Working Like a Dog:

The Effect of Fire Fighting Foams on Canine Arson Investigations

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The use of trained canine teams has proven to be an effective and valuable asset in fire investigations. These special dogs are trained to locate and identify trace levels of ignitable liquid residues (ILRs) sometimes associated with arson fires. As science and technology changes, so must the training and testing for these canine teams.

One recent concern is the use of firefighting foams and their effect on the ensuing fire investigations. Foaming agents and bioremediation additives are now increasingly used in fire suppression. While these additives make fire suppression more efficient and can reduce the environmental impact of the water runoff at a fire scene, their use raises the question of what effect they may have on the detection and identification of ignitable liquid residues (ILR). These concerns relate both to the laboratory analysis and the canine identification aspects of fire investigations and so are critical to a comprehensive investigation.

For basic foams, most foaming agents actually tend to protect the ILR present in the debris and result in less “weathering” of the ILR. Weathering is the phenomena where lighter components in a mixture evaporate faster than heavier components and modify the chemical profile. Think of the foam as a blanket that keeps the ILR from evaporating. The good news is, that is not a problem for the laboratory analysis or canine teams. Canine teams are trained with varying levels of weathered ILR products and all competent forensic laboratories have libraries of ILRs at varying degrees of weathering.

The main concern is for foams with bioremediation agents because they can result in a false negative. These agents usually take the form of specialized bacteria that digest petroleum products. These work on the same principle as septic tank aids like Rid-X™. While the bacteria do not pose a risk to people or animals, they readily digest petroleum product and reduce contamination during runoff at a fire scene. It should be noted that this issue has always been present with soil samples and not new to the forensic world. Moist soil is where these types of bacteria naturally exist. As expected, the bioremediation agents are known to change the composition of the ILR and, given time, will eventually destroy evidence of ILR at a fire scene.

So how do we adapt to these agents? The only option when bioremediation agents are used is performing the investigations and sample testing as soon as possible, before the bacteria can do its thing. This also complicates the investigation for the canine teams because the odor profile of the ILR is continually changing and degrading. In the case of laboratory testing, keeping the samples cold or frozen is also beneficial but no guarantee. The bottom line is knowing if these bioremediation agents have been used so it can be considered on any subsequent investigation, by canine teams and/or laboratory.

Like many potential complications to an investigation, the proper homework is all important. In the case of fire investigations, it is incumbent on the investigator or canine team to verify if foaming agents or bioremediation agents have been used for fire suppression. Confirming the presence of these agents the day after a fire will undoubtedly be easier than six months down the road during litigation.

While basic foams should not present an issue for investigations, those containing bioremediation agents do. If bioremediation foams are confirmed at the fire site, investigators should follow three critical steps to ensure an accurate analysis.

- Investigate as soon as possible
- Keep lab samples cold or frozen before analysis to minimize degradation.
- Recognize the increased risk of false negatives over time.