

Houston Forensic Science Center, Inc.

MEETING OF TECHNICAL ADVISORY GROUP

MINUTES

August 12, 2016

The undersigned, being the duly appointed Secretary of the Houston Forensic Science Center, Inc., (the “Corporation”), hereby certifies that the following are true and correct minutes of the August 12, 2016 meeting of the Technical Advisory Group (the “TAG”), of the Corporation.

- A. The meeting was called by providing all members with notice of the date, time, place, and purposes of the meeting more than three days before the date of the meeting.
- B. In accordance with Chapter 551, Texas Government Code, which Chapter is made applicable to the Corporation by Section 431.004, Texas Transportation Code, a notice of the meeting was duly filed on August 9, 2016, in the same manner and location as required by law of the City of Houston, Texas (the “City”).
- C. The meeting was called to order by Janet Blancett, Liaison to the Technical Advisory Group (TAG), at approximately 1:00 p.m. on Friday, August 12, 2016, in the Council Annex Chambers, 900 Bagby St. (Public Level), Houston, Texas 77002.
- D. Ms. Ashley Chapman called the roll. The following TAG members were present: Darrell L. Davis, Dr. Sargur N. Srihari “Hari”, Dr. Bobby L. Wilson, John J. Lentini, and Stefan Garrard.

The following TAG members were absent: Dr. Bruce Budowle, Dr. Antonios G. Mikos, Dr. Clifford Spiegelman, and Ms. Michele Triplett.

- E. Members of the Houston Forensic Science Center (HFSC) Board of Directors were also in attendance. The following Directors were present: Nicole B. Cásarez, Janet Blancett, Dr. Robert “Bob” H. McPherson, Dr. Stacey A. Mitchell, and Sandra Guerra Thompson.

The following Directors were absent: Anthony Graves, David M. Feldman, and Tom P. Allen (ex-officio).

- F. Ms. Blancett welcomed all attendees to the meeting and TAG members and Board members in attendance introduced themselves.
- G. Ms. Blancett reviewed the agenda and proposed time constraints for presentations and questions.

- H. Mr. Lentini conducted a presentation regarding activities related to analyses of fire debris samples. He reviewed the ASCLD/Lab-International Assessment Report of the Florida Fire Marshal Bureau of Forensic Fire and Explosives Analysis which was conducted in January 2016 resulting in the suspension of accreditation. Annalivia Harris, senior trace analyst for the Houston Forensic Science Center (HFSC), thanked Mr. Lentini for sharing his knowledge with the HFSC trace section. (See attached PowerPoint presentation.)
- I. Ms. Blancett introduced the discussion regarding the nature of irregularities likely to require corrective action by the Corporation. Ms. Wilson, Quality Director, provided information on how incidents and corrective actions are handled and documented at the HFSC.
- J. Ms. Blancett introduced the discussion regarding statistically adequate blind samples and suggestions for creating blind samples. Dr. Peter Stout, Vice President and Chief Operations Officer, shared information about discussions he and Dr. Spiegelman continue regarding this topic.
- K. Mr. Garrard conducted a presentation regarding corporate IT security issues, including data security, retention of data, on-site versus off-site storage, backups, and access levels. He also conducted a presentation regarding backup power for critical equipment and protecting evidence from flood damage and/or power outages. Members from the Board of Directors, TAG, and HFSC staff contributed to both discussions. (See attached PowerPoint presentation.)
- L. Ms. Blancett extended her thanks to the members of the TAG for their contributions to the HFSC and noted that she would like to continue communications with the TAG more frequently. Nicole B. Cásarez, Chairwoman of the HFSC Board of Directors, also thanked the TAG for their willingness to serve.
- M. There being no other business, the meeting was ADJOURNED at 3:03 p.m.

Houston Forensic Science Center, Inc.

