



A History of the Technical/Scientific Working Group for Fire and Explosives Analysis T/SWGFEX

In 1996, The University of Central Florida (UCF) proposed the development of a National Center for Arson and Explosion Research to the National Institute of Justice (NIJ). The Center was to be a national resource center dedicated to the problems of arson and explosion debris analysis.

The key elements to accomplish this goal were for the center to facilitate:

- Transitioning emerging technologies through support of research so they would become applicable to fire and explosion analysis
- Technical support services as an information resource center by assembling a body of skilled scientists knowledgeable in the areas of arson and explosion technology capable of responding to problems of a national need.
- Development of relevant technical guidelines for analysis of arson and explosion debris
- Creation of an advisory group of recognized technical experts to assist in directing, promoting, and guiding the work of the Center. [1]

In March of 1997 UCF President John Hitt, Director of the National Institute of Justice, Jeremy Travis, U. S. Representative Bill McCollum (R-8th District), Chair of the House Subcommittee on Crime and others gathered at UCF to sign the official papers authorizing the creation of the National Center for Forensic Science: Arson and Explosion Research and Development [2]. Dr. William McGee was appointed as the first Director. [3]

On August 6 and 7, 1997, a National Needs Symposium bringing together experts in fire and explosion analysis was convened by NCFs in Orlando, FL [4]. The participants were sub-divided into eight (8) working groups to discuss the problems facing laboratories and to develop solutions. The various committees reported back at the end of the symposium with a list of eleven “solutions” needed by the experts in the field [5]:

1. Develop web accessible databases with exportable training media
 - a. Searchable literature database
 - b. Technology survey of agencies working in the field
 - c. Survey to identify flammable or combustible products and post relevant chromatograms on the database
2. Identification of laboratories with specialized technology to facilitate contact between analysts
3. Prepare and maintain a physical library of ignitable liquids, chemical incendiaries, and explosives where samples could be sent to requesting laboratories as needed
4. Conduct training
 - a. For analysts, investigators, and prosecutors
 - b. Inventory all pertinent training available across the nation
 - c. Work to standardize the various curricula



- d. Set up distance learning for both individual courses and graduate degrees
 - e. Provide opportunities for working groups of analysts, investigators, and prosecutors
5. Examine the concept of regional fire and explosion laboratories where multiple states could send evidence.
 6. Work with the National Fire Protection Association (NFPA) and NIJ to standardize the nomenclature for incident reporting
 7. Develop an electronic newsletter for fire and explosion analysts
 8. Research methods and technology for analysis with validation of the best methods
 9. Become a central resource for literature for certification of practitioners
 10. Assist laboratories with grant applications
 11. Sponsor or conduct research on the use of canines at fire scenes and develop national standards or guidelines on how they should be used.

It was at this meeting that the concept for a “Technical Working Group for Fire and Explosion Debris” was presented by Deputy Assistant Director Randall Murch of the Federal Bureau of Investigation (FBI).[6]

In April of 1998, the National Institute of Science and Technology (NIST) through their Office of Law Enforcement Standards (OLEs) began the process of creating two technical working groups to develop first responder guides for fire and bombing investigations. The planning panels worked to create outlines for these guides and were charged with selecting additional experts to fill their “committees”. The final group included some of the scientists and scene investigators who were to become the initial members of T/SWGFEX.

At the same time in early 1998, NCFs began the process for forming a separate TWG to look at the science of fire and explosive analysis. Following the NIJ method for forming TWG’s, they created six laboratory committees and appointed chairs with the initial responsibility of recruiting other laboratory experts to join. The initial committees and their Chairs:

- Fire Standard Protocols, Carl Chasteen – Florida Fire and Arson Laboratory
- Fire Education and Training, Valerie Turner – Texas Department of Insurance
- Fire Job Requirements, Dirk Erikson – Mississippi State Crime Laboratory
- Explosives Standard Protocols, Co-Chairs Rick Strobel – Bureau of Alcohol Tobacco, and Firearms and Steve Burmeister, PhD – Federal Bureau of Investigation
- Explosives Education and Training, Harry Finley – Naval Criminal Investigative Service
- Explosives Job Requirements, Joe Powell – South Carolina Law Enforcement Division

These individuals met on July 13, 1998 to draw up the initial plans that would be the foundation of the TWG. In that meeting they worked to develop a mission and goals for the organization and plan the composition and assignments of the various committees. It was additionally determined that the working group should be expanded to include scene investigation experts.



