Priority Action Report

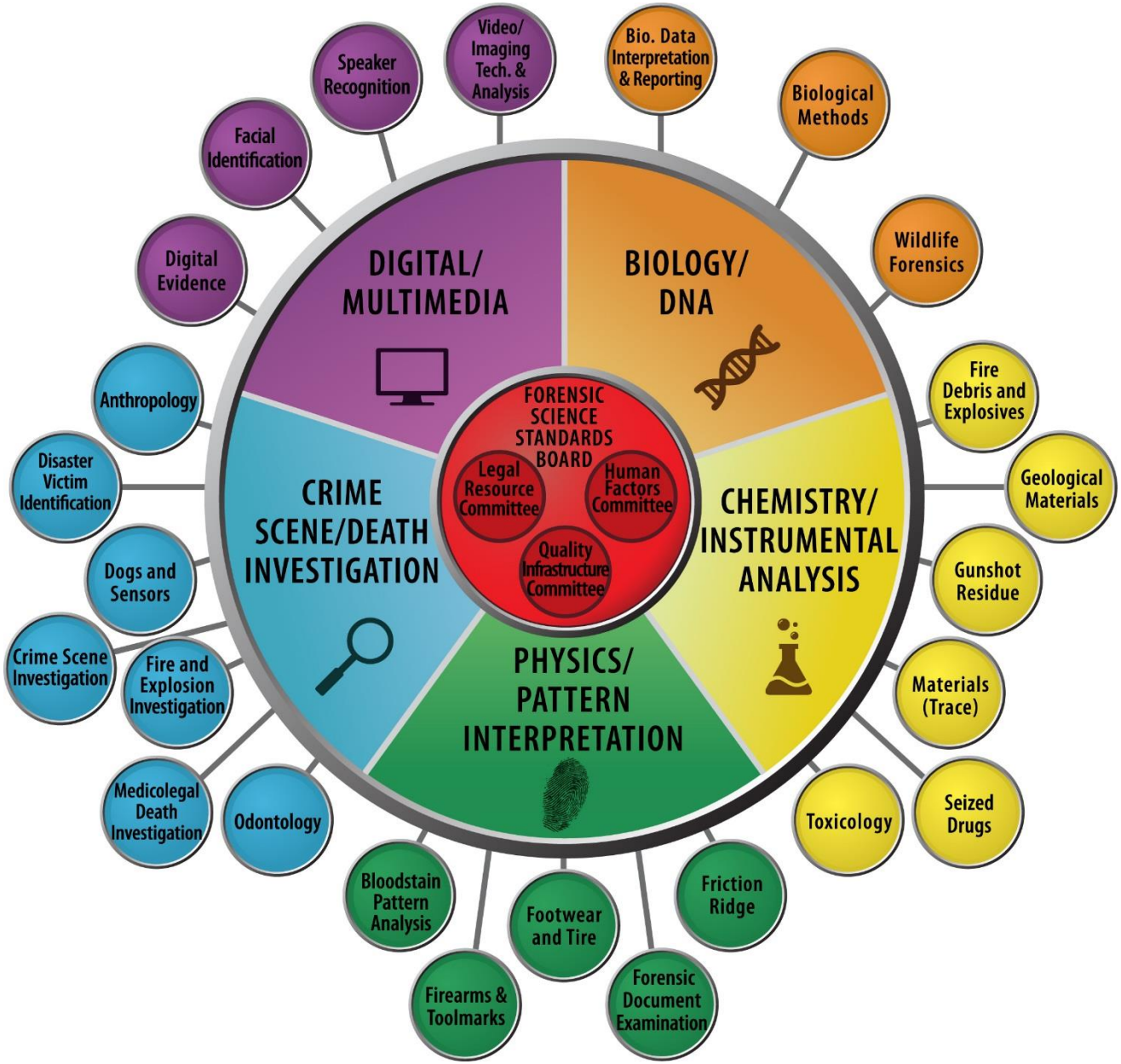
Fire Debris and Explosives Subcommittee

Chemistry and Instrumental Analysis SAC

Vincent J. Desiderio

February 23, 2016

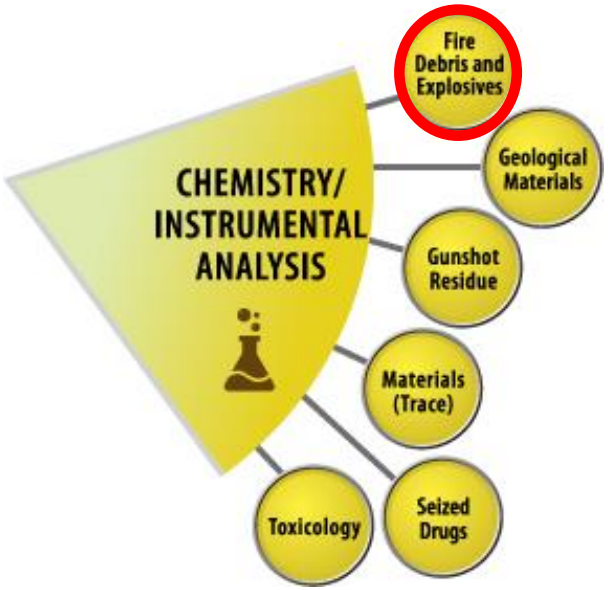
NIST
National Institute of Standards and Technology
U.S. Department of Commerce



