

The Bill Blackwood
Law Enforcement Management Institute of Texas

=====

A Comparison of Using Luminol or Flourscein as Methods of
Processing Crime Scenes in Search of Blood Evidence

=====

An Administrative Research Paper
Submitted in Partial Fulfillment
Required for Graduation from the
Leadership Command College

=====

By
Ron Hill

Galveston County Sheiff's Office
Galveston, Texas
October 25, 2004

ABSTRACT

This research is intended to provide a comparison of using luminol or flourscein as a method of processing crime scene in search of bloody evidence. The research will be using journals, newsmagazines, training classes and interviews with crime scene investigators and interviews with budget officers to assist in determining which method is better and which is more practical for the agency. In conclusion the research will show that the flourscein is a better method, however, it will also show that the investment the law enforcement agency would have to make could have substantial impact on the yearly budget.

TABLE OF CONTENTS

	Page
Abstract	
Introduction.	1
Review of Literature	2
Methodology	4
Findings	5
Discussions/Conclusions	7
References	11

INTRODUCTION

When law enforcement personnel respond to a crime scene they often face the difficult task of recreating the scene from evidence collected or detected while processing the scene for forensic evidence. Many officers have developed specialized technical training and/or an expertise in the field of forensic investigation. In doing so they have encountered a number of problems and questions related to the processing and locating bloody crime scene evidence. Law enforcement is also faced with the task of which type of processing method would best benefit their agency. The law enforcement agency will have to take into consideration additional training of personnel, extra equipment, additional chemicals, and budget considerations for the purchasing of the chemicals, equipment, and training. Other important details to be considered will be which chemicals can be used secondary, after a first chemical has been applied, with little or no damage to the evidence.

The purpose of this research project will be to educate the investigator and their immediate supervisor(s) as to the limits and abilities of two methods, luminol and fluorescein. These procedures are currently two of the most common methods used to process crime scenes for the detection of bloody evidence. They will be examined and compared to each other's advantages and disadvantages in this research.

Training documentation, prior documentation and trial and error will assist in the research of this project. It is intended that the research provided throughout this project would assist both large and small agencies with determining the method that could provide the best technique in processing crime scenes.

It is believed that the smaller agencies will be unable to fund the fluorescein method, due to the cost factor of the equipment required. However, it is also believed the smaller agencies should keep in contact with their larger neighboring agencies that could possibly have fluorescein capabilities to assist with investigations.

REVIEW OF LITERATURE

In researching the question of luminol or fluorescein, (Monk, 1992) stated that luminol had been banned in California, due to it being carcinogenic and that fluorescein was possible carcinogenic. Monk went on saying blood evidence is often not so obvious even in a violent crime scene where one might expect to find useful blood evidence. If a crime scene has been "cleaned up" it will make it more difficult for the investigator to locate forensic evidence. Also, knowing that the chemical being used is either carcinogenic or a possible carcinogenic the investigator will be using all methods of self-protection available.

It must also be kept in mind that both techniques are presumptive tests for blood, (Cheeseman & Tomboc, 1999).

Meaning that just because there is a reaction does not mean that the area being examined has blood on it. It is in reality a procedure for the investigator to pay special attention to the area being processed, that there might be a possibility for subsequent analysis. Both methods also have false positive reactions, many of which are from household cleaning products.

According to Cheeseman and Tomboc (1999) flourescein yielded greater sensitivity over luminol. He added that flourescein demonstrated an average of approximately four fold increased bloodstain detection sensitivity as compared to luminol. Which, to the investigator, indicates that flourescein would be the processing method of choice, without realizing the cost factor.

The shelf life of these chemicals would also be an issue to the forensic investigator. The shelf life of the working solution of luminol is approximately two to three hours. The shelf life of the working solution of flourescein is two to three days (Maucieri & Monk, 1992).

When working with either of the chemicals (McInnis & Rossi, 2001), note that the investigator must take into consideration of the surroundings, bloodborne pathogens, inhalation, UV light, caustic and oxidative chemicals. Without taking the proper methods of safety precautions the investigator could end up with respiratory problems.

In researching for the comparison of the luminol and flourescein chemical techniques, it was found that many of

the references tending to lean towards the flourescein method. However, the cost factor for the chemical and equipment needed for either method was not discussed. It is believed that the even though the flourescein method may prove to be the better of the two, the smaller police and county agencies, will not be able to afford the use of it due to budget demands.

According to a survey of eight law enforcement agencies with 50 or fewer personnel, six did not have a crime scene unit, six did have an alternate light source, three used luminol and none used flourescein. Four agencies with 50 to 100 personnel were surveyed showing that three of them had a crime scene unit, three had an alternate light source, three used luminol, and two used flourescene. Two agencies with personnel of 101 to 200 were surveyed with one having a crime scene unit, one with an alternate light source, one using luminol and one using flourescein. It should be noted that on the survey of 101 to 200 Officers one of the agencies was a school distict police department and they used they crime lab belonging to the City. Of the eight agencies having 201 plus Officers, all had crime scene units, all had alternate light sources seven of them used luminol and/or flourescein.

