OSAC Research Needs Assessment Form

Title of research need: Evaluation and comparison of different adsorption/elution methodology

Keywords: Ignitable liquid, adsorbent, activated carbon, Tenax, SPME, headspace extraction

Submitting subcommittee(s): Fire Debris and Explosives **Date Approved:** 28JAN16

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

Background information:

1. Description of research need:

Evaluation of extraction efficiency of current adsorption methods used for the recovery of ignitable liquids from fire debris samples. This will include the calculation of real extraction efficiencies for a variety of ignitable liquid residues using different adsorbents (e.g. activated charcoal and Tenax) and different eluting solvent(s).

2. Key bibliographic references relating to this research need:

1. Massey, D, E Du Pasquier, and C Lennard. "Solvent Desorption of Charcoal Strips (DFLEX) in the Analysis of Fire Debris Samples: Replacement of Carbon Disulfide." Canadian Society of Forensic Science Journal 35, no. 4 (2002): 195–207. 1.

2. Lentini, JJ, and AT Armstrong. "Comparison of the Eluting Efficiency of Carbon Disulfide with Diethyl Ether: The Case for Laboratory Safety." Journal of Forensic Sciences 42, no. 2 (1997): 307–11.

3. Newman R, Lothridge K. The effects of time, temperature, strip size and concentration in the use of activated charcoal strips in fire debris analysis. In: Current Topics in Forensic Science. Tokyo, Japan: Shunderson Communications; 1996. p. 218–24.

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

Laboratories will be able to use methods with demonstrated extraction efficiencies and avoid those methods with less than ideal extraction efficiencies.

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

While some qualitative work has been done to explore the elution efficiency of some solvents, the extraction efficiencies of different adsorbents and eluting solvents have not been calculated. This gap in knowledge means that the relative efficacy has not been quantitated for the popular ASTM methods for fire debris extraction.

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

If certain adsorption/elution methods are found to give superior extraction efficiencies compared with other methods, greater standardization of fire debris methods will occur as laboratories choose to use the method(s) with greater extraction efficiency.

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	**I**	**III**
Existing current research is being conducted	**II**	**IV**

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 10, 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.)