Radiation Training for First Responders

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Overview

- Firefighter/fire department overview
- The Training
- Scenarios
- Future
- Conclusions
FD Overview
• Some time in the mid 2000’s Orange County obtained radiation detectors for all its fire departments
• In February 2019 WCFD Fire Chief asked UNC CH Fire Marshal about getting his radiation detector calibrated and possibly some radiation training for his firefighters.
• The Fire Marshal at the time referred him to me.
• After talking to the Fire Chief we agreed that a 3 hour training during one of their regular Monday night trainings would be the best approach.
Local FDs

- Chapel Hill
  - 5 Stations covering all of downtown Chapel Hill including UNC
  - ~80 full time staff
  - 1 Bicron Surveyor M with End Window Probe

- White Cross
  - 2 Stations covering an area West of CH
  - ~5 part time staff and 30 volunteers
  - 1 Bicron Surveyor M with End Window Probe

- New Hope
  - 2 Stations covering Parts of Chapel Hill and Orange County
  - ~15 part time staff and ~20 volunteers
  - 1 Bicron Surveyor M with End Window Probe

- Carrboro
  - 2 Stations covering Carrboro
  - ~40 full time staff
  - ???????
Three levels

1. Awareness (8 hrs)
2. Operations (32-40 hrs)
   - This is the level most FFs are trained to.
3. Technician (80-160 hrs)
Expectations

- Most firefighters are on the operations level. They should not touch the product.
- They identify and stabilize the situation, and wait for the nearest hazmat team (Durham) to arrive.
- They do participate in decontamination.
FF Encounters with Radiation

In reality, probably never but just in case:

- **UNC Campus** Many different isotopes, mostly in very small quantities
  - Irradiators
  - Cyclotron & Radiochemistry

- **Terrorism** A radiological dispersal device or improvised nuclear device in or near CH would ruin their day.

- **Reactor release** CH sits within 50 miles of the Harris Plant and has the potential for contamination from a release.

- **TRANSPORTATION** RAM going to and from places in UPS/FEDeX/Currier caught in a traffic incident.
Summary

- FFs are given an initial 40 hour hazmat training (upwards of 20 years ago)
- Initial training barely mentions radiation
- There is an annual 8 hour refresher
- They are likely never to encounter a radiation hazmat call
- They received radiation detectors with no training on how to use them
At the end of the day whether the firefighters are comfortable with radiation or not, they will still have to respond. My goal is to make them comfortable enough with radiation and their detectors that they see radioactive material as just another hazardous material.
The Training
What to Cover?

The material should be comprehensive, but not overwhelming. We only have three hours and it needs to stick.

- Try to make the FFs comfortable with their equipment and how it works
- Clear up misconceptions about the effects of radiation
- Give them the basic tools they need to respond to a radiation call
- Cancer
What to Cover? Fundamentals

- Fundamentals of Radiation
  - Atomic structure
  - Types of radiation
  - Identifying RAM
  - Exposure vs. dose vs dose equivalent
  - Activity
  - Prefixes

- Basics of Radiation Hazards
  - Stochastic vs. Deterministic
  - How much is a lot?
What to Cover? Safety

- Exposure & Contamination
- Time, Distance, Shielding
- Contamination Control
This was the main focus of the training. Getting the firefighters familiar and comfortable with using the detectors.

- Features, Limitations
- Detail their use
  - Calibration, Battery, Response
  - Listen, don’t look
What to Cover? Surveys
What to Cover? Encounters

- Daily, medical, in the FD
- How to ID a RAM package, a RAM lab (UNC)
- How to ID Isotope and Activity (1 or 2 letters and a number)
Open the floor early to any questions related to radiation

- I saw on Chernobyl ______. Is that true?
- What about x-ray machines?
- Will we get dosimeters?
- Why do they check for Radon in houses?
- If Kim Jung Un launches a nuke at NC, will this detector detect the blast?
Cancer is a hot topic in fire departments. According to NIOSH firefighters face a 9 percent increase in cancer diagnoses, and a 14 percent increase in cancer-related deaths, compared to the general population in the U.S.

A lot of money and effort is being spent to try to protect firefighters from exposure to carcinogens.

Radiation is a carcinogen. Radiation is also used to treat cancer.

I received a lot of questions about both.
What to Cover? Scenario

- You are dispatched to a vehicle collision involving a FedEx truck and another car. When you arrive command advises that the uninjured driver of the FedEx truck handed the first due Captain a hazardous goods declaration showing that he was transporting radioactive material (Cs-137). Hazmat is en route, but as a precaution command has asked your crew to survey the crew who first responded.

- You are dispatched to a structure fire in Marsico Hall at 1900. One of the labs on the third floor has a small fire on a lab bench. After the fire is extinguished a firefighter notices a radiation symbol on a fridge located under the lab bench. A call to the 24 hour number listed on the lab bench reveals that the lab uses P-32 although the PI does not know if any was being used that day. As a precaution the commanding officer has asked you to survey everybody who entered the lab.
Practicals

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FF Training

22/28
Results

- FFs received some radiation safety training
- FFs received hands on training on using actual equipment they carry
- FFs were able to ask any questions about radiation/RAM they had
- New turn back policies have been put into place (CHFD)
- New contamination policies have been put into place (CHFD)
- FDs know who to call if they have lingering radiation questions
Future Training

- Live or "live" contamination drill in a lab
- Live or "live" decontamination
What I learned

- KISS (Keep It Simple Steve)
- Keep the practicals practical and realistic
- Be prepared to answer any possible question about radiation
- Bring a source that pegs the meter
- Be available after the training
- Plan on going back (annually?)
At a joint training a few months later. . .
FF: Hey, you’re the radiation guy right?
Me: Yep, that’s me. What did you think of the training?
FF: It was really good, but I don’t think I remember any of it.
Me:. . .
Questions?