By: _____

Ashley Chapman

Secretary



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Saturday, August 6th, 2016

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Suspension of Accreditation

Laboratories Which Have Been Suspended

AGENCY / STATE LABORATORY NAME	DATE OF SUSPENSION
Florida Fire Marshal Bureau of Forensic Fire and Explosives Analysis (fire debris category of testing only)	March 7, 2016 (appeal in process)

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Interim Assessment

ASCLD/LAB-International

Special Interim Assessment Report

Florida Fire Marshal
Bureau of Forensic Fire and Explosives Analysis
Tallahassee, Florida

PART 1 – GENERAL INFORMATION

INTRODUCTION

This is the *ASCLD/LAB-International* Interim Assessment Report of the Florida Fire Marshal Bureau of Forensic Fire and Explosives Analysis. The on-site special interim assessment was conducted during the period January 20-21, 2016.

The *ASCLD/LAB-International* assessment team consisted of the following members:

Lead Assessor:

Harry A. Fox, III – *ASCLD/LAB* / Annville, PA

Technical Assessors:

Judi Hoffmann – Montana DOJ Forensic Science Division / Missoula, MT

Reta Newman – Pinellas County Forensic Laboratory / Largo, FL

OBJECTIVES OF ASSESSMENT

The assessment was conducted to evaluate the management and technical operations of the laboratory in accordance with the accreditation requirements specified below, and to report the findings of the assessment in a fair and impartial manner to the laboratory and to the ASCLD/LAB Board of Directors for the purpose of accreditation in accordance with the scope of the assessment.

1. Were the test results issued in the following cases sufficiently supported by test data in the casefile? (2011 Supplemental Requirements for Testing Laboratories- 4.13.2.5)

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No. While ignitable liquids could not be precluded from being present, technical review of the testing data from these cases using interpretation criteria set forth in the ASTM Test Method E1618 Guidelines to base conclusions, revealed that the test data was not sufficient to support a conclusion that an ignitable liquid (gasoline) was present.

Did the laboratory issue an erroneous report in any of these cases as alleged by the complainant? (ISO/IEC 17025:2005 – 5.10.1)

The data was determined to be insufficient to support the conclusions.

Richard Freeman case

Irma Castro case

It is the opinion of the technical assessors that a conclusive identification of gasoline as reported by the laboratory is **not supported by the available data.**

Twenty-six (26) randomly selected cases where gasoline or gasoline mixture was reported were evaluated.

There were fourteen (14) cases in which concerns for the accuracy of the reported findings are in question.

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There were fourteen (14) cases in which concerns for the accuracy of the reported findings are in question.

2. Does a review of these case files and/or a review of the related depositions of the laboratory analyst(s) in the Freeman or Castro cases indicate a competency concern(s) regarding any laboratory personnel (including technical reviewers)? (ISO/IEC 17025:2005 – 5.2.1 and 2011 Supplemental for Testing Laboratories 5.2.6.2)

2. Does a review of these case files and/or a review of the related depositions of the laboratory analyst(s) in the Freeman or Castro cases indicate a competency concern(s) regarding any laboratory personnel (including technical reviewers)? (ISO/IEC 17025:2005 – 5.2.1 and 2011 Supplemental for Testing Laboratories 5.2.6.2)

Review of these case files indicates concern regarding the competency of laboratory personnel. **Failure to adequately apply fundamental fire debris analytical procedures** for 1) contamination control, 2) sample preparation (i.e., ignitable liquid concentration considerations), 3) interpretation of data (when high concentrations of ignitable liquids are present), and 4) the impact of sample matrix (gasoline identification) are of particular concern.

**If so, is there appropriate objective evidence that laboratory management implemented appropriate corrective action(s)?
((ISO/IEC 17025:2005 – 4.11.1)**

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(ISO/IEC 17025:2005 – 4.11.1)**

No corrective action records were provided that related to the Freeman or Castro cases, or any other casework for the timeframe that was reviewed.

