Basic Problems And Requirements

“The private interest in the accuracy of a criminal proceeding that places an individual’s life or liberty at risk is almost uniquely compelling.”1 “The ultimate mission of the system upon which we rely to protect the liberty of the accused as well as the welfare of society is to ascertain the factual truth.”2 To this end, “state and federal governments unquestionably have a legitimate interest in ensuring that reliable evidence is presented to the trier of fact in a criminal trial.”3 “The integrity of the adversary process depends both on the presentation of reliable evidence and the rejection of unreliable evidence.”4

“The major danger of scientific evidence is its potential to mislead the jury; an aura of scientific infallibility may shroud the evidence and thus lead the jury to accept it without critical scrutiny.”5 In a prosecution for DUI, it is well accepted that forensic breath “test results are ‘virtually dispositive of guilt or innocence.’”6 Accordingly, the “correctness” of evidence proffered to establish an individual’s blood alcohol concentration (BAC) is “crucial.”7 Absent substantial evidence to the contrary, “[a] citizen’s . . . liberty will depend on the verdict of a machine.”8 Under these conditions, our legal system has a strong obligation to ensure that breath test evidence “meets a threshold of well-established scientific reliability.”9

It is not simply the science itself that must be reliable, however, but those who conduct it. Forensic scientists are the holders of a unique “public trust.”10 Not only does their work have a significant impact on individuals’ lives, but most who rely on it are unable to evaluate it for themselves.11 Unfortunately, the frequent failures of forensic scientists to keep this public trust are well documented.12 The state has a duty to require “proper standards of conduct” from its forensic scientists.13

Simulator Solutions And Breath Testing

Breath test machines operate utilizing the method of infrared spectroscopy. An infrared beam of known intensity is passed through a sample of an individual’s breath. Alcohol in the individual’s breath absorbs energy at specific wavelengths. A detector collects the beam after it has passed through the breath sample and compares its final intensity with the value it started with. If done correctly, the decrease in intensity at “ethanol wavelengths” allows us to quantify an individual’s BAC. It is critical to note, however, that even when done correctly, “[b]reath alcohol analysis results, like all measurements, possess uncertainty.”14

The result of any measurement is only an approximation of the particular quantity being measured.15 “Whenever the true value of the measured quantity is needed . . . bias can be a serious problem.”16 A “result is complete” only when an instrument’s bias has been determined and the result corrected for that bias.17 The reporting of BAC results is no exception. Where bias exists in a breath test machine, any results it yields must be corrected for that bias before they are reported.18 “The forensic scientist must have the relevant information and perform the computations before trial [and] [t]hese must [] be disclosed to attorneys for both sides prior to trial.”19

A reference material is a substance whose properties are sufficiently well known to be used for the calibration of a measuring instrument and the assessment of its accuracy.20 “The accuracy of breath alcohol measurements is determined by the measurement of known . . . and traceable standards” called simulator solutions.21 Simulators are one of the necessary safeguards for accurate breath test results.22

[The] simulator is a device that contains a glass jar and the top portion has a thermometer, a motor, and heating elements

Chaos Reigning

Breath Testing and The Washington State Toxicology Lab

“Simulator solutions are being falsified as far as the certification.”

This anonymous tip, left on a Washington State Patrol (WSP) message service on March 15, 2007, was not the first clue that there was something wrong in the Washington State Toxicology Lab. It was, however, the one that led to the revelation of the panoply of sins the Lab was guilty of: perjury, conspiracy, cover-ups, carelessness, reckless disregard for the truth, incompetence, and failures to follow universally accepted scientific standards. Twenty years of complacency and an overriding concern for facilitating successful prosecutions at the expense of sound science threatened the liberty of innocent citizens and the integrity of the system of justice itself. Now, a once highly respected state toxicologist has resigned and breath test results throughout the state, stretching back for at least half a decade, are in question.
and ports. The purpose of it is to simulate a breath alcohol sample. And it contains a solution of alcohol and water that has been prepared. The solution is heated. . . . And then it can produce a known vapor alcohol concentration and it can be used as a calibrating device and as a testing device when you are testing a breath test, any type of breath test instrument.\textsuperscript{23}

Proper calibration and calibration check procedures are the primary means of minimizing and determining bias and assuring the forensic acceptability of breath test machines and their results.\textsuperscript{24} “Calibration’ is the process of standardizing [a breath test] instrument to a known ethanol vapor concentration.”\textsuperscript{25} Although proper calibration will minimize bias, it does not necessarily eliminate it. In order to determine an instrument’s bias, a series of measurements must be performed on a distinct reference standard following calibration. The difference between the mean of those measurements and the value of the reference standard is the bias of the instrument. Once determined, bias can be corrected for utilizing the following expression:\textsuperscript{26}