METHODOLOGY

In attempting to determine if the crime scene investigator should use luminol or flourescein, we must first asked ourselves these questions. Is there a better

method between the two and which method would be better for the department using it?

It is believed that this research will show that the flourescein will provide the forensic investigator with a better working tool. However, it is also believed that the smaller police and county agencies will be unable to afford the more costly flourescein technique.

In order to conduct this research, journals, news magazines, training classes, interviews with crime scene investigators and interviews with budget officers will be utilized. The journals and newsmagazines will be used to enhance the better of the two methods. The interviews with the crime scene investigators will assist with determining what is their preferred method. The interviews with the budget officer will show how practical it is for one method over the other.

FINDINGS

In researching the articles on luminol and flourescein it was noted many of the times that the flourescein had greater results for the two. It should be noted that writer has received on the job training with luminol and classroom training with flourescein. Writer believed that both methods have their place in the investigator toolbox. They both produce the false positives, where the untrained investigator could misinterpret the reaction.

Having used both the flourescein and luminol writer

believes the flourescein should be used if the opportunity for luminol does not exist. The reasoning for this is due to the use of an alternate light source, video camera and the chemical is applied with two separate sprays. In order for the method to properly be applied there should be at least two investigators present.

Writer believes that the luminol should be used whenever possible. The method is used by mixing the proper chemicals into a single spray bottle and the use of a camera, with a bulb setting and a tri-pod. This job can be accomplished by a single investigator. It should be kept in mind that the environment should be noted for which method should be used. If the area can not be made into complete darkness then the use of luminol is futile.

Part of this research was in determining how many of the law enforcement agencies in Galveston County would be able to utilize either of the two methods. It was found that Galveston County had fourteen (14) different law enforcement agencies, not counting state agencies. Of those fourteen only seven (7) agencies had the availability of a crime scene unit. Of those seven only one (1) had access to the use of an alternate light source. It should also be noted that the one agency that did have the light source currently had two officers who had received training in the use of flourescein.

It is believed that one of the reasons that the remaining seven (7) agencies that did not have a crime scene

unit was due to the fact that they were either too small, such as a suburb police agency, or that they didn't have the tax base to justify spending approximately \$8,000.00 to \$12,000.00 on a single piece of equipment, that being the alternate light source.

The survey taken during Module II, Bill Blackwood Law Enforcement Management Institute of Texas, showed that of the twentytwo agencies, fourteen of them had crime scene units, eighteen of them had alternate light sources, fourteen of them used luminol, and nine of them used flourescene.

In speaking with the Police Chief of Santa Fe, B. Cook, (personal communication, November 2002), he elaborated that he had been attempting to create an identification division within his department for the last several years and was hopeful that in the future they would at least have one officer dedicated to that type of investigation.

And, while interviewing the Lieutenant over the Identification Division for Galveston County, J. Pruitt Jr., (personal communication, October 2002), knowing that his department was the only one with an alternate light source, he stated that when another agency requested the use of the alternate light source one of his officers would make it available to them. That the Sheriff's Office was here to help the smaller agencies and anything we could do to assist in their investigation would be done.

CONCLUSIONS

At the beginning of this research the problem was proposed of a comparison of using luminol or flourescein as methods of processing bloody crime scenes. The purpose of the research was to determine if one method was better than the other, and to attempt to determine if it would cause problems for the investigating agency.

It was hypothesised that the research would show that the flourescein would prove to be the better of the two methods. But it also believed that the cost factors relating to the use of flourescein would cause the smaller agencies to revert to the use of luminol.

After researching the questions it appears that the authurs and persons interviewed did believe that flourescein was a better method to process bloody crime scenes. However, due to the cost factor in purchasing an alternate light source, the chemicals needed and training personnel in the proper use of the chemicals.

The findings of the research and conclusions strongly supported the hypothesis provided at the beginning of this research paper.

It is important for law enforcement agencies to realize the importance to properly processing crime scenes for bloody evidence. This research shows the law enforcement crime scene investigator, their immediate supervisor and possibly the budget Officer the effects and results that the availability of having an additional tool for crime scene

processing and the importance of the additional tool. If an agency limits themselves to the use of a few standard tools, then when the occasion for the use of specialized equipment, the agency will be unable to provide their community with the best methods of forensic investigation. It should also be noted that an alternate light source can be used for a number of additional crime scene, not exclusively to the use of flourscein.

REFERENCES

Cheeseman, R. (1999.) Direct sensitivity comparison of the fluorescein and luminol bloodstain enhancement techniques. *Journal of Forensic Identification*, 261-267.

Maucieri, L., & Monk, J. (1992). Enhancement of faint and dilute bloodstains with fluorescence reagents. CANews, 13-20.

McInnis, P., & Rossi, D. (2001.) Fluorescein the safe alternative to locating latent bloodstains, Power Point Presentation Training Class.