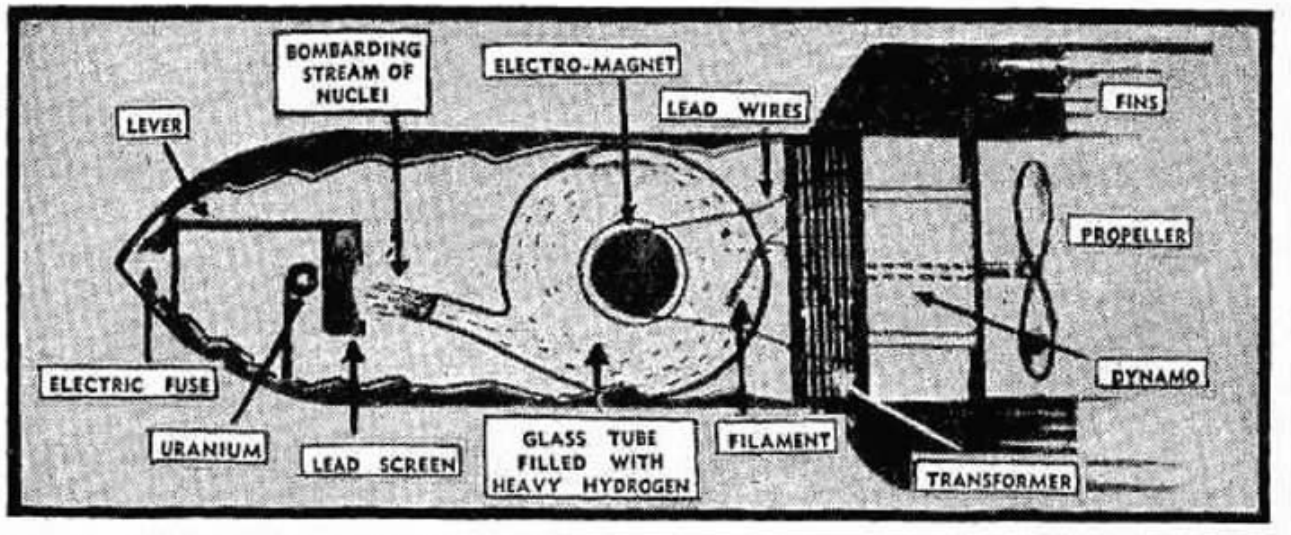
Atomic Detectives:
Science Behind International Efforts to Combat Nuclear Terrorism

"From Domestic to International Nuclear Forensics"



Domestic Nuclear Forensics

Role of the FBI in domestic nuclear forensics

- Lead investigation
- Collect, package, & ship evidence
- Conduct analyses
  - To determine nature of the radiological & nuclear material
  - To identify persons & places associated with the material
- Issue report on findings