\textbf{Eq. 1} \[ BAC_C = BAC - \left( \frac{u_r}{\sigma} \right) \]

\textbf{Eq. 2} \[ BAC_C = \text{the BAC after being corrected for bias} \]

\textbf{Eq. 3} \[ u_r = \text{the reference value for our simulator solution} \]

\textbf{Eq. 4} \[ M = \frac{\sum X_i}{n} \]

\textbf{Eq. 5} \[ WM = \frac{\sum (w_i M_i)}{\sum w_i} \]

\textbf{Eq. 6} \[ C < \frac{|X_{ol} - M_i|}{SD} \]

\textbf{Eq. 7} \[ C = \text{decision point} \]

\textbf{Eq. 8} \[ X_{ol} = \text{suspected outlier} \]

\textbf{Eq. 9} \[ M = \text{mean of the measurements} \]

\textbf{Eq. 10} \[ SD = \text{standard deviation of the measurements} \]

\textbf{Eq. 11} \[ C < |X_{ol} - M|/ SD \] where

\textbf{Eq. 12} \[ C = \text{decision point} \]

\textbf{Eq. 13} \[ X_{ol} = \text{suspected outlier} \]

\textbf{Eq. 14} \[ M = \text{mean of the measurements} \]

\textbf{Eq. 15} \[ SD = \text{standard deviation of the measurements} \]

The calibration and determination of bias are parts of a quality assurance program that should be performed on every instrument before being placed in the field. Another necessary safeguard is the performance of a control test accompanying every subject test.\textsuperscript{27} This allows one to determine whether the machine is capable of reporting accurate values at the time a test is administered.

At the base of all this are the simulator solutions. Properly certified simulator solutions are critical not only in calibrating and determining the accuracy of a breath test machine generally, but in determining the accuracy of each individual test administered.\textsuperscript{28}

\textbf{Scientific Reliability} \[ \text{If citizens “are to have any confidence” in state breath-testing programs, those programs must “have some credence in the scientific community as a whole.”} \textsuperscript{29} \]

This requires compliance with scientific standards recognized internationally “both inside and outside of the field of forensic science.”\textsuperscript{30} These include standards set forth by the International Organization for Standardization (ISO) and the National Institute of Standards and Technology (NIST).\textsuperscript{31} ISO 17025 specifies the general requirements that all labs must meet in order to be deemed competent to perform measurements and/or calibrations.\textsuperscript{32} NIST standards also apply to the utilization of simulator solutions as reference materials in forensic breath testing.\textsuperscript{25}

Some of these standards are matters of common sense. All data and calculations should be checked for accuracy before being reported.\textsuperscript{33} Where computers are being utilized to process, evaluate or report data or calculations, software/programming must be checked to verify that it is functioning properly.\textsuperscript{34} This is particularly true where programming modifications have been made.\textsuperscript{35} When clear deviations from proper measurement practices occur, results should be discarded whether or not they appear reasonable.\textsuperscript{36} And, every lab must conduct periodic audits of its activities to ensure the validity of its test and/or calibration results.\textsuperscript{37}

Other standards require reference material producers to utilize “accepted statistical principles for the assignment of property values.”\textsuperscript{38} Take, for example, the discarding of data. The natural uncertainty attendant to any measurement necessarily leads to scientifically valid measurements that deviate more than others from the mean.\textsuperscript{39} Whether intentional or not, if data is rejected simply because it fails to conform to preconceived expectations, the outcome is analogous to fixing the results.\textsuperscript{40} An outlying observation may be merely an extreme manifestation of the random variability inherent in the data. If this is true, the value should be retained and processed in the same manner as the other observations in the sample.\textsuperscript{41} On the other hand, a result may be statistically invalid (an outlier) if its deviation from the mean of a set of measurements is greater than can be justified by statistical fluctuations.\textsuperscript{42} If a lab permits data to be discarded absent identified deviations from proper procedures, it must develop uniform policies governing the investigation and treatment of outliers “based on accepted statistical principles.”\textsuperscript{43} The most common criterion utilized is the ratio of the difference between the suspected outlier and the mean of the data to the standard deviation:40

\textbf{Eq. 2} \[ C < \frac{|X_{ol} - M_i|}{SD} \]