In the case of the reporting of gasoline in matrix-predominate samples, **the laboratory management maintains that the data was properly interpreted; therefore, they contend that no corrective action is necessary.**

In the cases of the misreporting of gasoline/isoparaffinic **mixtures**, laboratory management stated that they were aware and **in current cases would report as only gasoline. However, no corrective action or amended reports were issued.**

3. At the time of the analysis of any of these cases, was the laboratory's approved testing protocol followed? (ISO/IEC 17025:2005 – 5.4)

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The issue is not whether protocols were followed; rather, it appears to be **a lack of sufficient protocols.**

Interviews and depositions of the director make it clear that the **interpretation of data deviated from ASTM Test Method E1618; however, E1618 is the only guide listed for interpretation in the laboratory protocols.** There was nothing found in the case records reviewed that indicated the customer was notified when deviation from the protocol was made nor were there any laboratory developed methods for interpretation validated or documented. Furthermore, the laboratory protocol for interpretation of data is limited to "Consider ASTM Test Method E1618". **There is no other policy or published guidance for data interpretation or reporting found in the laboratory's fire debris protocols.**

**Did the laboratory's approved testing protocol consist of a properly validated method(s) fit for the intended use?
(ISO/IEC 17025:2005 – 5.4.5)**

Did the laboratory's approved testing protocol consist of a properly validated method(s) fit for the intended use? (ISO/IEC 17025:2005 – 5.4.5)

In terms of data interpretation, **the laboratory has no documented or validated method that it uses for data interpretation when it elects not to use ASTM Test Method E1618.** From interviews, the laboratory's interpretation method appears to employ a combination of limited pattern recognition and significant, but abbreviated target compound analysis.

4. Does the laboratory's documented, approved testing protocol include the use of the "additive effect"? (ISO/IEC 17025:2005 – 5.4)

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The term "additive effect" was not found in the laboratory's documented, approved testing protocol.

While the term "additive effect" is not defined in scientific literature, the concept of matrix derived pyrolysis products contributing to chromatographic data is well known.

Most fire debris cases, if they contain an ignitable liquid, also contain matrix components. All are represented in the data and many matrix produced compounds are the same compounds found in petroleum products.

There is no guidance in the laboratory's analytical protocols for data interpretation other than reference to ASTM Test Method E1618.

If so, can the laboratory provide objective evidence that considering the “additive effect” to form test conclusions has been properly validated? (ISO/IEC 17025:2005 – 5.4.5)

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The contribution of pyrolysis and combustion products from substrate materials is well documented and acknowledged in ASTM Test Method E1618 11.1. Although not termed the “additive effect”, ASTM Test Method E1618 does instruct practitioners that these contributions need to be taken into account during visual pattern evaluation. ASTM Test Method E1618 11.2 states “The presence of ...extraneous product components is acceptable **when sufficient ignitable liquid product remains to allow proper classification of the sample.**”

The laboratory could not provide objective evidence to verify their interpretation methodology had been validated.

Is this approach generally accepted in the scientific community?

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The laboratory's approach of using distorted extracted ion profile ratios coupled with an abbreviated selection of target compounds for identification of gasoline in case data dominated by the sample matrix, as described by analysts in interviews and alluded to in the data provided in the case files reviewed, **is not accepted in the scientific community.**

5. If the answer to question #4 is that the approved protocol does not include the use of the “additive effect,” is there any objective evidence that the “additive effect” is being employed by the laboratory as an undocumented, non-validated protocol? (ISO/IEC 17025:2005 – 5.4)

5. If the answer to question #4 is that the approved protocol does not include the use of the “additive effect,” is there any objective evidence that the “additive effect” is being employed by the laboratory as an undocumented, non-validated protocol? (ISO/IEC 17025:2005 – 5.4)

The term “additive effect” is not at issue. However, the issue is that **the interpretation methodology being employed by the laboratory is an undocumented, unvalidated protocol that is not generally accepted in the scientific community.**

6. Does the laboratory follow “ASTM Test Method E1618 (current version)” when conducting testing?

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The laboratory policy **does not require analysts to follow ASTM Test Method E1618** (current version) when conducting testing. In the laboratory policy *SOP 3.3.7 Instrumental Analysis of Fire Debris* it states “For GC/MS data, operation and interpretation should **consider** the guidelines found in ASTM E1618 “Standard Test Method for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectra”.”

