ISP FORENSIC SERVICES

Forensic Services Newsletter

SPRING 2010

Quality management and quality assurance are hallmarks of Idaho State Police Forensic Services. Our attention to quality allows Idaho officers of the law and officers of the courts to be confident in the interpretation of the data they receive from ISP Forensic Services. ISPFS actively participates in many internal and external assessments and audits each year. February 25th and 26th our accrediting body (ASCLD/LAB) conducted a required yearly on-site inspection. No findings were issued to any ISP labs. ASCLD/LAB staff were very complementary of ISP Forensic Services. On March 13th ASCLD/LAB continued the accreditation of all three ISP labs. ISPFS labs were also audited last year by the United States Office of the Inspector General (OIG), the National Forensic Science and Technology Center (on behalf of the Federal Bureau of Investigation and the National Institutes of Justice), and by a Latent Print auditor from the Oregon State Police. In addition to external assessments, ISPFS uses internal auditors to evaluate each accreditation requirement (in each lab) every year. Assessors and auditors looked at the management of grants, quality assurance procedures and practices, use of the Federal DNA databases, health and safety, evidence security, and management operations.

COLD CASES

ISPFS is interested in your "Cold Case" information. We are interested in writing for a Federal grant to investigate and process cold cases. We are most interested in cases where all leads have been exhausted and where forensic science might open new leads. Several agencies have informed us that they have cold cases, but we do not know how many of these cases exist across Idaho. We will be sending out a survey in the next few months to get some information from each agency in Idaho. We would ask you to give us the best information possible so that we can obtain a level of funding appropriate to be able to help you with these cases.

WHAT'S NEW

ISP Forensics Website

The FBI just released an article in response to the NAS report focusing on Latent Print Analysis. The article is published in Forensic Science Communications Vol. 11 No. 4 The focus of the article is on ACE-V, standards for reporting conclusions, the role of statistics, quality assurance and documentation, training and qualifications of examiners, and standards for the sufficiency of friction ridge impressions for individualization. This article is a must read for those wanting to understand the current state of Forensic Latent Print Analysis.

Biological Stain Collection Pamphlets

Recently the Idaho Innocence Project circulated laminated, double sided handouts and tri-fold pocket editions of a biological stain evidence collection and preservation guide. These should have been distributed to every law enforcement agency in Idaho. The information was mostly taken from the ISPFS website. While it is not an official ISP publication, ISPFS reviewed the pamphlets. We are comfortable with officers using this resource. Officers should always consult with the ISPFS Website for the most current information. For additional copies of the pamphlet put out by the Innocence Project of Idaho, please contact Mr. Richard Visser at richardvisser@boisestate.edu or 208-426-4207

UPCOMING TRAINING

Course	Location	Dates	Contact
Breath Testing Specialist	ISP R1 Building	4/1-4/2	Register
Evidence Preservation and Packaging	Orofino	5/11	Register
Breath Testing Specialist	ISP Patrol Pocatello	5/27-5/28	Register
Breath Testing Specialist	POST	6/3-6/4	Register
Breath Testing Specialist	ISP R1 Building	8/26-8/27	Register
Breath Testing Specialist	POST	9/9-9/10	Register
Breath Testing Specialist	ISP Patrol Pocatello	10/28-10/29	Register
Advanced Digital Photography (Investigators)	Pocatello	October	Register
Breath Testing Specialist	POST	12/2-12/3	Register

* The first day of all BTS classes is Alcosensor/Lifeloc and the second is Intoxilyzer 5000/EN .

Did you Know?

The fuel cell was discovered in the early 1800's.

In the 1960's researchers at the University of Vienna demonstrated a fuel cell that was specific to alcohol.

Commercial fuel cell instruments used in Breath Alcohol testing were introduced in the mid 1970's.

ISP FORENSIC SERVICES

FOCUS ON

Breath Alcohol Testing Frequently Asked Questions

Courtesy www.kboi2.com

Courtesy www.freakingnews.com

#1 Will a fuel cell based breath testing device respond to substances other than alcohols (ethanol, methanol, isopropyl alcohol, etc.) which are found on the human breath?

"No. Fuel cells will not respond to substances other than alcohols on the human breath."

#2 What units of measure are used to report breath alcohol concentrations?