\textbf{Eq. 3} \[ M = \frac{\sum X_i}{n} \]

\textbf{Eq. 4} \[ WM = \frac{\sum (w_i M_i)}{\sum w_i} \]

\textbf{Eq. 5} \[ C = \text{decision point} \]

\textbf{Eq. 6} \[ X_{ol} = \text{suspected outlier} \]

\textbf{Eq. 7} \[ M = \text{mean of the measurements} \]

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\textbf{Eq. 12} \[ M = \text{mean of the measurements} \]

\textbf{Eq. 13} \[ SD = \text{standard deviation of the measurements} \]

The value chosen for C determines the likelihood that the suspected outlier is spurious.\textsuperscript{46}

Other standards govern the fact that “results obtained when analyzing reference materials should be interpreted with consideration given to the conditions of measurement.”\textsuperscript{47} “Within-laboratory” characterization occurs “when a substance is analyzed using the same method under the same conditions, that is, by the same operator, with the same equipment, on the same day and in a single laboratory.”\textsuperscript{48} “Between-laboratory” characterization concerns results obtained when the same material is analyzed by the same method under different conditions, whether different analysts, operators, instruments, or laboratories.\textsuperscript{49}

The arithmetic (common) mean of a group of numbers is determined by adding the numbers up and dividing by how many numbers we have:

\textbf{Eq. 3} \[ M = \frac{\sum X_i}{n} \]

This operation is appropriate for determining the mean of “within-laboratory” characterization data.

When “between-laboratory” characterization data is utilized, a weighted mean must be considered.\textsuperscript{50} To find the traditional weighted mean, we calculate the arithmetic mean of distinct groups of data separately, determine a weight to assign each and combine them as follows:

\textbf{Eq. 4} \[ WM = \frac{\sum (w_i M_i)}{\sum w_i} \]

\textbf{Eq. 5} \[ C = \text{decision point} \]

\textbf{Eq. 6} \[ X_{ol} = \text{suspected outlier} \]

\textbf{Eq. 7} \[ M = \text{mean of the measurements} \]

\textbf{Eq. 8} \[ SD = \text{standard deviation of the measurements} \]

\textbf{Eq. 9} \[ C < |X_{ol} - M|/ SD \] where

\textbf{Eq. 10} \[ C = \text{decision point} \]

\textbf{Eq. 11} \[ X_{ol} = \text{suspected outlier} \]

\textbf{Eq. 12} \[ M = \text{mean of the measurements} \]

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\textbf{Eq. 14} \[ \text{The weight assigned to a particular group of measurements represents the} \]

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\textbf{Eq. 18} \[ \text{The weight assigned to a particular group of measurements represents the} \]

\textbf{Eq. 19} \[ \text{The weight assigned to a particular group of measurements represents the} \]

\textbf{Eq. 20} \[ \text{The weight assigned to a particular group of measurements represents the} \]
the weighted mean (WM)

Generally, these means are not equal. The WM yields the highest probability estimate of the true property value.

There are many situations in which it would be very misleading to average quantities without weighting them. When there are significant “between-laboratory” differences in precision and assigning a value to a reference material is our objective, a WM should be utilized. What constitutes significant is determined by the impact the differences have on the purpose for which the reference material is needed.

“A weighted mean provides a better estimate of the true simulator solution value and should be employed for those cases in which significant [between-laboratory] variability exists.”

Proper Standards Of Conduct

“Professional ethics provide the basis for the examination of evidence and the reporting of analytical results.” This requires that forensic toxicologists carry out their professional responsibilities “with honesty and integrity, and refrain from any knowing misrepresentation of . . . evidence and results of examinations, or other material facts.” It also requires that they “strive to ensure that forensic science is conducted in accordance with sound scientific principles.”

“Users of forensic laboratory services must rely on the reputation of the laboratory, the abilities of its analysts and the standards of the profession.” As one local court recognized, state forensic labs are “not created . . . as an advocate or surrogate for the state. While [they] will always assist the state, [they] must never do so at the cost of scientific accuracy or truth.” The guiding principle should be that the end does not justify the means; the means must always be in keeping with the law and with good scientific practice.

Chaos Reigning

Approximately 60 simulator solutions are prepared and certified every year by the Washington State Toxicology Lab. Certification requires that a minimum of three toxicologists test each solution before it can be used as a reference standard. Requiring that multiple toxicologists independently test a solution helps ensure the accuracy of the certification. In 2003, Lab Supervisor Ed Formoso began running two sets of tests on each solution, one in his name and one in Lab Manager Ann Gordon’s name. In general, it has been shown that solution certification data may vary in a manner peculiar to each scientist. Formoso is no different. When two sets of his data are included, as opposed to one, it generally skews the certified value for a solution.