With the Daubert decision and its progeny, it was recognized that the basis of scene investigations would need to be focused on the scientific method and a scientific basis for origin and cause observations would be needed. Where better to promote this effort than in a working group that would bring field investigators with analysts to share topics and discuss mutual problems. A survey of laboratories where fire or explosives analysis was performed was discussed [7].

On August 5 & 6, 1998 a meeting was held at UCF for the finalizing the draft of the NIJ Guides for fire scene and explosions scene responders. While this group was technically created only for creation of these guides, many of the participants would meet the following week to form what would become T/SWGFEX. The NIJ guides were published 2000 [8]. They can be found in the NIJ website documents archive:

[“A Guide for Explosion and Bombing Scene Investigation”](#) [9]

[“Fire and Arson Scene Evidence: A Guide for Public Safety Personnel”](#) [9]

In the August 10, 1998 Chairs meeting the name of the working group was selected to be the “Technical Working Group for Fire and Explosions” (TWGFEX), pending approval by the group that would meet the next two days. NCFS contracted with retired FBI and United States Fire Administration (USFA) personnel to act as technical managers to assist the various committees. Mr. Steve Allen (FBI) was the technical manager for fire debris related subcommittees; Mr. Stuart Case (FBI) was the technical manager for explosives subcommittees [10]. Mr. Tom Minnich (USFA and Pennsylvania State Police) became technical manager for scene committees in 1999.

On August 11 & 12, 1998 NCFS invited numerous experts in fire and explosives from across the nation and Canada to come to Orlando, FL to form a new Technical Working Group for fire and explosion debris [11]. The invitees included many of the people who attended the National Needs Symposium in August 1997 as well as the people who worked on the NIJ scene guides. The original sponsors of this meeting were NCFS, the Bureau of Alcohol, Tobacco, and Firearms (BATF), the Federal Bureau of Investigation (FBI), UCF, and NIJ.

This was the first meeting of what would become T/SWGFEX. Dr. McGee appointed Mr. Carl Chasteen, Chief of the Florida Fire Marshal’s forensic laboratory, as the meeting facilitator to assist in running the meeting. At this initial meeting, there were various guest lecturers to discuss how a Technical Working Group functioned and how Guidelines were promulgated. During the facilitator led session, the group sub-divided into working committees (selecting chairs and members). Once these initial subcommittees were formed, they met individually to begin working on proposals to address the eleven “solutions” that came out of the National Needs Symposium [12].



The earliest task for the new group was to determine the status of forensic science as it related to fires and explosions. To this end the national laboratory survey that was discussed by the chairs on July 13, 1998 was assembled, completed, and sent out in early 1999.

The survey consisted of fifty-six questions grouped into five sections:

- Demographics
- Job Descriptions
- Education and Training
- Analytical Protocols
- General information

It was sent to over 600 analysts in the United States and Canada. A total of 216 surveys were returned (35%). The demographics revealed a wide participation in the survey. Small and large laboratories; rural and suburban laboratories; and federal, state, and local laboratories provided responses. A copy of the report to this survey is found in the Documents section of the TWGFEX website, www.twgfex.org. TWGFEX used the responses to further develop the plans for its committees on products they could develop that would assist analysts in fire debris and explosions [13].

