

***Radioactive Air Sampling Methods: (“The Book”)***  
**2008 Progress Report**

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**R&D Environmental Health & Safety, Wyeth Research**

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**NIOSH - Centers for Disease Control**

**April/May, 2008**

**20<sup>th</sup> AMUG Meeting**

**Las Vegas Nevada**

**Wyeth**  
Research

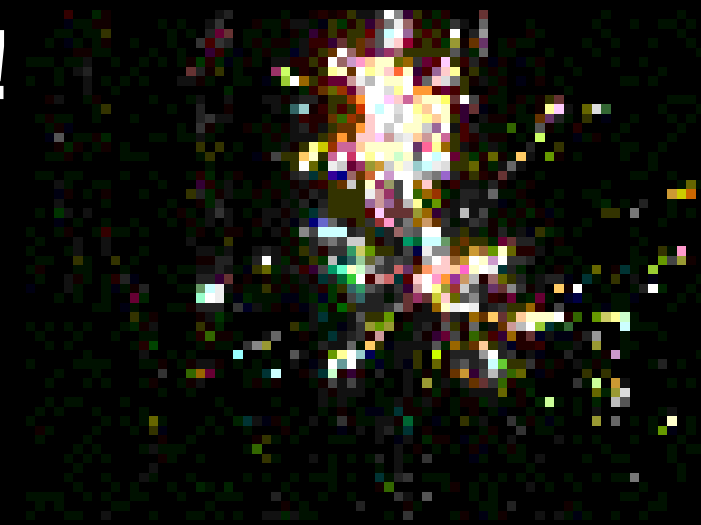
# Congratulations to the Air Monitoring User Group



XX

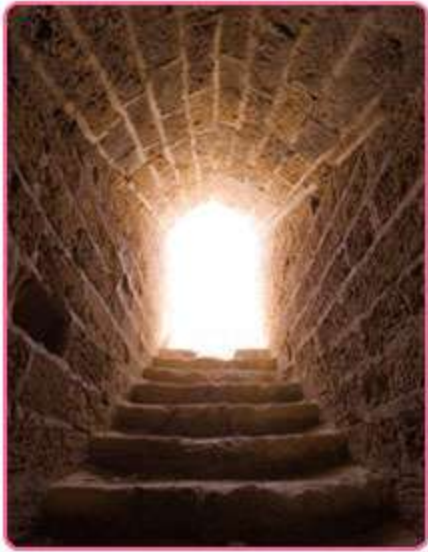
20<sup>th</sup> Annual  
Meeting !

*Apr 29 to  
May 1, 2008  
Las Vegas, NV*



# Have We Made Progress On the Book? Yes. Are We Finished? No.

But, We Can See The Light At the End of the Tunnel



I hope it's not the oncoming 5:42...








[www.macksimpson.com/.../images/octobertrain.jpg](http://www.macksimpson.com/.../images/octobertrain.jpg)

# Progress on the Book Continues

## Book Components

### Part I - Objectives, Safety Issues, Standards, and a Methods Development Approach for Sampling Airborne Radioactivity

-  *Chap 1 - Objectives for Sampling Airborne Radioactivity – Mark D. Hoover & Mark L. Maiello* **DRAFT**
-  *Chap 2 - Radiation Safety Issues for Air Sampling – Mark L. Maiello & Mark D. Hoover* **DRAFT**
-  *Chap 3 - Standards, Guidelines, Regulations, and Recommendations for Measuring Airborne Radioactivity – Mark D. Hoover, Morgan Cox, Cyndi G. Jones, Liliane Grivaud, Mark L. Maiello, Michelle L. Johnson, George J. Newton* **DRAFT**
-  *Chap 4 - Life Cycle Approach to Development and Application of Air Sampling Instruments and Methods – Mark D. Hoover & Morgan Cox* **DRAFT**

 = I have seen it!

# Progress on the Book

## Part II - Fundamentals of Radioactivity and Radioactive Aerosols

*Chap 5 - Review of Radioactivity, Detection and Measurement*

– Mark L. Maiello **FINAL R**



*Chap 6 - Aerosol Physics* – Erno Sajo **DRAFT**

*Chap 7 - Behavior of Radioactive Aerosols and Gases* – Mark D. Hoover



*Chap 8 - Principals of Filtration* – Mark D. Hoover



*Chap 9 - Radon and Radon Decay Product Issues For Radioactive Air Sampling*  
– Philip Jenkins **DRAFT**

*Chap 10 - Internal Dosimetry of Inhaled Radioactive Aerosols*

– Charles A. Potter **FINAL R**




= “The Goose Egg” (zero; nothing seen yet)

# Progress on the Book

## Part III - Fundamentals of Sampling System Design and Operation for Airborne Radioactivity

*Chap 11 - Basic Air Sampling Equipment – Mark L. Maiello* **FINAL R**

 *Chap 12 - Calibration of Air Sampling Equipment – James T. Voss and Jeffrey J. Whicker* **DRAFT**