If not, does language in the test reports issued by the laboratory **lead the customer to believe** that the most current version of ASTM method E1618 was or is followed or used during analysis? (ISO/IEC 17025:2005 – 5.10.1)

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Yes, the test reports issued by the laboratory do lead the customer to believe that the most current version of ASTM Test Method E1618 was followed during analysis. The verbiage found in the test reports reviewed states: “The wording of the opinions and interpretations in the preceding report **was developed using recommendations** in ASTM E 1618 (Current Version)...”

**Are test reports clear and unambiguous in this regard?
(ISO/IEC 17025:2005 – 5.10.1)**

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(ISO/IEC 17025:2005 – 5.10.1)**

In deposition, it was made clear that the laboratory does not rely solely on ASTM E1618 for interpretation. However, the test report in question during the deposition did not state ASTM Test Method E1618 was not used contrary to what was done in the case referenced above. Therefore, **test reports are not clear and unambiguous.**

The Lab Response to 11 Corrective Action Requests:

51 pages stating the assessment team is unfairly holding them to a “conservative” standard.

Agrees to stop referencing ASTM.

“We will modify the wording on our report which apparently is so confusing to some.”

“The **conservative approach** is the simple and easy path which states that any ignitable liquid seen in a sample must perfectly match the pattern of an ignitable liquid reference standard which is prepared as a simple dilution in an appropriate solvent.”

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Actually, ASTM E1618 states,

11.1 Pattern matching of extracted ion profiles or target compound chromatograms **rarely gives perfect correlation** with reference ignitable liquids.

“Analysts with only occasional or limited exposure to fire debris analysis rightly need to maintain a very high threshold of confidence and **be very conservative** in their determinations simply because they lack the experience.”

“The **conservative** approach championed by this special assessment team and Mr. Lentini, **ignores basic and fundamental chemistry** which can allow analysts to use the capabilities of the instruments available to them to make low level determinations within reason. This is allowed in ASTM E1618 and is also discussed in **various authoritative references** which indicate that a strict adherence to the inter-peak ratios seen in dilute reference standards may not be present in extracts pulled from burned matrices.”

“The **conservative** approach championed by this special assessment team and Mr. Lentini, **ignores basic and fundamental chemistry** which can allow analysts to use the capabilities of the instruments available to them to make low level determinations within reason. This is allowed in ASTM E1618 and is also discussed in **various authoritative references** which indicate that a strict adherence to the inter-peak ratios seen in dilute reference standards may not be present in extracts pulled from burned matrices.” (No references provided)

“We submit that an objective review of the data in our cases show objective evidence supporting the presence of gasoline. The special assessment team chose to use a more **conservative** view than is in the ASTM E1618 Standard or written in a book co-authored by one of the assessors. It appears that **they interpreted our work based on how they perform the analyses in their laboratories** and used a very **conservative** approach.

The response to most of the CARs was:

Since we do not accept that the assessment team is correct, there is nothing to correct.

A previous document prepared by the Lab Director:

The research on how expected ratios of ignitable liquid components are changed in the in the presence of varying concentrations of matrix background co-eluent contributions is **rare.**

A previous document prepared by the Lab Director:

The degree of the “additive effect” of co-elution is concentration dependent. When the concentration of the ignitable liquid is significantly greater than the concentration of the background compounds, the resulting chromatographic pattern will appear to “match” the suspected ignitable liquid reference standard. **When the concentration of the residual ignitable liquid is the same or less than the contributions from the matrix, the resulting TIC (or FID if we look at archaic methodology) will not compare to the reference ignitable liquid standard.**

A previous document prepared by the Lab Director:

“In spite of these cautionary notes, it should not be inferred that valid interpretations cannot be made with distorted data. In a review of this laboratory’s findings from 1992 (when we installed a LIMS system) to 2011, over 63,000 analyses for fire debris were completed. Over 51% were called negative and **only 33.48%** were determined to contain gasoline or a gasoline mixture.

