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Qualitatively Analyzing QuEChERS' Ability to Extract Ignitable Liquid Residues (ILRs) from Cotton-Based Fire Debris

Authors: Ashley L. Jess, MS • Donald P. Land, PhD • Mathew Hengel, PhD • Boyd Lasater, MS

Abstract: This project examined the potential of using the QuEChERS method to extract ignitable liquid residues from fire debris for the purpose of forensic fire analysis. Samples of 10 cm cotton t-shirt squares were doused in one of three ILs and ignited; the debris was then analyzed either via the QuEChERS method or the current method used in forensic labs, PHC. After extraction, subsequent analysis was performed via gas chromatography-mass spectrometry. The initial ignitable liquid used was a combination of 3-methylpentane, cyclohexane, toluene, nonane, dodecane, and hexadecane. Additional samples were analyzed using either charcoal starter or unleaded gasoline. After extraction, resulting spectra from both extraction methods were compared to one another. All of the major peaks present in the PHC mass spectra were also present in the QuEChERS spectra, but the QuEChERS method was consistently at a lower abundance. The results demonstrated that the QuEChERS method may be a viable extraction method to use in fire debris analysis, but its potential forensic use needs to be further analyzed before it can be fully viable.

INTRODUCTION

The Current Method

...tion and identification of ignitable liquid residues (ILRs) ... step in any fire investigation. The most ... commercially-available ... use they

A Possible New Method

In 2003, an Italian group of research... multi-residue cleanup method that ... perform than any of its predecesso... provide high recovery rates. This m... for the extraction of nonpolar pest... became known as QuEChERS, a... Quick, Easy, Cheap, Effective, R... nonpolar a...

health & safety Committee Update

Providing the latest in fire investigator health and safety information to our members

Jeff Pauley
M.S., IAAI-CFI, and CI, MIFire, Chair, Health & Safety Committee

The Health & Safety Committee is now accepting requests for 2022 in-person and virtual training presentations. The preferred presentation length is four hours (with breaks); however, we will consider other time frames if needed. If you are in the planning stages for next year's chapter or other investigator training and would like to include a health and safety segment in your curriculum, email **iaai-safety@firearson.com** for more information or to get on the schedule.

Health & Safety In-depth: The Importance of Having a Safety Culture

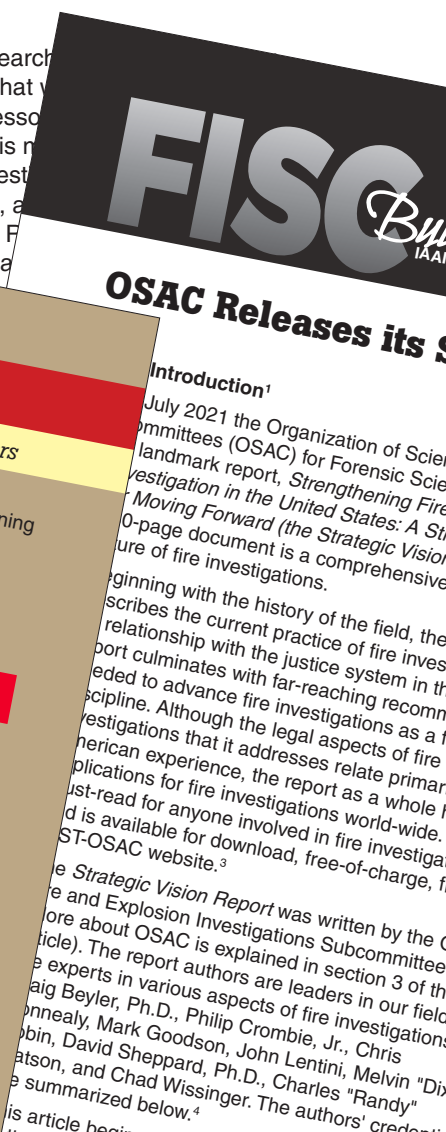
Suppose you accept the premise that post-fire scenes are inherently hazardous to everyone's health, and fire investigators are exposed to many gases and particulates that can adversely affect their health. In that case, your agency or company needs to ensure that it has a good safety culture. We encourage everyone to have a personal safety culture and do things to take care of themselves regardless of their employer's policy or position. However, great things can happen when employers take this to the next step and embrace fire investigator safety as their culture.

From the smallest organization to the largest, in today's fire investigation workplace environment, and with a keen awareness of the hazards that are likely present in almost every post-fire scene, having a positive safety culture just makes good sense. Many papers and articles are available to help understand and implement the process, but developing a culture is more than just issuing a policy document.

An essential element to building an organization's safety culture is top-down leadership. From multiple personal experiences, I can assure you that if a new process, procedure, etc., is not fully embraced and supported at the top, and then by each of the layers below, it will not work. But then, those folks need to lead by example! On average, it can take five to seven years for an organizational change to become fully embraced and incorporated. So, it is more than just a decree from above.