With Formoso’s knowledge, Gordon signed a declaration under penalty of perjury for each solution stating that she “examined and tested this solution.” These declarations are intended to be relied upon in lieu of live testimony. They also provide the necessary foundation for Lab personnel to testify that they found a solution to be accurate. Each declaration was a lie.

The purpose of the conspiracy was to facilitate successful prosecutions of citizens charged with DUI. According to a 2004 internal review by the WSP, “successful case prosecutions are top priorities for the Lab . . . [while] policies and required procedures appear to be of secondary concern.” Under Gordon, sound scientific practice was made secondary to the facilitation of successful DUI prosecutions.

WSP brass assigned State Toxicologist Dr. Logan to investigate the March 2007 complaint. He delegated this to Gordon who submitted an investigative memo, co-authored by Formoso, indicating no basis for the complaint. Although Logan learned days later that Formoso was testing solutions for Gordon, he informed no one, permitting the false memo to stand uncontradicted.

At least seven other toxicologists engaged in multiple incidents of false swearing, signing declarations under penalty of perjury, and reporting solution values that were false. This occurred because it was standard practice for the toxicologists to sign these declarations without checking to ensure that the data being reported was correct. That this flowed from laziness as opposed to intentional deceit does not change the result.

Although inclusion of “Gordon’s data” skewed certified solution values, rendering thousands of breath tests statewide invalid, it has not been removed from a single certification.

The investigation into Gordon’s perjury revealed that the software used by the Lab to certify solutions was not operating correctly. Due to programming errors, values reported for at least 32 solutions between August 2005 and August 2007 were wrong. Prior to this, no one had ever checked the software to ensure that it was operating correctly. Many of the toxicologists, including senior supervisors, admitted that they could not have checked the calculations because they did not know the simple algebra necessary to do so. Although Logan originally assured the public that only eight tests were impacted by software/programming errors, it was later shown that thousands of tests statewide were affected.

Subsequently, at least 170 additional errors (not related to software) affecting 88 different solutions were identified. These include entering incorrect measurement data, signing off on the wrong data, mixing up data for different solutions, entering incorrect control values, and failing to identify the controls used. Toxicologists never checked to see if the data they were reporting matched the results of their measurements. They simply assumed data attributed to them was correct and signed off on it. And again, thousands of breath tests statewide were rendered invalid as a result.

The next issues to be considered are the practices of discarding valid data and using bad data. To be useful as a reference material, simulator solutions must have certain alcohol concentration values. The value assigned to a solution is the mean of the data collected by multiple toxicologists. The mean must either lie within a certain range or be discarded. Toxicologists were trained not to use data from any run containing a single value falling outside the required range. Instead, such data was rejected and new measurements made. If each new value fell within range, the data was used. This is tantamount to fixing one’s data. Unless a solution has been grossly misprepared, no solution will ever fail to fall within the required range!

In a two-year period, at least five solutions were certified after valid data had been discarded. Had any type of outlier analysis been performed, the data in question would not have been discarded. The miscertification of these five solutions alone rendered thousands of breath tests invalid statewide. In December 2007, the Lab adopted statistically sound outlier criteria. Still, the Lab fails to recognize the physical significance of adhering to it. One solution, certified prior to December, has so many outliers that the state’s methodology...
requires it to be discarded. Nonetheless, the solution remains in use — tainting test results statewide.

Data obtained in violation of proper measurement procedures is another major problem. When a solution is certified, an external control is tested with it to ensure that the chromatograph utilized to perform the testing is capable of returning an accurate value. If the chromatograph encounters a particular malfunction,\(^7\) it will be indicated in the results by what is referred to as a low ISTD area. This renders data collected during the run unreliable so that it must be discarded. At least 13 solutions have been certified with such data and some are still being used in the administration of breath tests today.

Then there is the issue of WMs. Over 90 percent of solution certifications are performed on multiple instruments. This includes an instrument that had a known history of not always functioning properly. The WM has been shown to be more precise than the arithmetic mean in the certification process. Moreover, the differences between the two methods are significant enough to cause an individual’s liberty to be wrongly deprived. Nonetheless, the Lab still refuses to utilize a weighted mean because it assumes that the liberty of “only a few” will be affected by any errors.