Data from the Laboratory's Website

Findings 1992 to 2013	Samples	Percent
No ignitable liquid/Negative	37,015	52.49%
Gasoline & Gasoline Mixtures	23,244	32.96%
Petroleum Distillates & Petroleum Distillate Mixtures	4,388	6.22%
Oxygenates	857	1.22%
Isoparaffinic Products	217	0.31%
Naphthenic/Paraffinic Products	234	0.33%
Aromatic Products	332	0.47%
Normal Alkane Products	126	0.18%
Miscellaneous	4,108	5.83%
Total	70,521	100%

Next step: The ASCLD/LAB Board
considers the appeal



Technical Advisory Group

Information Technology

Stefan Garrard, MS

August 12, 2016

Structure

- Physical Infrastructure
- IT Security
- Data Backup and Retention



Physical Infrastructure

Physical Infrastructure

- Power quality affected by many factors including age of infrastructure, overhead / underground transmission lines, work on other parts of the circuit, building equipment condition
- Protecting critical equipment is important everyday, not just during weather events (hurricanes)
- Important to consider mechanical infrastructure when designing backup systems – it doesn't matter if your systems are up if they overheat!
- Infrastructure design can be designed to protect everything (expensive) to only critical equipment (less expensive)

Physical Infrastructure – UPS Systems

- UPS – "Uninterruptible Power System"
- Purpose is to condition power by protecting from sags (undervoltage) and surges (overvoltage), and provide continuous power during a loss of mains power
- Runtime is a factor of connected load size vs. UPS size, number of batteries, and efficiency of the UPS system
- Not typically used to protect mechanical equipment (cooling, etc.)
- Building-sized UPS systems are better when many systems throughout the facility must be protected

Physical Infrastructure – UPS Systems

- Flywheels are an alternative technology that provides "ride through" power until generators can come online
- Typically provide 15-30s of protection but have quick recovery times
- More expensive up front, lower maintenance costs over traditional UPS systems
- Can protect the entire building if required

Physical Infrastructure Design Considerations

- What do you need operational when utility power is unavailable?
- If there was an extended outage (days or weeks), would the equipment need to stay operational for the duration of the outage?
- What are the requirements and the risk profile?
 - Is vital information / data at risk if utility power is unavailable?
 - Are there any legal obligations that must be satisfied?
 - Do employees need to continue work during an outage?
 - Is any of the equipment susceptible to loss of power events?

Physical Infrastructure Design Considerations

- This drives conversations about the infrastructure:
 - Are redundant (N+1, 2N) systems required?
 - What if the emergency equipment fails during an outage?
 - If the outage is prolonged, how is maintenance performed on emergency systems?
 - Can the generators be refueled while running? Are bladder tanks available?
 - Can an outage be sustained while maintenance is performed?
 - How easily can temporary equipment be staged / connected in case of a primary system failure?

Physical Infrastructure Design Considerations

- Placement of emergency equipment is crucial!
- Houston learned this first during TS Allison, again in 2015/2016
- Generators don't work if they are underwater, or Diesel is contaminated
- During extended outages, how do you refuel?
 - What types of fuel contracts does COH hold? Can HFSC take advantage of these contracts?
 - Can generators be refueled without shutting down? Are bladder tanks available?
 - Is a natural gas or propane-fueled generator a better option?

