Forensic Chemistry Section

Fire Debris Analysis Data Interpretation and Report Writing Policy

1.   Scope

This document details the interpretation and report wording to be used when examining fire debris evidence.

2.   Data Interpretation

2.1   Data will be interpreted based on the Ignitable Liquid Classification Chart. The chart is to be used as a guideline only. The analyst has the discretion to openly interpret the data when necessary.

2.2   The analyst will use the Ignitable Liquid Classification Chart to compile a list of examples to be used in the conclusion portion of the report. An example of a conclusion statement is:

Item X was found to contain a medium petroleum distillate. Examples may include but are not limited to some charcoal starters, some paint thinners, and some dry cleaning solvents.

2.3   The analyst will indicate in the report the extraction method(s) and instrumentation used.

2.4   The examiner will assign a hydrocarbon range to each identified product based on the predominant pattern: light = C4-C9, medium = C8-C13, heavy = C9-C20+. A combination such as light-medium or medium-heavy may be used when a pattern falls between the normal ranges.

2.5   Gasoline does not fall into the normal classification scheme and is not identified by a hydrocarbon range. The peak spread is commonly C4-C12. Gasoline has a characteristic aromatic profile. The aromatic content of gasoline is similar to that of petroleum distillates. However, in gasoline, the aromatics are significantly more abundant than the aliphatic content. The aliphatic profile of gasoline will vary by brand, grade, and lot, but is always present. Most gasolines contain characteristic naphthalenes.

2.6   All positive identifications will be compared to ignitable liquid library samples. In the instance of mixture samples, a mixture may be made of library samples or the analyst may use data of each component of the mixture. The comparison data will be included in the case folder. Exclusion data may be included at the analyst's discretion.

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IGNITABLE LIQUID CLASSIFICATION CHART

Classification	Pattern Characteristics	Product examples
Petroleum Distillate	Characterized by predominant n-alkane pattern with an overall gaussian curve to the pattern. Cycloparaffins and isoparaffins are also present. Aromatics and naphthalenes may also be present at varying abundances.	**Light** = cleaning solvents, camping fuels, cigarette lighter fluids **Medium** = charcoal starters, paint thinners, dry cleaning solvents **Heavy (up to C18)** = kerosene, jet fuel, charcoal starters **Heavy (C18+)** = diesel fuel, home heating fuel
Oxygenated Solvent	Product is generally very volatile with major components before C8. Major peaks include an oxygenated compound. Other compounds may be present including toluene, xylenes, petroleum distillate, and aromatic solvents.	**Light** = lacquer thinners, fuel additives, surface preparation solvents **Medium** = lacquer thinners, industrial solvents, metal cleaners. **Heavy** = none noted
Isoparaffinic	Product consists solely of isoparaffininc products. Chromatographic data are distinguished by similar TIC and alkane and cycloparaffin profiles.	**Light** = aviation gas, specialty solvents **Medium** = charcoal starters, paint thinners, copier toners **Heavy** = commercial specialty solvents
Naphthenic Paraffinic	Product consists of isoparaffinic and cycloparaffinic compounds. TICs are characterized by an unresolved envelope of compounds. Aromatics and naphthalenes are not present. Normal alkanes may be present in low amounts.	**Light** = none noted **Medium** = charcoal starters, insecticide vehicles, lamp oils **Heavy** = insecticide vehicles, lamp oils, and industrial solvents
Aromatic Solvent	Product consists almost exclusively, of aromatic compounds in the range of C6-C14. Aliphatic and cycloaliphatic compounds are not present in significant amounts.	**Light** = paint and varnish removers, automotive parts cleaners **Medium** = automotive parts cleaners, specialty cleaning solvents, insecticide vehicles, fuel additives. **Heavy** = insecticide vehicles, industrial solvents
Normal Alkane	Product consists exclusively of straight chain alkanes. Isoparaffins, cycloparaffins, aromatics, and naphthalenes are notably absent.	**Light** = none noted **Medium** = candle oils and some copier toners **Heavy** = candle oils, NCR papers, and copier toners

FC-P010
Rev 2.1 Current
Uncontrolled When Printed

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Effective Date: 2/26/2015
Approved by: Erin Miragliuolo