Organization of OSAC Scientific Area Committees

NIST National Institute of Standards and Technology U.S. Department of Commerce

Fire Debris and Explosives



The OSAC Subcommittee on Fire Debris and Explosives will focus on standards, guidelines, and resources related to the scientific examination and analysis of materials associated with fire and explosion investigations.

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Fire Debris and Explosives

Subcommittee Leadership

Position	Name	Organization	Term	Email
Chair	Vincent Desiderio	US Postal Inspection Service	3 Years	vjdesiderio@uspis.gov
Vice Chair	Susan Hetzel	SEA Limited	4 Years	shetzel@sealimited.com
Executive Secretary	Brenda Christy	Virginia Department of Forensic Science	2 Years	brenda.christy@dfs.virginia.gov

Subcommittee Members

#	Name	Organization	Term	Email
1	Phillip Antoci	New York City Police Department	4 Years	philip.antoci@nypd.org
2	Dr. Andrew T. Armstrong	Armstrong Forensic Laboratory	3 Years	andrew@aflab.com
3	Marcela Brown	National Institute of Standards and Technology	4 Years	marcela.najarro@nist.gov
4	Inge Corbin	Defense Forensic Science Center	3 Years	inge.corbin.civ@mail.mil
5	Michelle Evans	Bureau of Alcohol, Tobacco, Firearms, and Explosives	3 Years	michelle.r.evans@usdoj.gov
6	Dr. Adam Hall	Northeastern University	4 Years	a.hall@neu.edu
7	Dennis C. Hilliard	Rhode Island State Crime Laboratory	2 Years	dch@uri.edu
8	Judith L. Hoffman	Montana State Crime Laboratory	2 Years	jhoffman@mt.gov
9	Dr. Katherine Hutches	Bureau of Alcohol, Tobacco, Firearms, and Explosives	3 Years	katherine.d.hutches@usdoj.gov
10	Douglas Klapec	Bureau of Alcohol, Tobacco, Firearms, and Explosives	4 Years	doug.j.klapec@usdoj.gov
11	Wayne Moorehead	Pennsylvania State University	4 Years	criminalistics@hotmail.com
12	Robert F. Mothershead II	Federal Bureau of Investigation	2 Years	robert.mothershead@ic.fbi.gov
13	Reta Newman	Pinellas County Crime Laboratory	2 Years	rtnewman@co.pinellas.fl.us
14	Dr. Jimmie C. Oxley	University of Rhode Island	2 Years	joxley@chm.uri.edu
15	William A. Randle	Missouri State Highwau Patrol	3 Years	will.randle@mshp.dps.mo.gov
16	Dr. Michael Sigman	University of Central Florida	3 Years	michael.sigman@ucf.edu
17	Lisa Windsor	Tucson Police Department Crime Lab	3 Years	lisa.windsor@tucsonaz.gov

Task Group Chairs

Task Group	Name
Document Development and Evaluation	Michelle Evans
Reports, Terminology, and Testimony	Dr. Katherine Hutches
QA/QC	Robert Mothershead
Research and Training	Dr. Adam Hall

Subcommittee Liaisons

Position	Name
QIC Liaison	Reta Newman
HFC Liaison	Dr. Katherine Hutches
LRC Liaison	Phillip Antoci
KAVI Liaison	Dr. Adam Hall

Summary of Standards/Guidelines Priority Actions

Priority	Working Title of Document
HIGH	(SDO-11) E1618-14: Standard Test Method for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry
HIGH	(RA-1) ASTM E2881-13e-Standard Test Method for Extraction and Derivatization of Vegetable Oils and Fats from Fire Debris and Liquid Samples with Analysis by Gas Chromatography-Mass Spectrometry
HIGH	(RA-2) ASTM E2451-13: Standard Practice for Preserving Ignitable Liquids and Ignitable Liquid Residue Extracts from Fire Debris Samples
HIGH	(RA-3) ASTM E1386-15: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Solvent Extraction
MEDIUM	(SDO-10) ASTM E1388-12: Standard Practice for Sampling of Headspace Vapors from Fire Debris Samples