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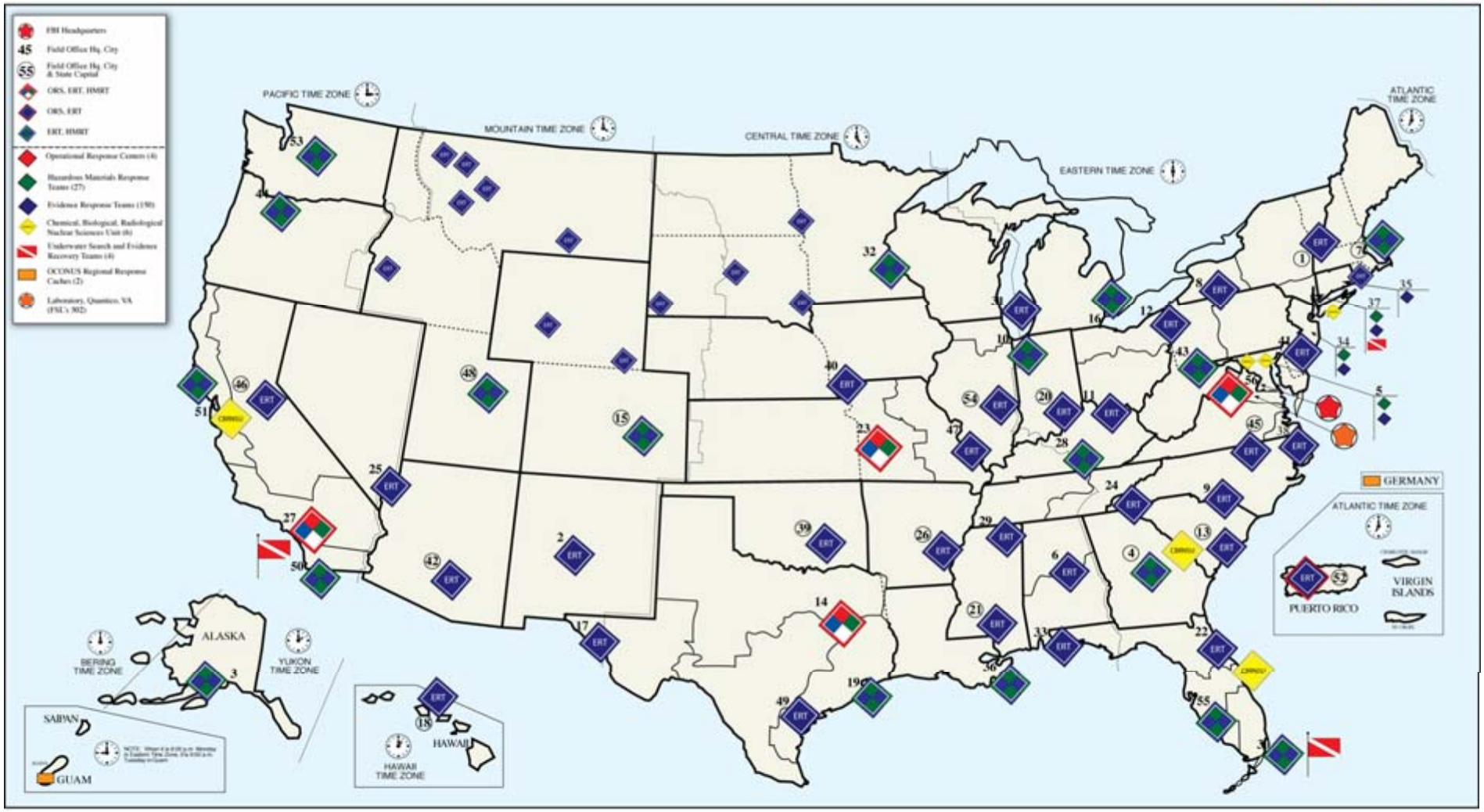
Role of the FBI Laboratory

FBI LABORATORY OPERATIONAL RESPONSE ASSETS



FIELD OFFICES — *Evidence Response Teams (BLUE)* — *Hazardous Materials Response Teams (GREEN)* — *Underwater Search and Evidence Recovery Teams (RED)* — *Laboratory (ORANGE)*

1. ALBANY	8	11. CINCINNATI	16	21. JACKSON	8	31. MILWAUKEE	16	41. PHILADELPHIA	24 24	51. SAN FRANCISCO	32 16
2. ALBUQUERQUE	24	12. CLEVELAND	24	22. JACKSONVILLE	16	32. MINNEAPOLIS	16 8	42. PHOENIX	32	52. SAN JUAN	24
3. ANCHORAGE	8	13. COLUMBIA	16	23. KANSAS CITY	24 8	33. MOBILE	8	43. PITTSBURGH	24 8	53. SEATTLE	24 8
4. ATLANTA	24 8	14. DALLAS	32 24	24. KNOXVILLE	16	34. NEWARK	32 16	44. PORTLAND	16 8	54. SPRINGFIELD	8
5. BALTIMORE	24 16	15. DENVER	24 8	25. LAS VEGAS	16	35. NEW HAVEN	16	45. RICHMOND	16	55. TAMPA	16 8
6. BIRMINGHAM	8	16. DETROIT	24 16	26. LITTLE ROCK	16	36. NEW ORLEANS	24 8	46. SACRAMENTO	24	56. WASHINGTON, DC.	40 32 12
7. BOSTON	32 16	17. EL PASO	24	27. LOS ANGELES	40 24 12	37. NEW YORK	40 32 12	47. ST. LOUIS	16		
8. BUFFALO	24 8	18. HONOLULU	16	28. LOUISVILLE	16 8	38. NORFOLK	8 8	48. SALT LAKE CITY	16 8		
9. CHARLOTTE	24	19. HOUSTON	32 8	29. MEMPHIS	16	39. OKLAHOMA CITY	16	49. SAN ANTONIO	24		
10. CHICAGO	40 16	20. INDIANAPOLIS	16	30. MIAMI	40 16 12	40. OMAHA	16	50. SAN DIEGO	24 8		

ERT TOTALS	1200
HRMT TOTALS	368
USERT TOTALS	48
COMBINED LABORATORY FORENSIC EXPERTISE	502

FBI's program in nuclear forensics

- Emphasis on:
  - Use of validated methods
  - Demonstrated and documented competencies
  - Use of certified reference materials
  - Access to databases and comparison samples

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"Pillars of Forensic Science" – Necessary but not sufficient conditions for a reliable and defensible forensics capability

First – But not in Quantico!