"The United States assumes a 2100:1 partition ratio; therefore, results are expressed in terms of grams of breath per 210 liters. (i.e. .080 grams per 210 liters of breath or .080 BrAC). Idaho Statute 18-8004(4) states evidentiary tests for alcohol concentration shall be based upon a formula of grams of alcohol per one hundred (100) cubic centimeters of blood, per two hundred ten (210) liters of breath or sixty-seven (67) milliliters of urine."

View the Statute

#3 What evidential breath testing devices (EBT's) are approved for use in Idaho?

"Currently (as of January 2010), the Intoxilyzer 5000, the Intoxilyzer 5000EN, the AlcoSensor-III/IIIA, and the Lifeloc FC20 are the only instruments approved by the Idaho State Police Forensic Services (ISPFS) to perform evidentiary breath testing. The Lifeloc FC20 was approved for use on February 1, 2008 as a replacement for the AlcoSensor-III, which will be supported through the end of January 2013." **FC20 Approval Document**

#4 How are new testing devices (EBT's) approved and certified?

"New instruments must be certified by Idaho State Police Forensic Services prior to being placed into service. The certification process evaluates the instrument to ensure the accuracy of results is within the standards as established by the ISP Analytical Method (AM). Upon successful completion of the initial evaluation process, a certificate will be issued approving the instrument for evidentiary testing. Once the instrument has passed the initial calibration (and is approved), the performance of the instrument is monitored by regular field performance verifications. If the instrument fails its required field performance verifications (see FAQ #5), it must be taken out of service and returned to ISPFS for calibration. The instrument will be adjusted, if necessary, and calibrated at the ISPFS Laboratory. The instrument will not be recertified upon repair or calibration, rather the instrument will be approved to be returned to service (a new certificate will not be issued)."

#5 What is the difference between performance verification, calibrations, and adjustments?

"Performance verifications are performed in the field to test the general trending of the instrument using an ISPFS approved solution. Currently the performance verification solutions are provided by RepCo Marketing Inc. When an instrument tests outside of an established performance verification range, the instrument must be returned to the ISPFS Laboratory for calibration (see FAQ #5). Calibration is the act of checking (by comparison with a standard) the accuracy of a measuring instrument. Calibrations are done under controlled conditions in the ISPFS Laboratory. The instrument result is compared against the target value of the known standard. If the instrument does not produce a result within the tolerances required by the testing program, the instrument will be adjusted. Adjustments fine tune the analytical system so that it will read a known standard properly."

#6 When should the breath testing instrument be calibrated?

"Each new instrument is calibrated in an ISPFS Laboratory before it is certified for field use (see FAQ#3). Once the instrument passes the initial calibration and is certified for use (ISPFS approved), the performance of the instrument is monitored by regular field performance verifications. Field performance verifications are conducted using a performance verification solution of ethanol-water. Satisfactory field performance verification includes a pair of samples acquired in sequence with the values of both samples falling within the acceptable range. If the result of one (or both) samples is not within the acceptable range, the test may be repeated. If results after a total of three tests (equivalent to six samples) are unsatisfactory, the instrument fails and may not be used for evidentiary testing. If an instrument fails its field performance verification, it must be sent into the ISPFS Laboratory. If an instrument is repaired or serviced by an outside vendor, it must be returned to ISPFS for calibration. ISPFS will return the calibrated and approved instrument to the agency for further use in the field."

#7 How accurate are approved Evidential Breath Testing Devices (EBT's)?

"ISPFS approved evidential breath analyzers meet and exceed the USDOT requirements of producing results within plus or minus 5% or .005 (whichever is greater) of a known alcohol standard in order to be included in the conforming products list of evidential breath testing devices. Measurement uncertainty percentages for the Intoxilyzer 5000/EN and the Alcosensor III/IIIA are +/-3%. Measurement uncertainty percentages for the Lifeloc FC20 are +/-3.16%, +/-1.81% and +/-2.64% at the critical levels of 0.04, 0.08 and 0.20 respectively. Measurement uncertainty percentages calculated from ISPFS validation studies for each approved instrument are available upon request of ISPFS."

#8 How do I apply the measurement uncertainty percentage?