Summary of Standards/Guidelines Priority Actions

Priority	Working Title of Document
MEDIUM	(SDO-7) E1412-12: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration With Activated Charcoal
LOW	(SDO-12) E1413-13: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration
HIGH	(SDO-8) General Fire Debris Analysis Guide (New Document)
MEDIUM	(SDO-9) General Intact Explosives Analysis Guide (new Document)
HIGH	(SDO-4) Fire Debris Terminology (New Document)
HIGH	(SDO-3) Explosives Terminology (New Document)
MEDIUM	(SDO-6) Fire Debris QA/QC (New Document)

Summary of Standards/Guidelines Priority Actions

Priority	Working Title of Document
MEDIUM	(SDO-13) Semi-Dynamic Headspace Sampling for Fire Debris (New Document)
MEDIUM	(SDO-2) Fire Debris Report Writing Guide (New Document)
MEDIUM	(SDO-1) Explosives Report Writing Guide (New Document)
MEDIUM	(SDO-5) Case file review (New Document)

Standards/Guidelines Development Priority 1 Document

Document Title:

(SDO-11) E1618-14: Standard Test Method for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry

Scope:

This test method covers the identification of residues of ignitable liquids in extracts from fire debris samples using gas chromatography-mass spectrometry.

Objective/rationale:

The objective is to provide a standard method for the analysis and classification of ignitable liquids and their residues for analysis by GC-MS.

Task Group Name: Ad Hoc E1618 Evaluation Task Group
Task Group Chair Name: Reta Newman
Date of Last Task Group Meeting: TBD

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Standards/Guidelines Development Priority 1 Document

Key Components of Standard:

(SDO-11) E1618-14: Standard Test Method for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry)

- Guidance provided for gas chromatograph and mass spectrometer instrument parameters.
- A comprehensive classification system for ignitable liquids/residues.
- Report guidance.

Task Group/Subcommittee Action Plan

Planned Actions	OSAC Process Stage (e.g., SDO 100)	Assignee	Estimated Completion Date
Ad hoc task group evaluation of document for suitability as a definitive standard.	SDO-100	R. Newman	June 30, 2016
Subcommittee evaluation of ad hoc task group report.	SDO-100	S. Hetzel	July 29, 2016
Subcommittee discussion and vote on path forward.	SDO-100	V. Desiderio	August, 5, 2016

Standards/Guidelines Development Priority 2 Document

Document Title:

(RA-1) E2881-13e-Standard Test Method for Extraction and Derivatization of Vegetable Oils and Fats from Fire Debris and Liquid Samples with Analysis by Gas Chromatography-Mass Spectrometry

Scope:

This test method covers the extraction, derivatization, and identification of fatty acids indicative of vegetable oils and fats in fire debris and liquid samples. This procedure will also extract animal oils and fats, as these are similar in chemical composition to vegetable oils and fats.

Objective/rationale:

The objective is to provide a standard method for the extraction, derivatization, and analysis of vegetable oils and fats.

Task Group Name: Document Development and Evaluation
Task Group Chair Name: Michelle Evans
Date of Last Task Group Meeting: January 27-29, 2016

Standards/Guidelines Development Priority 2 Document

Key Components of Standard:

(RA-1) ASTM E2881-13e-Standard Test Method for Extraction and Derivatization of Vegetable Oils and Fats from Fire Debris and Liquid Samples with Analysis by Gas Chromatography-Mass Spectrometry

- Guidance for the derivatization of oils and fats that may be encountered in fire debris in preparation for chromatographic analysis.
- Suggested instrumental parameters.
- Suggested sample handling procedures.
- Guidance on interpretation and reporting.

Priority 2: **(RA-1) E2881-13e-Standard Test Method for Extraction and Derivatization of Vegetable Oils and Fats from Fire Debris and Liquid Samples with Analysis by Gas Chromatography-Mass Spectrometry**

Task Group/Subcommittee Action Plan

Planned Actions	OSAC Process Stage (e.g., SDO 100)	Assignee	Estimated Completion Date
Subcommittee review of referenced documents for general technical merit.	RA-700	B. Christy	February 26, 2016
Resubmit to QIC for second review.	RA-800	V. Desiderio	March 11, 2016

Standards/Guidelines Development Priority 3 Document

Document Title:

(RA-2) E2451-13: Standard Practice for Preserving Ignitable Liquids and Ignitable Liquid Residue Extracts from Fire Debris Samples

Scope:

This practice describes procedures for preserving residues of ignitable liquids in extracts obtained from fire debris samples and questioned ignitable liquid samples.

Objective/rationale:

To provide guidance for the practice of preserving fire debris extracts for subsequent analysis.

Task Group Name: Document Development and Evaluation
Task Group Chair Name: Michelle Evans
Date of Last Task Group Meeting: January 27-29, 2016

Standards/Guidelines Development Priority 3 Document

Key Components of Standard:

(RA-2) E2451-13: Standard Practice for Preserving Ignitable Liquids and Ignitable Liquid Residue Extracts from Fire Debris Samples

•Best practices guidance for saving sample extracts for possible later analysis.