Also in 1998 the scene experts in TWGFEX began working on a similar survey for field investigators that was sent out in late 1999. Rather than sending the survey to individuals it was distributed to professional organizations requesting that their members complete and return the survey. The organizations included the International Association of Arson Investigators (IAAI), the National Association of Fire Investigators (NAFI), the National Association of State Fire Marshals (NASFM), and the International Association of Bomb Technicians and Investigators (IABTI). The response in 2000 was significant with 422 surveys returned. Again, as with the analytical committees, the TWGFEX scene committees used the responses to further develop the plans for its committees on products they could develop that would assist analysts in fire debris and explosions [14].

In June, 1999, Dr. William McGee was replaced as Director of NCFS by Ms. Carrie Whitcomb formerly with the United States Postal Service Laboratory (USPS) [15]. Before then and since TWGFEX has created products for the forensic community and hopes to be able to continue to do so for the foreseeable future. They have produced recommendations for standards development which they submitted to the American Society for Testing and Materials for development into national consensus standards. The ignitable liquids database committee was formed and has since developed one of TWGFEX's most recognized products, the Ignitable Liquid Reference Collection and Repository, <http://ilrc.ucf.edu/>. Additional databases have been created for substrate/matrix items that contribute background interferences in fire debris analysis, and a smokeless powders database.

TWGFEX members helped in the planning design and execution of a specialized class on Organic Chemistry for the Fire Debris Analyst in 2000. Training guidelines for fire debris analysts and job



descriptions for explosives examiners were developed and posted. Other TWGFEX members were working to develop a class in post-blast investigations and fire dynamics for the arson investigator.

In 2000 the plans for a 2001 symposium dedicated to fire and explosion analyses and investigation was conceived. The first TWGFEX symposium was held from August 15 through 17, 2001 with over 120 laboratory analysts and scene investigators in attendance. Fewer than half the attendees were TWGFEX members. The overall critiques were quite positive with the most common complaint that we had separated the sessions too much.

There were general sessions to report on the progress of the various TWGFEX committees. The closing session was presented by former FBI Agents on the Investigative, Analytical, and Legal aspects of the Unabomber case that they worked on. The remaining sessions were divided into three topical areas. The three areas were Fire Debris Analysis, Explosives Analysis, and Scene Investigations. Each area presented workshops and papers. Attendees were free to choose a session or paper to attend. The difficulty for attendees was in deciding which area/paper to attend as some of the most interesting topics were offered at the same time.

The quality of the sessions and papers were quite high. Examples include:

Dr. Marvin Johnson, formerly of Philips Petroleum Corp. spoke about the petroleum refining process. Dr. Johnson holds over 200 domestic and foreign patents in petroleum refining and invented many of the processes used by the industry.

Mr. John Capers from Austin Powders spoke on the development and manufacturing of smokeless powders.

Mr. Mike Donohue from BATF spoke about the safety aspect of scene investigations.

Mr. Dan Madrzykowski of the National Institute of Standards and Technology presented a workshop on Fire Scene Modeling.

The comments received were sufficiently positive that we planned additional symposia in the following years.

By 2002, the funding for TWGFEX had begun to decline. NIJ could not provide the same level of funding as it had previously. UCF could not afford to cover the discrepancy so TWGFEX approached BATF with a proposal for the agency to assist with funding. While this source of funding was only successful in 2002 and 2003, it allowed us to continue with annual meetings and symposia.



At that time we were also challenged to better define our two basic groups of scene investigators and laboratory analysts. This was prompted both as a funding issue and because most working groups had dropped the term “technical” in favor of the term “scientific”. We made a modification to our By-Laws that designated the umbrella organization which included both analysts and investigators as TWGFEX while the various laboratory analysts committees were designated as the Scientific Working Group on Fires and Explosions (SWGFEX). While this portion of the organization is what is commonly referred to as a SWG, the unique character of the organization where both non-scientists (mostly working in scene investigations) as well as scientists (working in the labs) has prompted us to publicly call ourselves the Technical and Scientific Working Groups on Fire and Explosions (T/SWGFEX).