If this critical component happens, then there needs to be consistent and ongoing training. Safety needs to be incorporated into every process. Formal and informal training are important ways to accomplish this, from the first day of new employee orientation training to regular practical exercises and in-service classes. Perhaps of greater importance are the impromptu opportunities that present themselves when good safety practices are not followed. Let's agree that it is everyone's responsibility to ensure a safe working environment. We should also agree that it is the role of anyone who observes an... or practice to say something when they see it. There needs to be coaching... shortcomings are observed.

In many cases, fire investigator... presents some unique ... Administrati...



FISC Bu... IAAI

OSAC Releases its S...

Introduction[1]

July 2021 the Organization of Scie... ommittees (OSAC) for Forensic Scie... landmark report, *Strengthening Fire... vestigation in the United States: A St... Moving Forward (the Strategic Vision...* 0-page document is a comprehensive... ure of fire investigations.

...ginning with the history of the field, the... scribes the current practice of fire inves... relationship with the justice system in th... port culminates with far-reaching recomm... eded to advance fire investigations as a f... scipline. Although the legal aspects of fire... vestigations that it addresses relate primar... nerican experience, the report as a whole h... plications for fire investigations world-wide. ...ust-read for anyone involved in fire investiga... d is available for download, free-of-charge, f... ST-OSAC website.[3]

...e *Strategic Vision Report* was written by the C... e and Explosion Investigations Subcommittee... ore about OSAC is explained in section 3 of th... ticle). The report authors are leaders in our field... e experts in various aspects of fire investigations... aig Beyler, Ph.D., Philip Crombie, Jr., Chris ...onnealy, Mark Goodson, John Lentini, Melvin "Dix... bin, David Sheppard, Ph.D., Charles "Randy" ...atson, and Chad Wissinger. The authors' credentia... e summarized below.[4]

...is article begins with a précis of th... the National Acad...

ELECTRICAL SHORTS

By Cameron J. Novak, P.E., ATF – FRL

Cameron Novak, Electrical/Fire Research Engineer with the ATF's Fire Research Laboratory. He is a licensed electrical and fire protection engineer and holds the IAAI's Certified Fire Investigator and Certified Instructor certifications.

Welcome to the first installment of Electrical Shorts. It is the goal of this series to provide informative content related to electricity, electrical systems, and fire investigations. While most of these topics will be related to electricity, we may also sprinkle some gas-related content in as well. This first article will answer the question: **What is electricity?**

The Merriam-Webster Dictionary defines electricity as "a fundamental form of energy observable in p[illegible] negative forms that occurs naturally (as in lightning) or is produced (as i[illegible] expressed in terms of the movement and interaction of [illegible]

[illegible] how do

lletin Board
Fire Investigation Standards Committee (FISC)

by Terry-Dawn Hewitt, Esq., Chair and Wayne J. McKenna, Esq.

Strategic Vision for Fire Investigations

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and the National Commission on Forensic Science (NCFS) is also briefly addressed, because the *Strategic Vision Report* has adopted several of the NCFS's recommendations. Thereafter we feature highlights from the report, consisting of excerpts of some of its most significant recommendations. We conclude with a few observations concerning the report's logical organization.

2. The Entry of Fire Investigations into the Forensic Sciences

The "big bang" event transporting fire investigations into the realm of forensic sciences occurred after the National Academy of Science published the *NRC Report*,[6] which was funded by Congress.[7] This 350-page exposé took a deep dive into the scientific reliability and validity of a number of forensic science disciplines and found many of them seriously wanting. Further, it noted that the problem caused by gaps in the scientific foundations of many disciplines is compounded by a number of factors putting pressures on the forensic science system, as well as by sources of error or even fraud by forensic practitioners.[8]

The *NRC Report* also examined the role of the judicial system in admitting forensic science evidence, concluding:

The bottom line is simple: In a numbe[illegible] forensic science discipl[illegible] professio[illegible]

the northern exposure

By Margot Liechti, BSc, BEd, LLB, LLM and Christopher Mackie, BA, LLB, LRHSC

Part 2

Furious George II:

Peace is Restored

"'[A] pessimist gets nothing but pleasant surprises, an optimist nothing but unpleasant.'

- Fer-de-Lance, Rex Stoud

e, a jury of his peers had
ng to damage his own
g it on fire, and, in doing
the safety of others.

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was extremely dangerous
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But for the burns, [George]

what George

So, the following week, George was back. And this time he was ready: as he returned to the courtroom, he bore a fully-packed backpack with a small, pink suitcase trailing behind him. Before announcing to George how long he would be spending in jail, the judge asked him if George had anything to say to the court. And George, in fact, did: along with his backpack and suitcase,

The court insisted that George review this statement with his lawyer before he began reading it aloud. And so, after a 10-minute intermission, George came back, and read out an abridged version of his statement. It began by expressing his confusion as to how he had been found guilty. But then he went on to express his thanks for his treatment during the process. George thanked the police for their, 'wonderful job': "I have to say I was really impressed by the[ir] professionalism, especially [by the fact] they even unlocked [my] iPhone." Then he thanked his lawyer, whom he called "a true gentleman." And he thanked the tax-payers for the trial.

The record is silent as to what kind of impact this statement made on the court. The judge did remark, in [illegible] decision, that what George did was ext[illegible] "unbelievably stupid". It w[illegible] "degree of [illegible]