

UNCERTAINTY COMES TO MICHIGAN

A District Judge Makes 2 Historic Rulings That Will Change Things Forever

The horseless carriage; rock and roll; DNA evidence: like many historic developments, the uncertainty budget is here to stay. Like many new developments that seem to be no-brainers years following their advent, the uncertainty budget has its critics and those who are uncomfortable with it. The Michigan State Police (MSP) seems to be a little uncomfortable with it. However, it appears that MSP may be starting to become more comfortable with embracing the sources of uncertainty in flame ionization headspace gas chromatography. Do not be intimidated by the term: it is the fairly simple process of using a flame to ionize a gaseous mix that contains what is suspected to be beverage alcohol in blood from a suspect in an OWI-DUI-based charge.

The MSP joined the ranks of those to try to estimate the uncertainty in its measurement just in the nick of time. Specifically, it happened in January, 2011 when Dr. Michelle Glinn authored a memorandum to inspector Greg Michaud. Dr. Glinn was acting head of the day-to-day operations of the forensic toxicology unit at the time. Her memo outlined her understanding of measurement uncertainty and a protocol for the MSP to follow in determining the uncertainty in forensic analysis. Understanding measurement uncertainty is important. In order to grasp the importance of measurement uncertainty, it is important to understand the history of the uncertainty movement.

Measurement uncertainty is one of the overarching principles of metrology. Metrology is the science of measuring things. What is important is the ability to grasp 3 basic concepts: 1. When you measure something 100 different times with enough specificity you will get 100 different results; 2. The more data you collect and analyze the more confident you will be that you a. understand what are your sources of uncertainty and b. that the result is within a known range that contains the true value of the measurement; 3. You never truly will be able to know with 100% confidence what your true value is.

Once you have tried to determine all the sources of uncertainty in your measurement and you have tried to understand what the impact each has on your overall measurement process then you can build an “uncertainty budget” which should give a good estimate of the range of values within which the true value may fall. The goal for everyone should be to give as much information to jurors and fact-finders to make sure that the guilty are convicted and the not guilty are not convicted.

There is a rift on the horizon. That rift is between the scientists who either developed or study and understand measurement uncertainty and the 3 concepts above. This community follows the Guide to Uncertainty Measurement (GUM) developed by the international bureau of weights and measures. It is abbreviated as “BIPM.”¹ The BIPM GUM is the protocol on which all others are predicated including protocols developed by the National Institute for Standards and Technology (NIST) and the ASCLAD-LAB. That is important because ASCLAD-LAB is the agency which “accredits” member crime labs in America including the Michigan State Police crime lab. MSP is scheduled for re-accreditation in 2012.

The ASCLAD-LAB accreditation is the peg on which a state toxicologist almost always hangs her hat when testifying about the reliability of the principles and methods of his crime lab. The state toxicologists appear to be taking the position that the uncertainty does not necessarily need to be reported with the result in any measurement such as blood alcohol concentration. The uncertainty is not being reported in the MSP results at the time that this is being written. The state toxicologists also appear to be taking a “simplified” approach: using only 6 sources of uncertainty in their overall uncertainty budgets without regard to the overall impact that each one has on the analysis. For example, the variance in the calibration solution is given just as much weight as the variance in the amount of the internal standard. The 2 will have varying impact on the overall budget based strictly on the amount of variance in each one according to the vendor that provided them.

¹ BIPM is a French phrase because the bureau was created and is maintained in Paris, France as a centrally-located European geographic hub.

Judge Peter J. Wadel of the 79th judicial district court heard Michigan's first uncertainty case. Judge Wadel ruled that MSP must report the uncertainty in order for the blood alcohol concentrations to be admitted in his court. Many expected this ruling on May 6, 2011 to be overturned on appeal. Those who were in that category were wrong. Instead of appealing, the prosecutor produced a result with an uncertainty budget, using MSP's uncertainty protocol as of January 2011.

The ASCLAD-LAB requirements now hold that every toxicology lab must have an uncertainty budget in order to achieve re-accreditation. MSP will have to have an uncertainty budget that is acceptable to ASCLAD-LAB's inspectors.² The ASCLAD-LAB protocol does NOT require the lab to report the uncertainty with the measurement unless the "customer" requires it. Both Dr. Glinn and her predecessor, Dr. Felix Adatsi, have testified previously that the customer is the police agency that sends the measurand to be analyzed. The "measurand" in metrology is defined simply as "the thing to be measured."

The MSP unveiled its uncertainty budget through the Mason County prosecutor to Judge Wadel after his order on May 6 and asked him to allow its 2008 measurement into evidence after his ruling. On September 28th, the court issued a follow-up order. The court ruled that the "customer" is not the police agency but the courts, the prosecutor and the defense attorney. Further, the MSP lab should report its results with the measurement uncertainty. He rejected the argument that the MSP lab "benefits the defendant" when it simply reports the lower of 2 results from 2 analyses so long as the 1st and 2^d agree within .01 grams of ethanol/100 milliliters of blood. The goal is to convict the guilty and acquit those who are not guilty.

The MSP lab is hopefully a few steps closer to serving its "customers," who frankly are the people of the state of Michigan. The measurement uncertainty knowledge has been available to our

² Dr. Glinn was on the committee for ASCLAD-LAB.

courts for nearly 20 years thanks to the scientists who developed the BIPM GUM and thanks to lawyers like Ted Vosk, a Michigan native with an undergraduate education in math and physics, who is currently serving as a lawyer/consultant in the State of Washington, from where he has been educating courts and lawyers on metrology and measurement uncertainty.

I am reminded of the Johnny Depp portrayal of Ichabod Crane in the movie "Sleepy Hollow," when he stood before the magistrate and howled about the lack of pursuit of scientific clues to solve crimes and the over-reliance on false confessions derived from torture tactics at the dawn of the 19th century. When forensic analysis starts with a conclusion and works to prove that conclusion our justice system is ill-served. When we start with a process, adhere to that process and report to the finder of fact the conclusion, qualified by all the factors that could alter that conclusion, the justice system is much more informed about what may have happened in a case.

It is too late for uncertainty to save the criminal records of all those accused citizens, whose blood alcohol content may truly have been below the legal threshold. For all those whose alleged blood sits in the MSP crime lab now and may be under the legal threshold when the uncertainty is reported to a jury, it is just in the nick of time.

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