*Appendix – Calibration of Rotameters – Mark D. Hoover*



*Chap 13 - Principles for Air Sampler Placement in the Workplace – Jeffrey J. Whicker* **FINAL R**

*Chap 14 - The Practice of Continuous Air Monitoring for Alpha-Emitting Radionuclides – John C. Rodgers* **FINAL R**

*Chap 15 - Principles for Sampling Airborne Radioactivity from Stacks – John Glissmeyer* **FINAL**

*Chap 16 - Other Aerosol Characterization Techniques – Mark D. Hoover*



# Progress on the Book

## Part IV - Non-Routine Radioactive Air Sampling

*Chap 17 - Emergency Situation Air Sampling – Robert B. Hayes* **FINAL R**

*Appendix First Responder Radiological Monitoring - Thomas F. O'Connell and Stephen Clendenin* **FINAL**

*Chap 18 - Monitoring Nuclear Fallout – Harold Beck* **FINAL**

*Chap 19 - Air Sampling In Extreme Environments – Mark D. Hoover*



*Appendix – Radionuclide Characteristics – Mark Maiello* **FINAL R**

*Glossary – Mark Maiello and Morgan Cox* **FINAL R**

# Progress on the Book Continues

## Part V - Example Air Sampling Methods for Airborne Radioactivity

*Introduction to the Methods*

*Method 1 - Gross Alpha* FINAL R

*Method 2 - Gross Beta* FINAL R

*Method 3 – Tritium* FINAL R

*Method 4 - Tritium Oxide* FINAL R

*Method 5 - Carbon 14* FINAL R

*Method 6 - Iodine* FINAL R

*Method 7 - Gamma-Emitting Isotopes* FINAL R

 *Method 8 - Radon* ADDITIONAL MATERIAL TO BE ADDED (SOLID STATE)












*Method 9 - Plutonium* FINAL R

*Method 10 – Personal Air Sampling* FINAL R



# The Push Forward

## Summary Of Chapters To Be Completed

1.  **Chap 1** - Objectives for Sampling Airborne Radioactivity – Mark D. Hoover & Mark L. Maiello **DRAFT**
2.  **Chap 2** - Radiation Safety Issues for Air Sampling – Mark L. Maiello & Mark D. Hoover **DRAFT**
3.  **Chap 3** - Standards, Guidelines, Regulations, and Recommendations for Measuring Airborne Radioactivity – Mark D. Hoover, Morgan Cox, Cyndi G. Jones, Liliane Grivaud, Mark L. Maiello, Michelle L. Johnson, George J. Newton **DRAFT**
4.  **Chap 4** - Life Cycle Approach to Development and Application of Air Sampling Instruments and Methods – Mark D. Hoover & Morgan Cox **DRAFT**
5.  **Chap 6** - Aerosol Physics – Erno Sajo **DRAFT**
6.  **Chap 7** - Behavior of Radioactive Aerosols and Gases – Mark D. Hoover **NO FIRST DRAFT**
7.  **Chap 8** - Principals of Filtration – Mark D. Hoover **NO FIRST DRAFT**
8.  **Chap 9** - Radon and Radon Decay Product Issues For Radioactive Air Sampling – Philip Jenkins **DRAFT**
9.  **Chap 12** - Calibration of Air Sampling Equipment – James T. Voss and Jeffrey J. Whicker **DRAFT Appendix** – Calibration of Rotameters – Mark D. Hoover **NO FIRST DRAFT**
10.  **Chap 16** - Other Aerosol Characterization Techniques – Mark D. Hoover **NO FIRST DRAFT**
11.  **Chap 19** – Air Sampling in Extreme Environments – Mark D. Hoover **NO FIRST DRAFT**

# Status of Mark Hoover's Chapters

as of 4-24-08

- Ch 1. Sampling Objectives - (80% complete)
- Ch 3. Standards - Recommendations - (95%)
- Ch 4. Instrumentation Lifecycle - (85%)
- Ch 8. Filtration - (70%)
- Ch 16. Other Characterization Techniques (50%)
- Ch 19. Air Sampling In Extreme Environments (15%)
- Rotameter Calibration Appendix (?)

# So Yes, We Can See The Light At the End Of The Tunnel, But It's Not As Pretty As I Expected

- [Home](#) : [Blogs](#) : [Danny Thornton](#) : [The Mortgage & More Blog](#)



# We Need to Complete This Book!

- **It takes about 4 weeks in real time to read, edit, send-around to author for each chapter.**
- **With 10 chapters to complete, the means 10 more months before completion.**
  - ▶ Chapters 1 to 4 are nearly complete so these *should not* take 4 weeks each
- **Issues -**
  - ▶ There is the possibility that the material can get dated
  - ▶ There is the damage to our reputations: I've already heard too many comments from colleagues about how long this has taken
  - ▶ It takes 6 to 7 months from submission to publication (ages the material; could result in more delays if authors need to re-write)
  - ▶ Our publisher at CRC (Jill Jurgenson) first contacted us on Apr 12, 2005 (3+ years ago)
  - ▶ We are looking at a 2009 publishing date if we finish this year (material in the book is aging).