"The ISPFS evaluation of precision is based on data obtained under controlled laboratory conditions. The data will only apply in a DUI testing situation when a pair of deep lung air samples are obtained properly and in accordance with the Breath Alcohol Analytical Methods. If the breath sample is inadequate, most likely a lower reading and less agreement between samples (precision) may result. It must be emphasized that the application of the measurement uncertainty percentage results in a value ***range****, both below and above the obtained value. An attorney wishing to provide a [+/-] value to a jury would multiply the uncertainty percentage (at the chosen prosecution level) by the breath instrument measured value. For example, if a Lifeloc FC20 case being prosecuted at the 0.080 level had a breath result of 0.084, the uncertainty percentage (1.81% or 0.0181) is multiplied by 0.084. The obtained number is then added to and subtracted from the instrument measured value (e.g. 0.084 x 0.0181 = [+/-] 0.00152)."*

BREATH ALCOHOL

#9 What can be inferred from "performance verification" performed in the field?

"If the instrument is accurately reporting the target values in the field during the performance verification checks (simulator checks), it is reporting results accurately and is precise to within the ISPFS stated measurement uncertainty percentages. The performance verification results performed in the field do not lend themselves to generating a separate "accuracy number." The variability associated with field performance verification conditions for the instrument does not insure that the data generated would be comparable within a scientific certainty. The performance verification results should only be used to state whether or not the instrument's trend is to under report or over report the given values."

Classes on Breath Testing

#10 What factors may affect the results of a breath test?

"There are many factors affecting the results of a breath test, most of which result in the underreporting of the breath alcohol concentration of the breath sample. Sources of these factors are the breath testing instrument, and the pair of breath samples which were provided. Any variation in the duplicate breath samples will affect the results. Therefore according to the Analytical Method, duplicate breath samples must agree to within 0.02 of each other in order to be considered valid. If a deep lung air sample is provided for both breaths, then the samples will be within the instrumental precision as reported by ISPFS. Most of the variation in a pair of samples is due to the inconsistency in the breath samples that were provided to the instrument. Results of a complete breath test such as 0.085 and 0.097 (all procedures were followed according to the Analytical Method for the instrument) are outside the expected range of instrumental precision. In order to determine which breath sample is the true breath alcohol concentration, other factors must be considered. The major factors to consider are a variation in breath consistency, or external contamination. The Analytical Method is designed to eliminate an external contamination as a contributing factor to a breath testing result. An external contamination (i.e. mouth alcohol, burping, belching, or vomiting alcohol into the breath pathway) dissipates and is not detectable after the 15 minute observation period. Also, in the presence of an external breath contaminant, the external alcohol source dissipates so rapidly that a duplicate breath sample, separated by a blank, does not produce results within the 0.02 acceptability tolerance. By following the proper procedure, any effect of an external contamination is eliminated. The only other significant factor is a variation in breath consistency. It has been demonstrated that if an individual does not provide a deep lung air sample to the instrument, the results are underreported by the instrumentation."

Lifeloc FC20 Measurement Uncertainty Correspondence

March 23, 2010

This correspondence is to address misconceptions within the legal community in Idaho regarding a recently introduced breath testing instrument. This instrument, the Lifeloc FC20 portable breath testing instrument, is United States Department of Transportation (USDOT) and National Highway Traffic Safety Administration (NHTSA) tested and approved. It is intended for professional law enforcement use. To be placed on USDOT's conforming product list, an instrument must comply with rigorous specifications. The major misunderstanding is that all readings obtained from the FC20 are precise within ±5% based on USDOT minimum technical specifications. In truth, USDOT merely certified that the FC20 precision was less than ±5%, not that it was ±5%.

In order to provide independent verification of the precision and associated measurement uncertainty (not to be confused with error) of the Lifeloc FC20, Idaho State Police Forensic Services (ISPFS) conducted a scientific study. Data was generated using five different FC20 instruments that were put into service at different times in the State of Idaho. Data was also obtained over the complete acceptable operational temperature range of the instrument (between 10 and 37 degrees Celsius). The scientists performing the study concluded that the readings obtained from the FC20 instrument are indeed more precise than the minimum criteria set by the USDOT (in order to be listed on the USDOT Conforming Products List).

The ISPFS validation study of precision is based on data obtained under controlled laboratory conditions. The following table provides the ISP Forensic Services Laboratory obtained precision data for the FC20. If it is assumed that proper breath sample was provided, the values may be used to adjust breath testing values for measurement uncertainty at the critical values of 0.04, 0.08, and 0.20 respectively.