- FBI cannot examine evidence containing radiological or nuclear materials at our laboratory in Quantico, Virginia

Therefore, we rely on Partner Laboratories

SRNL
SAVANNAH RIVER NATIONAL LABORATORY
TM

2010 Ribbon-cutting for the FBI's Radiological Evidence Examination Facility (REEF) at SRNL

Challenges we face: How to examine evidence containing radiological or nuclear materials

How does one conduct tradition forensic examinations, such as lifting fingerprints, using optical microscopy, or swabbing for DNA if the evidence is confined to a radiation hot cell?

Solutions


SCIENTIFIC WORKING GROUP
CHEMICAL, BIOLOGICAL, RADIOLOGICAL & NUCLEAR TERRORISM


HAZARDOUS EVIDENCE ANALYSIS TEAM
HEAT
FBI LABORATORY

SWGCBRN publications

Quality Assurance Guidelines for Laboratories Performing Forensic Analyses of Radiological Materials

The Scientific Working Group on the Forensic Analysis of Chemical, Biological, Radiological and Nuclear Terrorism (SWGCBRN)

Contact: Benjamin Garrett, FBI Laboratory, 2501 Investigation Parkway, Quantico, Virginia, 22135

Draft dated August 10, 2006; finalized February 12, 2009; approved April 20, 2009

Preface

The Scientific Working Group on the Forensic Analysis of Chemical, Biological, Radiological and Nuclear Terrorism (SWGCBRN) was formed from the merger of three Scientific Working Groups: Scientific Working Group for the Forensic Analysis of Chemical Terrorism (SWGFACT), Scientific Working Group for Microbial Genetics and Forensics (SWGMGF), and Scientific Working Group for the Forensic Analysis of Radiological Materials (SWGFARM). It is the intent of SWGCBRN to provide guidance to all laboratories performing forensic analysis of CBRN materials. SWGCBRN offers the following guidelines, which were developed by SWGFARM.

SWGCBRN publications

Best Practices for the Collection of Chemical, Biological, Radiological or Nuclear Evidence

The Scientific Working Group on Forensic Analysis on Chemical, Biological, Radiological, and Nuclear Terrorism (SWGCBRN)

Contact: Benjamin Garrett, FBI Laboratory, 2501 Investigation Parkway, Quantico, VA 22135

Scope/Terms and Definitions/CBRN Evidence Collection Process/Packaging CBRN Evidence for Transport/Final Survey/Supporting Literature/ Contributors

Draft dated June 1, 2009; Finalized June 3, 2009; Approved June 20, 2009

Preface

The Scientific Working Group on the Forensic Analysis of Chemical, Biological, Radiological, and Nuclear (CBRN) Terrorism is a professional forum for collaboration among federal, state, local, and international government experts as well as academic and private sector scientists. The SWGCBRN is focused on the development of guidance for operational issues specific to forensic activities associated with CBRN materials. The SWGCBRN task group on Collection of CBRN Evidence has developed this *Best Practices for the Collection of CBRN Evidence* document to support the design and implementation of CBRN evidence collection activities.

SWGCBRN publications

Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science
Volume 8, Number 4, 2010 © Mary Ann Liebert, Inc.
DOI: 10.1089/bsp.2010.0023

Planning for Exercises of Chemical, Biological, Radiological, and Nuclear (CBRN) Forensic Capabilities

Dennis Reutter, Steven E. Schutzer, Charles M. Craft, Jacqueline Fletcher, Frederick L. Fricke, Scott A. Holowachuk, Rudolph C. Johnson, Paul S. Keim, James L. Pearson, Robert W. Sibert, and Steve Velsko

A forensic capability to help identify perpetrators and exclude innocent people should be an integral part of a strategy against terrorist attacks. Exercises have been conducted to increase our preparedness and response capabilities to chemical, biological, radiological, and nuclear (CBRN) terrorist attacks. However, incorporating forensic components into these exercises has been deficient. CBRN investigations rely on forensic results, so the need to integrate a forensic component and forensics experts into comprehensive exercises is paramount. This article provides guidance for planning and executing exercises at local, state, federal, and international levels that test the effectiveness of forensic capabilities for CBRN threats. The guidelines presented here apply both to situations where forensics is only a component of a more general exercise and where forensics is the primary focus of the exercise.