Physical Infrastructure Additional Considerations

- Coexisting in another facility has unique challenges
 - Most buildings shut down mechanical systems at night; not good for IT equip.
 - Emergency power may be limited to core building services; adding additional generators may be cost-prohibitive or impossible
- Important to ensure spaces requiring 24/7 conditioning are independent from normal office cooling systems
- Building engineers may program zones to provide continuous cooling, but how do you know if the room is really cool overnight?
 - Cost-effective monitoring systems exist that provide temperature, humidity, air pressure, leak detection, intrusion notification
 - Some systems can also track assets through active RFID tags



IT Security

IT Security

- Important to protect from both external and internal threats
 - Internal threats could be rogue employees, but could also be accidental deletion of data, careless mistakes
 - External threats include hackers, rogue states, etc.
 - Must consider physical security as well!
- Physical security is the first line of defense
 - Uncontrolled access / systems without audit capabilities means the data is at risk at all times
 - Cameras can be used to monitor building perimeter as well as equipment

IT Security

- Second line of defense for IT systems is the firewall that sits between the local network and the Internet
 - Modern firewalls can detect and contain malicious activity, viruses, other threats in real-time
 - Intrusion Detection Systems (IDS) scan all traffic (inbound and outbound) in real-time and drop malicious packets before they reach their destination
 - Most update their threat definitions continuously, providing instant protection from emerging threats
- Important to restrict Internet access for critical internal networks to minimum required to complete the job.

No Internet access is better, air-gapped networks are best

IT Security

- Securing data is achieved by protecting the data both physically and logically (network, permissions)
 - Restrict access to server rooms where filesystems reside
 - Routinely audit access to these rooms
 - Lock racks and data cabinets as an added line of defense
 - If possible, disable USB ports on servers holding very sensitive data
 - Encrypt data "at rest" and "in flight" through the use of self-encrypting drives and encrypted network communication

IT Security

- USB drives are a major threat to IT systems
 - Many companies are blocking their usage entirely or requiring encryption
 - Serve as a carrier for viruses, Trojan horses, other malicious software
 - Serves as a vector for data to leave IT systems
 - Best approach is to block the use of USB drives, but this isn't always practical
- Encryption can help mitigate some of the risks of data leakage
- Virus scanning software is an important front-line defense for limiting exposure to threats on USB devices

IT Security – Best Practices

- Enforce password policies for all users
- Immediately terminate all access when an employee leaves
- Use the concept of "least privilege" for accounts and access
 - Users should not have accounts that provide access to all data or all systems
 - Provide only the access required to do the job
 - Administrators should have separate accounts for daily tasks and administrative functions
- Enable auditing capabilities wherever possible
- If VPN access is required, use two factor authentication for all users (something you know plus something you have)

IT Security – Best Practices

- Use workflows and automation whenever possible to minimize human error
- For sensitive systems, separate duties such that no person can use and administer the system



Data Backup and Retention

Data Backup

- A well-designed backup strategy can accomplish both data backup and retention
- Off-site storage is critical to the strategy!
 - What if the server room is damaged in a fire?
 - What if someone steals the backups?
- Several strategies exist for off-site storage:
 - Replication to a remote facility
 - Removal of tape media for storage in a secure facility
 - Replication to a cloud provider

Data Backup

- Replication to a remote facility
 - Protected against damage to the main facility
 - Possible to architect the backup system for quick data recovery
 - Requires a stable, high-speed network connection to secondary facility
 - Requires physical and logical controls at the remote location that match the requirements at the main location
- Off-site storage
 - Typically cost-effective (only storing the media, no IT equipment)
 - Longer recovery time (media must be retrieved from storage facility)
 - Widespread use throughout the industry
 - Must ensure the service complies with any security requirements

Data Backup

- Cloud-based replication
 - Many solutions exist, not all may be suitable for sensitive data
 - Backups are dependent on the Internet connection; slow connection may not be able to complete backup within the time window
 - Some solutions have expensive data retrieval fees
- Best solution may be a hybrid approach:
 - Snapshots to allow quick recovery from accidental deletion, etc.
 - Backup to disk on-site
 - Replicate to secondary site / write to tape and store offsite
- Amazon has tools available to calculate TCO / ROI for cloud backup

Data Retention

- Important to develop a plan to remove data at the end of the retention period
- Requires diligence to maintain a record of archived data and retention requirements
- Software solutions exist that can manage data backup, archival, and retention, but the process is still complicated especially if multiple data retention requirements exist
- Software solutions may be complex and expensive
- Many companies struggle with this; no easy answer



Questions | Discussion