ISP Forensic Services Scientists will reference and use the ISPFS validation percentages listed below for FC20 related cases. All instruments tested in this validation performed at or better than the following percentages.

0.04g/210L	0.08g/210L	0.20g/210L
±3.16%	±1.81%	±2.64%

It must be emphasized that the application of the percentages in the table results in a value **range**, both below and above the obtained value. An attorney wishing to provide a [+/-] value to a jury would multiply the uncertainty percentage (at the chosen prosecution level) by the breath instrument measured value. For example, if a Lifeloc FC20 case being prosecuted at the 0.080 level had a breath result of 0.084, the uncertainty percentage (1.81% or 0.0181) is multiplied by 0.084. The obtained number is then added to and subtracted from the instrument measured value (e.g. 0.084 x 0.0181 = [+/-] 0.00152).

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Breath Testing Instrument Calibration

ISP Forensic Services recently started the validation process to convert from doing "wet bath" calibrations on the Lifeloc FC20 instrument to "dry gas" calibrations. The dry gas standard is encouraged on evidentiary breath testing instruments. The main reason to switch to dry gas calibration is the ability to obtain a certified NIST traceable standard for the calibration of the instrument. The dry gas canisters come with a certificate of analysis. The cylinders are analyzed by the provider and are directly traceable to a NIST (National Institute of Standard and Technology) NTRM (NIST Traceable Reference Material). Using the dry gas will allow for ISP to perform over 500 calibrations accurate to ±2% for a 105L tank. The tanks are certified for at least 18 months. Dry gas canisters contain a single-phased mixture of nitrogen and ethanol. Several different alcohol concentrations are available. ISP will validate the calibration of the FC20 at the 0.20g/210L level (the same level we are currently using for the wet bath calibration).

If the validation proves successful, all three ISP regional labs will calibrate the FC20 instruments using the 0.20g/210L dry gas standard. The end user of the FC20 will not be affected in any way by this change. Once the conversion to dry gas has been accomplished on the FC20, other instruments certified by ISP may also be converted to dry gas calibration.

FEEDBACK

ISP Forensic Services welcomes your feedback, questions, and kudos.

Susan Williamson is an excellent employee and an excellent witness in court.—*We completely agree! Susan is the Toxicology Discipline Leader. She loves Toxicology. She does excellent work and explains the science very well in court. Susan is a favorite with officers, attorney's, and jurors.*

Just wanted to drop a line and say how much I appreciate the newsletter. Not only is it attractive, but it contains a lot of very useful information. I find myself cutting and pasting a lot of information for future use. Thanks and keep up the good work.—*We are glad that you are able to put it to immediate use. We hope to keep the information worth reading.*

Lamora Lewis (Pocatello Chemist) did an excellent job on the witness stand. She had a way of illustrating her testimony that I know the jury understood and identified with. I appreciate the professional manner and thank her for making my job easy—Bannock County Deputy Prosecuting Attorney.—*Lamora is one of our newer analysts. She is a quick learner and a great scientist.*

The turn-around time for DNA has improved remarkably.—*The DNA section has not only decreased turn-around times, but have validated all the new DNA database equipment. They are doing great work.*

I appreciate the quick turn-around time from the time I submit the evidence to receiving the lab report. Excellent work—*Thank you for the nice compliment. We made great strides in some areas this year and are still working on others. We are likely to be meeting or exceeding all of our strategic goals this year.*

The timeliness of getting evidence processed needs to improve. I have lost cases because the evidence was not processed in a timely manner. I would like to have some way of tracking evidence once it is sent to the lab.—*We appreciate your concern and are working on the few areas where we still have backlogs. Turn-around times in Latent Prints and Blood Toxicology are improving every month. We would be happy to update you on the status of your case any time you call the laboratory. In the near future you should not need to call because you will see your report in a more timely manner.*

My concern is that you will not be able to continue with some services.—*We have not cut any services in the last several years and are looking for ways to improve upon the services we offer. We have incredible employees that make things happen. We are currently trying to add Trace Analysis and hope to be able to hold the line on the services we offer in the next budget year. We appreciate the support of the citizens of Idaho.*

Submit your questions

If you have questions you would like answered in future editions of this newsletter, please email them to us. Please be concise and specific.