



## OSAC Research Needs Assessment Form

**Title of research need:** Determining the Threshold of Identification for Ignitable Liquids

**Keywords:** ignitable liquid, threshold of identification, GC-MS

**Submitting subcommittee(s):** Fire Debris and Explosives

**Date Approved:** 29JAN2016

*(If SAC review identifies additional subcommittees, add them to the box above.)*

### Background information:

#### 1. Description of research need:

Research is needed to determine the threshold of identification for ignitable liquids by GC-MS. Similar to the determination of a limit of identification (LOI) for a single compound, which is defined as the lowest analyte concentration that yields a library searchable mass spectrum, the threshold of identification is the minimum concentration of ignitable liquid that can be identified from GC-MS data using accepted pattern identification criteria (e.g. peak ratios of extracted ions).

#### 2. Key bibliographic references relating to this research need:

Currie LA. Limits for qualitative detection and quantitative determination. *Analytical Chemistry*, 1968; 40(3): 586-593.  
Long GL, Winefordner JD. Limit of detection, a closer look at the IUPAC definition. *Analytical Chemistry*, 1983; 55(7): 712A-724A.  
Tahbou YR, Zaater MF, Barri TA. Simultaneous identification and quantitation of selected organochlorine pesticide residues in honey by full-scan gas chromatography-mass spectrometry. *Analytica Chimica Acta*, 2006; 558(1-2): 62-68.  
Stauffer E, Dolan J, Newman R. *Fire Debris Analysis*. Elsevier/Academic Press; 2008.

#### 3a. In what ways would the research results improve current laboratory capabilities?

Laboratories will be able to use this method to measure the threshold of identification for the instrumentation they use for the analysis of ignitable liquids. By having a standardized method for determining the threshold of identification, threshold results from different instruments within the same laboratory may be compared, and intra-laboratory comparisons of instrument threshold results may also be made. This method could be used to optimize GC-MS instrument detection for the analysis of ignitable liquids (with and without background matrix).

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

Currently, it is not known what the thresholds of identification are for instrumentation used by forensic laboratories conducting ignitable liquid analysis. This research would allow laboratories to determine the threshold of identification of their instrumentation.

3c. In what ways would the research results improve services to the criminal justice system?

Once a method for determining a threshold of detection has been developed, a minimum standard for the threshold of detection may be set and this standard used by forensic laboratories as part of their quality assurance program.

4. Status assessment (I, II, III, or IV): I

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	<b>I</b>	<b>III</b>
Existing current research is being conducted	<b>II</b>	<b>IV</b>

*This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.*

Subcommittee

Approval date:

February 12, 2016

*(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)*

SAC

1. Does the SAC agree with the research need? Yes    No

2. Does the SAC agree with the status assessment? Yes    No

*If no, what is the status assessment of the SAC:*

Approval date:

*(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)*