An even greater cause for concern is the fact that in Washington, the state ignores bias when reporting BAC results. Even though the bias of each breath test machine is determined before it is placed in the field, BAC results are reported without correcting for it. Given the typical magnitude of bias encountered,\(^8\) the majority of BAC results reported may be false and even misleading. Although acknowledging the problem, the state adheres to the practice because, again, it assumes the liberty of “only a few” will be affected, and it finds that acceptable.

This “minimal impact” is belied by the fact that the relative bias of a small sample of randomly selected breath test machines was discovered to be .007. It was later determined that one of these machines was operating outside the required ±5 percent accuracy limit. When the effects of the aforementioned errors are factored in, discrepancies in BAC of at least .01 are reasonably anticipated.

 Sadly, in the 20 years the Lab has certified solutions for breath testing, the process has never been subject to an audit. When it finally was audited in the wake of this scandal, it failed miserably. According to Logan, “The Lab became complacent. Everybody involved in the process became complacent.” The Lab anticipates being able to pass its first audit of this process by mid-summer 2008.

The most alarming discovery may be that of State Toxicologist Barry Logan’s incompetence. According to Logan, in order to be competent he must understand how BAC results are affected by bias. Despite 18 years as the state toxicologist, an adequate understanding of bias in breath testing eluded him. In a public notification discussing the errors above, Logan engaged in a bias analysis that was simplistic, inaccurate, and misleading.

Nor is this the first example of his incompetence. In order to place the state’s breath test program on more scientifically sound footing, he formerly required simulator thermometers to be certified “traceable to NIST.” Although traceability is a well-understood concept throughout the scientific community, Logan neither knew how to comply with his own requirement nor took the time to visit the NIST Web site to find out.\(^9\) When breath tests were suppressed statewide because of the failure to comply with this standard,\(^7\) instead of fixing the problem, Logan simply eliminated the requirement.

The Response

Confronted with Gordon’s and Formoso’s conduct, an administrative hearing officer concluded:\(^8\)

Whether one labels this conduct fraudulent misrepresentation, or extremely deceitful and completely dishonest . . . The fact that the Laboratory management engaged in such dishonest conduct is an appalling reflection on the credibility of the laboratory.

Courts have acted variously under state statutes governing the admissibility of breath tests and/or ER 702/703.\(^7\) As determined by the King County District Court:

[U]nder ER 702, the work product of the WSTL has been so compromised by ethical lapses, systemic inaccuracy, negligence and violations of scientific principles that the simulator solution work produ-

Notes

7. State v. Clark, 593 P2d 123, 126 (Or. 1979) (quoting State v. Clark, 583 P2d 1142, 1145 (1978)).


11. ASCLD, GUIDELINES FOR FORENSIC LABORATORY MANAGEMENT PRACTICES, 1-4.


15. NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, GUIDELINES FOR EVALUATING AND EXPRESSING THE UNCERTAINTY OF NIST MEASUREMENT RESULTS, NIST TECNICAL NOTE 1297, §2.1 (1994).


19. Gullberg, supra, note 14, FORENS. SCI. REV., at 94.


25. WSP BTS, POLICY AND PROCEDURE MANUAL, 23; WASHINGTON STATE PATROL BREATH TEST SECTION, POLICY AND PROCEDURE MANUAL, 22 (2005).

26. Rod Gullberg, Confidence Interval Calculation for Specific Subject Test Results, 3 (2007).


28. Harding, supra, note 21, at 187; Dubowski, supra, note 27, at 306-311; Gullberg, supra, note 21, at 196; Straka, 810 P.2d at 894.


31. The Crime Lab Report, supra, note 30; American Society of Crime Lab Directors/Laboratory Accreditation Board, Breath Alcohol Accreditation Program, ASCLD/LAB NEWSL., June 1, 2007, at 5; AMERICAN SOCIETY OF CRIME LAB DIRECTORS, LAB INTERNATIONAL ACCREDITATION PROGRAM, 5-6 (2006); INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY, BREATH ALCOHOL ANALYZERS, 2 (2006); Clark-Munoz, supra.


35. ISO/IEC 17025 § 5.4.7.2; ISO GUIDE 34:2000(E) § 5.13.2(a); NIST HANDBOOK 150 55.4.7.1; David Brodish, COMPUTER VALIDATION IN TOXICOLOGY: Historical Review for FDA and EPA Good Laboratory Practice, 6 QUALITY ASSURANCE 185, 194 (1999).