As funding continued to be an issue, T/SWGFEX reduced to one meeting per year where the executive board, the chairs, and the members met over one to two days. Most committee assignments and work was coordinated electronically by the subcommittee chairs. The annual meetings would be combined with the TWGFEX Symposia from 2003 through 2006. There was no annual meeting or symposium in 2007. In 2008, the National Institute of Standards and Technology (NIST) stepped forward to fund a limited annual meeting where all officers, subcommittee chairs and vice chairs, as well as selected members were able to attend. At that time an initiative to develop the smokeless powders database similar to the ignitable liquids database was defined. A major re-write to our By-Laws was accomplished at the meeting.

In 2009, NCFE received a grant from NIJ to develop five hybrid web courses in Fire Debris Analysis, Organic Chemistry for Fire Debris Analysts, Explosives Analysis, Fire Dynamics, and Post blast bombing Investigations. The majority of these courses were taken by selected students online over four months then culminated with a one to two day classroom component. They were able to leverage the funding for the classroom meetings with funding from UCF to have a limited annual meeting of a few T/SWGFEX members and a one day symposium in addition to the hybrid course classroom sessions.

There was no funding for a T/SWGFEX annual meeting or symposium in either 2010 or 2011. For 2012 NIST has again stepped forward to fund a limited annual meeting where all officers, subcommittee chairs and vice chairs, as well as selected members will attend in December. Currently in the planning process for discussion and approval at this meeting are this history, a code of ethics, and a comprehensive glossary of terms related to fire and explosion investigations and analyses.

A complete listing of all T/SWGFEX products 1998 to 2012:

TWGFEX Reference Library

Responder Safety- Hydrogen Sulfide Gas (H₂S) Suicides on the Rise: [Responder Guide](#)
(Responders who fail to take proper precautions can quickly become victims themselves)



Published Guidebooks:

[Fire and Arson Scene Evidence](#)
[A Guide for Explosion and Bombing Scene Investigation](#)

Action Items Passed by TWGFEX:

[Standard for Archiving Ignitable Liquids in Extracts from Fire Debris Samples](#)
[Instructors' Training Curriculum Guide to: A Guide to Explosives and Bombing Scene Investigation](#)
[Glossary](#)
[Explosive Analyst Job Position](#)
[Explosive Analyst Training](#)
[Scene Procedures Draft 1](#)
[Scene Procedures Position 1](#)
[Scene Procedures Position 2](#)
[Guide for Identification of Intact Explosive](#)
[Fire Debris Analysis QA Guide](#)
[Fire Debris Training Modules](#)
[Systematic Approach Guide](#)
[Recommended Guidelines for Forensic Identification of Post-Blast Explosive Residues](#)
[SWGFEX Report Writing Guide](#)

Reference Bibliographies:

[Analysis and Detection of Explosives](#)
[Contamination and Limitations in Fire Debris Analysis](#)

Survey Results:

[Scene Survey Results](#)
[Scene Survey Final Version](#)
[Scene Survey Results Report](#)
[Lab Survey Results](#)

National Needs Assessment:

[2007-2008 National Needs Assessment for the Near and Long Term Future of Fire Debris and Explosives Analysis and Investigation](#)



Databases:

[Ignitable Liquids Reference Collection \(ILRC Database\)](#)

[Substrate Database](#)

[Smokeless Powder Database](#)

T/SWGFEX continues to operate through electronic media for the most part. When there are opportunities to fund individual committees for separate meetings, as is done with the ignitable liquids reference committee, T/SWGFEX seizes the opportunity. However, experience has taught us that the most efficient method to producing a standard, guide, article, or product requires both approaches: electronic communications coordinated by the subcommittee chair followed by a one or two day face-to-face meeting where all the concerns can be resolved to create the best consensus.

The current working subcommittees of T/SWGFEX:

Active Scene Committees:

Education/Training

Mission Statement: To develop relevant fire and explosive investigation training guidelines consistent with recognized national standards and protocols, to meet the needs of the fire investigative community.

