of 12 jurors versus the expected number of African-Americans that would be drawn from the jury eligible population in a draw of 12 jurors gives the impact of any under representation of African-Americans on the Qualified Jury Wheel. Since jurors cannot be split in half, the analysis uses only whole jurors.

33.

The impact is calculated by considering the chance that the result of independent draws from the Qualified Jury Wheel and from the jury eligible population would result in the same number of African-American jurors drawn from each, 1 less African-American juror, 1 more African-American juror, 2 less African-American jurors, 2 more African-American jurors and so on until the very small chances of 23 more African-American jurors or 23 less African-American jurors are considered.

34.

The most likely result of a draw of 12 jurors from the Qualified Jury Wheel would have the same number of African-American jurors than the same draw from the jury eligible population. This result would statistically happen 40.43% of the time.

35.

Impact analysis also looks at any skew that the under representation of African-Americans on the Qualified Jury List has. The chance that a draw of 12 jurors from the Qualified Jury Wheel would have the same number of African-Americans as a draw from the jury eligible population would be 40.43%. The chance that a draw of 12 jurors from the Qualified Jury Wheel

would over represent African-Americans by 1 or more jurors is 22.47%. However, the chance that a draw of 12 jurors from the Qualified Jury Wheel would under represent African-Americans by 1 or more jurors is 37.10%. The impact is skewed towards under representation of African-Americans.

36.

Similar to the Impact analysis, the Disparity of Risk analysis calculates the chance that the jury will under represent a distinctive group. Using the whole value of the expected number from that distinctive group if the jury were perfectly representative of the jury eligible population, the Disparity of Risk is calculated as the difference between the chance that a draw from the jury list under represents that distinctive group and the chance that a draw from the jury eligible population, by chance, would under represent that distinctive group. The Absolute Disparity of Risk takes the arithmetic difference between these two probabilities and the Comparative Disparity of Risk takes the relative difference between the two probabilities.

37.

In this analysis, the expected number of African-American jurors in a draw of 12 from the jury eligible population would be 1 African-American juror. The chance that there would be zero African-American jurors drawn from the Qualified Jury Wheel is 59.38%. The chance that there would be zero African-American jurors drawn from the jury eligible population would be 46.77%. The absolute difference between these two probabilities is 12.61% (the difference between 59.38% and 46.77%) and the comparative difference is 21.23% (12.61% divided by 59.31%). That is, the chance that the jury under represents African-Americans is increased by 12.61% absolutely and by over a fifth relatively when using the Qualified Jury Wheel.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on Febry 25th 2015

Jeffrey O'Neal Martin