40. ASTM DESIGNATION E 178 – 02, 1.1.1.

41. J. TAYLOR, AN INTRODUCTION TO ERROR ANALYSIS: THE STUDY OF UNCERTAINTIES IN PHYSICAL MEASUREMENTS, 166 (2nd ed. 1997); MEYER, DATA
GUIDELINES FOR

1 8

1. Let:

A. X be the BAC reported by a
DataMaster (reported to 3 decimal places);

B. Y 3 be the first 3 decimal places of the
corrected BAC.

C. Y 4+ be all decimal places of the cor-
corrected BAC beyond the first 3.

2. From this we know that:

i. X > X

ii. X < Y 3Y4+ : Combining 4A and
4B.

iii. X > Y3Y4+: From 2Bii.

iv. (X < Y 3): 4Aii and 4Aiii are

3. Our contention, wherever a DataMaster
is found to have a positive bias of .0001 or high-
er the corrected BAC (truncated to 3 decimal
places) of a test will always reduce the origin-
val value by at least .001, is true if X > Y3.

4. Assume by way of contradiction that X ≤
Y 3:

A. Case 1: X < Y 3

i. Y 3 ≤ Y 3Y4+ : Combining 4A and
4Aii.

ii. X < Y3Y4+ : Combining 4B and
4Bi.

iii. X > Y3Y4+: From 2Bii.

iv. (X < Y 3) : 4Aii and 4Aiii are

B. Case 2: X ≤ Y 3

ii. X ≤ Y3Y4+ : Combining 4B and
4Bi.

iii. X > Y3Y4+: From 2Bii.

iv. (X = Y 3) : 4Bii and 4Bi are

C. (X ≤ Y 3) : Combining 4Aiv and
4Biv.

D. (X ≤ Y 3) → X > Y 3 : Law of the
excluded middle.

5. X > Y 3

QED

The author actually realized this at a
public hearing when the NIST traceability
machines are no longer able to satisfy the
requirement that they be accurate to within
± 5 percent. The accuracy of at least 32
machines was incorrectly determined using
this solution with a minimum of 3,445 tests
being administered on them. Not a single
one of these citizens has yet been notified of
the error by the state.

74. E.g., a stuck injector needle.

75. Because in Washington bias is
always determined by values rounded to the
fourth decimal place while all BAC results are
reported truncated to the third, a bias of +.0001 or more automatically reduces a BAC
result by .001. This is easily proven. Consider
the following proof by contradiction:

1. Let:

A. X be the BAC reported by a
DataMaster (reported to 3 decimal
places);

B. Y 3 be the first 3 decimal places of the
corrected BAC.

C. Y 4+ be all decimal places of the cor-
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ii. X ≤ Y3Y4+ : Combining 4B and
4Bi.

iii. X > Y3Y4+: From 2Bii.

iv. (X = Y 3) : 4Bii and 4Bi are

C. (X ≤ Y 3) : Combining 4Aiv and
4Biv.

D. (X ≤ Y 3) → X > Y 3 : Law of the
excluded middle.

5. X > Y 3

QED

The author actually realized this at a
public hearing when the NIST traceability
regulation was being proposed. I approached Dr. Logan and informed him that I thought this was the case and would be problematic for the admissibility of breath tests. I then told him that I had previously spoken with Dr. Ashley Emery of the University of Washington, an expert on the subject, and that Dr. Emery would instruct the state on how to comply with the standard at no cost. Logan, without response, turned and walked away. Dr. Emery’s testimony subsequently provided the factual basis for the state’s opinion in Clark-Munoz, supra.

77. Clark-Munoz, supra.
78. Dept. of Licensing v. Amston, # omitted, at 17-18 (12/04/07).
79. Ludvigsen v. City of Seattle, 174 P.3d 43 (Wash. 2007) (Madsen, J, concurring); City of Fircrest v. Jensen, 143 P.3d 776 (Wash. 2006); RCW 46.61.506.
80. State v. Amach, No. C00627921 (King Co. Dist. Ct., WA – 1/30/08).
81. The Ethics in Public Service Act, Laws of 1994, ch. 154, § 1; Olmstead, 277 U.S. at 468 (Brandeis, J., dissenting).
83. Dilliner, 569 S.E.2d at 223-24 (Starcher, J., concurring); Honeymon, 560 So.2d at 829; See generally, Scheffer, 523 U.S. at 309; Taylor, 484 U.S. at 414-15; Brathwaite, 432 U.S. at 114; Green, 399 U.S. at 163 n.15; Green, 399 U.S. at 186 n.20 (Harlan, J., concurring).