Job Requirements and Certification Protocols

Mission Statement: To review and develop best practices which address the investigation of fires, examine and comment on job requirements and certifications of fire investigators.

Scene Protocol Committee:

Mission Statement: To identify and catalog the standards, protocols, references, and guides that are currently in use for fire, arson, and explosion scene investigations. Further, to publicize information about such documents and facilitate public safety personnel's use and understanding of such documents.

Fire Modeling Database:

Mission Statement: To gather valid materials properties data to disseminate to a materials database, for use by a multi-discipline group, that provides physical and mathematical interpretation of pre and post fire scenarios.

Active Laboratory Committees:

Explosives Education and Training

Mission Statement: To identify and develop, where necessary, training guides and materials for



current and future explosive lab analysts incorporating traditional and emerging methodology and responding to new challenges facing the forensic community.

Explosives Database

Mission Statement: To identify and develop online databases that may be useful to forensic explosives analysts and investigators.

Explosives Standard Protocols

Mission Statement: To describe standard laboratory analytical protocols, emphasizing best practices

Fire Education and Training

Mission Statement: To assist and guide the forensic science community in the training of aspiring fire debris analysts by developing training materials that ensure comprehensive coverage of all aspects of fire debris examination.

Ignitable Liquids Database

Mission Statement: To manage the development and continued enhancement of an ignitable liquid database, a substrate database, and an ignitable liquid product repository that are easily accessible, searchable, and downloadable resources for fire debris examiners.

Fire Standard Protocols

Mission Statement: To advance the practices of forensic laboratories in the examination and analysis of evidentiary samples associated with fire investigations.

Standing Committees:

Executive Committee

Provides executive guidance to the officers of T/SWGFEX and when necessary can provide tentative approval for items that will eventually have to go before the whole membership for approval.

Membership Committee

Reviews, investigates, and approves membership applications for individuals wishing to join T/SWGFEX

Communications Committee

Reviews, researches, and recommends methods for better communication between T/SWGFEX members.



Research Committee

Searches for potential research areas that t/SWGFEX and its members may be able to support.

By-Laws Committee

Review and recommends changes to the organization's By-Laws and Procedures based on stakeholder and member feedback.

Symposium Committee

Plans symposia (topics, speakers, logistics) in the years when funding is available

Chairs and Vice-Chairs of T/SWGFEX and their terms:

1998

Facilitator: Carl Chasteen

1998 to 2000

Carl Chasteen, Chair

Wayne Petrovich, Vice Chair

2000 to 2004

Carl Chasteen, Chair

J. Ron McCardle, Vice Chair

2004 to 2008

Jamie Crippin, Chair

Clyde Liddick, Vice Chair

2008

Carl Chasteen, Interim Chair

2008 - 2012

Dennis Hilliard, Chair

Carl Chasteen, Vice Chair



References Cited:

1. Amended Grant Proposal for NIJ dated December 20, 1996.
2. NCFS Background pamphlet from 1997
3. Letter to Carl Chasteen from Dr. William McGee thanking him for coming to the opening
4. Letter from William McGee announcing selection as a participant in the National Needs Symposium
5. Report on the National Needs Symposium by Carl Chasteen submitted to the State of Florida Division of State Fire Marshal dated September 9, 1997
6. National Needs Symposium Schedule
7. Minutes of TWG Chairs at NCFS 07/13/1998
8. Letter from Ms. Kathleen Higgins, Director of NIST/OLES announcing publication of guides.
9. T/SWGFEX website, www.twgfex.org
10. Minutes of TWG Chairs at NCFS 11/9/1998
11. Letter of invitation from NCFS announcing the formation of a TWG and preliminary plans.
12. Schedule of Activities for the meeting on April 6 & 7, 1998.
13. Results of TWGFEX Laboratory Survey
14. Results of TWGFEX Scene Survey
15. Minutes of TWGFEX Chairs and Advisory Board at NCFS 04/26/1999