# The Push Forward

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- It is hard to write
- It is hard to find time
- It is purely *voluntary*
- But therein lies the beauty of it...and the idea that you are producing something of real value beyond the normal routine of our jobs
- Education – at that is what this is – is one of the wonderful things in life
- Give your writing some priority and importance

# Some Book Statistics

As Of 4/22/08

## Number of Contributors\*

- **Total: 27**
- **Chapter Authors: 15**
- **Method Reviewer/Writers: 10**
- **Book Reviewers: 2**

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\* **Not including Mark M. & Mark H.**

## Number of Figures

- **Total: 80**
- **All Chapters: 68**
- **Methods: 12**
- **Chapters with most figures:**
  - ▶ 15-Stack – Glissmeyer (18 Figs)
  - ▶ 18 –Fallout – Beck (13)
  - ▶ 10-CAM – Rodgers (10)
  - ▶ The rest have 9 or less each

# Some Book Statistics

As Of 4/22/08

## Number of Tables

- Total: **22\***

*\*includes Methods*

## Number of Pages

- **Chapters\*:** 369 manuscript = 184.5 printed pages
- **Methods:** 235 = 118 printed pages
- **Total:** 302 printed pages (more to come)
- **Longest Chapters**
  - ▶ 10-CAM- Rodgers (15,520 words, 55 pages of manuscript)
  - ▶ 5 – Radioactivity – Maiello (11,727w, 50p)
  - ▶ 11 –Air Sampling Equip – Maiello (9641w, 43 p)
  - ▶ 15-Stack – Glissmeyer (8,015, 45 p)
  - ▶ 18 –Fallout – Beck (7842w, 27p)
  - ▶ 13– Placement –Whicker (5611, 22 p)
  - ▶ 10-Dosimetry – Potter (4367, 16 p)

**\*includes Appendix & Glossary**

# Some Book Statistics

As Of 4/22/08

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## Definitions In Glossary

**280+** definitions



# CRC Press Website Listing

art/products/product\_detail.asp?sku=9717&isbn=9780849397172&parent\_id=702&pc=

**CRC Press**  
Taylor & Francis Group

Essential Information for the  
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- Engineering - General
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- Environmental Science & Engineering
- Engineering
- Ergonomics & Human Factors
- Food & Nutrition
- Forensics & Criminal Justice
- Healthcare
- Homeland Security
- Industrial Engineering & Technology

### Description



Home -> Environmental Science & Engineering -> Environmental Health

## Radioactive Air Sampling Methods

**Mark L. Maiello** *Wyeth Research, Pearl River, New York, USA*  
**Mark D. Hoover** *Morgantown, West Virginia, USA*

**Cover Available Soon**

**List Price:** £67.99  
**Cat. #:** 9717  
**ISBN:** 9780849397172  
**ISBN 10:** 0849397170  
**Publication Date:** 1/15/2009  
**Number of Pages:** 350  
**Availability:** Not Yet Published

  **CRC Press**

- Describes specific methods for sampling radioactivity in air
- Discusses methods for sampling radionuclides that result from natural sources, catastrophes, or industrial hazards
- Contains step-by-step methods for measuring airborne radioactive substances
- Includes information on sensitivity, possible interferences, and safety precautions for methods
- Provides tools needed to perform complete radiation safety analysis

Describing specific methods for sampling radioactivity in air, *Radioactive Air Sampling Methods* discusses radionuclides that are found in nature, develop as the result of a hazard during industrial operations, or appear in the aftermath of a catastrophe, such as iodine and noble gases from a nuclear reactor release. It contains step-by-step methods for measuring airborne radioactive substances, including information on sensitivity, possible interferences, and safety precautions for each method. It also provides tools needed to perform complete safety analysis. This text makes important material accessible for industrial hygienists, air quality experts, and health physicists.

### Related Titles

# Draft Cover

## RADIOACTIVE AIR SAMPLING METHODS



*Edited by  
Mark L. Maiello and Mark D. Hoover*



CRC PRESS

**An idea from  
Jenny May-Maiello  
USDHS/EML**

**Wyeth**  
Research

# Special Mention

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- **Reviewers**

- ▶ Dr. Hung Cheng Chiou, USDOE, WIPP
- ▶ Dennis Brown, Shaw Environmental, Denver

# The Light at the End of the Tunnel

## Fake Near Death Kit



A very bright light