HEAT

FBI & Domestic Nuclear Forensics

- FBI has the lead for investigations requiring application of nuclear forensics
  - Goal of nuclear forensics is to link people, places and events in a manner that could withstand legal scrutiny
    - Nuclear Forensics supports attribution
    - Other inputs to attribution include investigation information and intelligence reporting

FBI & Domestic Nuclear Forensics

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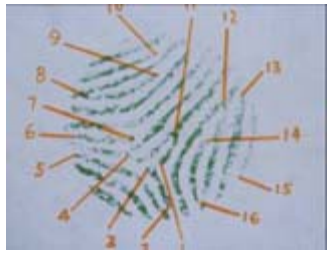
  - Goal of nuclear forensics is to link people, places and events in a manner that could withstand legal scrutiny
  - Ability to exclude is critical
    - Data bases are essential to making associations (both inclusions and exclusions)



FBI & Domestic Nuclear Forensics

- FBI has the lead for investigations requiring application of nuclear forensics
- FBI relies on US government partners for laboratory infrastructure and critical subject area expertise
  - DHS/DNDO/NTNFC, DoD, DOE, SRNL, LLNL, NNSS, and others are key partners

FBI & Domestic Nuclear Forensics

- FBI has the lead for investigations requiring application of nuclear forensics
- FBI relies on US government partners for laboratory infrastructure and critical subject area expertise
- FBI has elected to conduct traditional forensic exams with minimal or no removal of radiological contamination from evidence
  - HEAT ensures we have a cadre of competent, qualified examiners + validated methods

FBI & International Nuclear Forensics

International engagements

- FBI benefits by (among other things)
  - Sharing our "Best Practices", especially through publications and presentations
    - Sharing can enhance admissibility and defensibility of methods when presented at trial
  - Refining our laboratory methods based on experiences of international partners
    - We profit by the Lessons Learned by the work of others, such as ANSTO, AWE and RCMP
  - Building our network of collaborators

International engagements

- International community might benefit by
  - Gaining insights into the law enforcement dimensions of nuclear forensics
    - Law enforcement should be engaged in any incident or event involving radiological or nuclear materials outside of regulatory control
  - Exploiting methods and practices developed by the FBI, especially with regard to evidence collection and the conduct of traditional forensic examinations

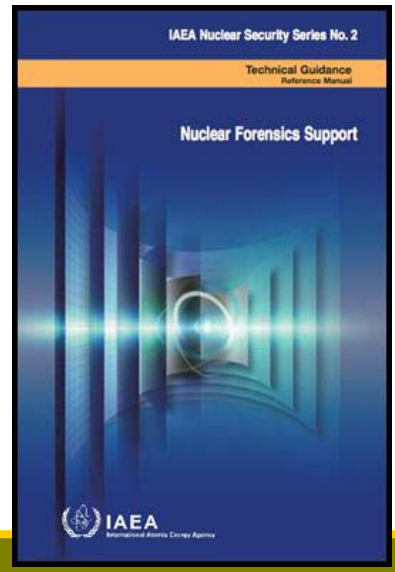
FBI is engaging with…

- Global Initiative to Combat Nuclear Terrorism
  - FBI is participating in the initiation of the Nuclear Forensics Working Group under the GICNT

FBI is engaging with…

- Global Initiative to Combat Nuclear Terrorism
- International Atomic Energy Agency
  - FBI has aided in developing & conducting "Radiological Crime Scene Management and an Introduction to Nuclear Forensics" training course
  - FBI is contributing to revisions of IAEA Nuclear Security Series #2, *Nuclear Forensics Support*

IAEA
International Atomic Energy Agency



FBI is engaging with…

- Global Initiative to Combat Nuclear Terrorism
- International Atomic Energy Agency
- INTERPOL
  - FBI Supervisory Special Agent manages overall CBRN Programme in Lyon, France
  - FBI is aiding the development of an RN Programme (to be inaugurated in May)

FBI is engaging with…

- Global Initiative to Combat Nuclear Terrorism
- International Atomic Energy Agency
- INTERPOL
- NATO

FBI is engaging with…

- Global Initiative to Combat Nuclear Terrorism
- International Atomic Energy Agency
- INTERPOL
- NATO
- Nuclear Forensics International Technical Working Group
  - Co-chaired by FBI Laboratory Senior Scientist
  - SWGCBRN documents posted onto ITWG Website

Questions?

Contact information:

Ben Garrett

FBI Laboratory

Quantico, Virginia, USA

Benjamin.Garrett@ic.fbi.gov

+1-703-632-7929