EXHIBIT D

UNITED STATES DISTRICT COURT

DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA,	)	
	)	
v.	)	No. 13-CR10200-GAO
	)	
DZHOKHAR TSARNAEV	)	

DECLARATION OF JANINE ARVIZU
REGARDING METHOD VALIDATION

I, Janine Arvizu, am a chemist, quality consultant and laboratory auditor in Tijeras, NM. My education includes a B.S. degree in biochemistry (California Polytechnic State University at San Luis Obispo, 1976) and ABD in chemistry (All But Dissertation; completion of graduate coursework and qualifying examinations, Ph.D. candidacy, University of New Mexico). I am a Certified Quality Auditor (senior member, American Society for Quality, certificate #19856) who specializes in quality assessments of laboratories and their results.

I conduct assessments of results reported by forensic laboratories, in order to help the data user understand whether the reported results were generated using a scientifically valid method, were performed on samples representative of the seized evidence, and were generated using a reliably performed test method. This type of quality assessment is performed through a review of relevant documents and contemporaneous records.

This declaration was prepared at the request of Dzhokhar Tsarnaev Defense team.

It is the consensus of the scientific community that the use of validated methods is an essential prerequisite for reliable measurement results. Method validation is the process of defining an analytical requirement, then confirming, through empirical testing, that the method

under consideration has performance capabilities that meet requirements for the intended use of the method.

Because the requirements of analytical methods differ with their intended uses, there isn't a single, uniform validation protocol that is applicable to all methods. Rather, the intended application of a method must be clearly defined, so that requirements for testing can be explicitly stated. During validation, the actual performance of the complete measurement procedure is determined through empirical testing, and the method's performance characteristics are compared to requirements for the intended use of the method.

No matter how competent a laboratory, how sophisticated an analytical instrument, or how proficient an analyst, an analytical question can only be answered through testing if the scope and content of the testing is appropriate to the question being answered.

The international quality standard for testing laboratories (ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*) is the consensus standard of the relevant scientific community regarding minimum requirements that a laboratory must meet to generate reliable test results. ISO 17025 requires that a test method be validated and determined to be appropriate for its intended use prior to use of the method to test unknown samples. The intended use of the test method, and the performance requirements for the method must be clearly specified.

ISO 17025 is the quality standard that serves as the basis for the FBI Laboratory's accreditation (ASCLD/LAB is the third party agency that granted the FBI Laboratory's accreditation to ISO 17025 on 8/2/2013). As an accredited laboratory, the FBI Laboratory is required to comply will all ISO 17025 requirements, including those related to method validation.

The analytical testing of tape, polymers, paper, or paint to draw forensically material conclusions regarding common origins or chemical consistency uses test methods for which formal method validation is a scientific imperative. Traditionally, analytical chemistry validation studies have been focused on quantifying a particular analyte in a particular matrix, using a particular analytical technique (e.g., quantitation of chromium in brine using ICP-AES). However, in forensic testing, the determination of a given analyte in two evidentiary samples is not sufficient to draw a positive or negative conclusion regarding common origin. The concentration of a given analyte in a given item of evidence is only material in the context of prior information regarding the known variability of that constituent within the matrix and the population in question.

For example, the presence of a given compound at identical concentrations in two different items of evidence does not necessarily mean that they share a common origin, or even a common method of manufacture. Similarly, the presence of a given compound at two different concentrations in two different items of evidence does not necessarily mean that they did not share a common origin or a common method of manufacture.

The FBI Laboratory provided copies of approved procedures that document the laboratory's requirements for analysis of paint, tape, and polymers (e.g., PPSU_101-2; PPSU_102-2; PPSU_200-2; PPSU_202-1; PPSU_203-3). While these procedures provide general guidelines for testing, they do not provide sufficient detail to enable different analysts to perform the same testing in the same manner, using the same criteria to determine whether two specimens can be differentiated from one another. For example, PPSU_200-2 states (section 10.a) "If differences are observed between the FTIR spectra of two (or more) samples being compared, then it is concluded that the specimens are different." However, measurable criteria

are not presented for what would constitute "a difference" between two spectra, either in absolute or relative terms. As a result, two different analysts following this procedure and obtaining the identical FTIR spectrum could be expected to draw completely opposite conclusions – one analyst concluding that the items were different, and one analyst concluding that the items were consistent with one another.

In forensic applications of tape, polymer, paper, and paint testing, in addition to explicit definition of testing requirements, some of the relevant issues which need to be addressed in a method validation study are the scope of applicability of the method, the inherent variability of the matrix and analytes, the rate of false positive and false negative associations, and the frequency of positive test results for specific populations. Without a robust and effective method validation study, conclusions regarding "chemically consistent" items of evidence are not scientifically supportable.

In order for an independent party to assess the scientific validity of the FBI Laboratory's reported conclusions regarding tape, plastic, paper, and paint testing in this case, it is essential that the laboratory provide copies of all the relevant validation documents and records that they generated or relied upon to draw their reported conclusions.

I declare under penalty of perjury, that the forgoing is true and correct, except upon matters alleged upon information and belief, and as to those matters, I believe them to be true, and that this declaration was executed by me on December 9, 2014 at Tijeras, New Mexico.

JANINE S. ARVIZU