Task Group/Subcommittee Action Plan

Planned Actions	OSAC Process Stage (e.g., SDO 100)	Assignee	Estimated Completion Date
Re-evaluate document for re-submission as a standard and review referenced documents for technical merit.	RA-375	S. Hetzel	April 29, 2016

Standards/Guidelines Development Priority 4 Document

Document Title:

(RA-3) ASTM E1386-15: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Solvent Extraction

Scope:

This practice covers the procedure for removing small quantities of ignitable liquid residue from samples of fire debris using solvent to extract the residue.

Objective/rationale:

To provide guidance for performing solvent extractions of fire debris in preparation for analysis.

Task Group Name: Document Development and Evaluation
Task Group Chair Name: Michelle Evans
Date of Last Task Group Meeting: January 27-29, 2016

Standards/Guidelines Development Priority 4 Document

Key Components of Standard:

(RA-3) ASTM E1386-15: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Solvent Extraction

•Guided procedures for selecting solvents and performing extractions.

Priority 4: **(RA-3) ASTM E1386-15: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Solvent Extraction**

Task Group/Subcommittee Action Plan

Planned Actions	OSAC Process Stage (e.g., SDO 100)	Assignee	Estimated Completion Date
Review referenced documents for general technical merit.	RA-100	S. Hetzel	April 29, 2016
Assemble and submit Registry Request packet and submit to SAC.	RA-100	S. Hetzel/ V. Desiderio	May 13, 2016

Standards/Guidelines Development Priority 5 Documents

Document Title:

(SDO-3) Explosives Terminology (New Document)

(SDO-4) Fire Debris Terminology (New Document)

Scope:

These are compilations of terms and corresponding definitions that are used in fire debris and explosives analysis. Legal or scientific terms that are generally understood or defined adequately in other readily available sources may not be included.

Objective/rationale:

To define commonly used terms so that they may be used and interpreted in a consistent fashion.

Task Group Name: Reports, Terminology, and Testimony
Task Group Chair Name: Dr. Katherine Hutches
Date of Last Task Group Meeting: January 27-29, 2016

Standards/Guidelines Development Priority 5 Documents

Key Components of Standards:

(SDO-3) Explosives Terminology (New Document)

(SDO-4) Fire Debris Terminology (New Document)

- Lists of terms related to fire debris and explosives analysis with standard definitions.
- References to sources from which the definitions were obtained.

Priority 5:

(SDO-3) Explosives Terminology (New Document)

(SDO-4) Fire Debris Terminology (New Document)

Task Group/Subcommittee Action Plan

Planned Actions	OSAC Process Stage (e.g., SDO 100)	Assignee	Estimated Completion Date
Identify which SDO these documents will be submitted to.	SDO-200	V. Desiderio	March 4, 2016
Complete the SDO Process Request form and submit documents to the SAC.	SDO-300	K. Hutches	March 18, 2016

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Standards/Guidelines Reviewed For Technical Merit

Title	Developing Organization	Status*	OSAC Process Stage (e.g., RA 100)
(SDO-10) ASTM E1388-12: Standard Practice for Sampling of Headspace Vapors from Fire Debris Samples	ASTM International	In SDO Revision	SDO-700
(SDO-7) ASTM E1412-12: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration With Activated Charcoal	ASTM International	In SDO Revision	SDO-700
(SDO-12) ASTM E1413-13: Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration	ASTM International	Still Evaluating	SDO-100

Research Gaps Identified

- **Fire Debris:**
  - The need to continue to research novel extraction methods that may be faster and more efficient than those already in use.
  - The need to develop research to determine thresholds for when a sample should be considered positive due to the identification of an ignitable liquid residue.
  - Continual work towards methods of improving ignitable liquid source attribution.
  - Funding to support the development and validation of new fire debris standards.

- **Explosives:**
  - Continual work toward methods of improving explosives source attribution.
  - Funding to support the development of new explosives standards.
  - Funding to support the validation of new explosives standards.

Note- Numerous additional needs have been discussed and will be released over time as the concepts are further developed.

Additional Items of Interest

- Reports, Terminology, and Testimony Task Group currently developing Daubert resources for Fire Debris and Explosives analysis.
- Research and Training Task Group currently developing training resources for Fire Debris and Explosives analysis.
- Provision of training will be scheduled for HFC on basic principles of fire debris analysis (HFC Liaison- Dr. Katherine Hutches).
- Many of our processes have received tremendous assistance and input from international Affiliates:
  - Dr. Mark Sandercock (RCMP)
  - Eamonn McGee (Centre of Forensic Science)
  - Jeanet Hendrikse (Netherlands Forensic Institute).

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