

Converting to SI: Practical Considerations for First Responder Training

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Practical Considerations: Training

General

- The change to SI calls for changes that range from trivial to more concerning.
- It is important to understand that first responders have a passing familiarity with classical radiation units. This is both good and bad.
 - **Good:** new first responders who learn SI only will be minimally affected
 - **Bad:** veterans memorize/associate numbers (in classical units) with effects. They will be considerably affected. Expect same conversion errors that the American scientific community made in Japan.
- Training in radiation science informs and affects the following:
 1. Internal to Agency Issues:
 - Interpreting instrument readouts (obvious)
 - Reporting results within a first response agency where familiarity with SI units will vary especially within transition period
 - Trainers will have to adapt to SI units and provide conversions for veteran responders
 2. Reporting results externally (in NYC to other city agencies, to City Hall, to Public Info Officers & media)
 - Need to be careful about being consistent w/ other city agencies because some report to public
 3. Higher probability for errors if the transition period is prolonged (best to get it over with!)



Practical Considerations: Training

Familiarity

Many first responders are not comfortable with Classic Units

- FDNY HAZMAT technicians & NYPD Emergency Services trained to deal w/ several hazards: radiation is but one
- Radiation and radioactivity are rarely encountered; less so than other hazards e.g., fire or electricity
- Training is usually the initial and sometimes only form of familiarity - not experience
- Training should be annual if OSHA 29CFR1910.120[q] is followed (but annual training which would include re-training on SI units leaves 364 days where radiation is not necessarily discussed or ever encountered)
- For new trainees, use of SI would not be detrimental; they would only learn SI
- Veterans would “learn” both



Practical Considerations: Training *Documentation*



- Internal FDNY and NYPD documentation use classic units
- External references use both units -
 - National Fire Protection Association 472 Edition 2017 and 1072 (due 2016) includes SI & conversion factors
 - International Association of Fire-Fighters documents:
 - Student manual uses classic units; w/ conversion chart.
 - Instructors currently discuss SI units but problems & examples use classic units
- New York City documents currently use classic units
 - Radiological Response and Recovery Plan
 - Community Reception Center (CRC) Field Guides
 - CRC Health and Safety Guidance
 - CRC Decontamination Plan
 - Field Guide for Safety Officers: Radiological Incidents
 - Internal documents of FDNY, NYPD, NYCEM, DEP
- An unfunded mandate that would require the SI change requiring local documents to be changed, reprinted, and redistributed has a high probability of being resisted

Practical Considerations: Training

Instrumentation



- Obviously: use of instruments is critical for training
- Digital readouts can be configured to read SI; ion chambers read out in mR/hr and would need to be replaced or if possible, have analog readout changed)
- Pulling out ion chambers from service presents problems:
 - Fast pull-out requires funding to replace the instruments
 - Pulling out of service over a prolonged period will potentially create confusion because SI & classic units used simultaneously
- PRDs can be reconfigured to read out in SI
- **Instrument Trainers: Those trained on classic units “most difficult to convert” This includes agency health physicists: P. A. Karam (NYPD) and M. Maiello (DOHMH) would also have to redevelop a “feel” for the measurements reported in SI**
- **NYC uses a Radiological Advisory Committee to advise DOHMH; RAC would have to be conversant in SI also**

Practical Considerations: Training

Reporting Up & Out - I



1. If SI adopted in US:
 - Report out to federal authorities will require SI Units
 - A **Radiological Operations Support Specialist (ROSS)** can convert to SI (if ROSS assigned to the incident)
2. Wireless reporting to the **Rad Responder** data-mapping platform:
 - Rad Responder records/displays (as a map) whatever unit is transmitted by the measurement device
 - Federal agencies can observe Rad-Responder maps & data (if SI mandated, they would desire SI unit data)
 - Rad-Responder adopted by FDNY (and in theory, NYC DOHMH and NYC DEP) to share survey data with other NYC agencies in an incident
 - Rad-Responder has NOT been adopted by NYPD (considered insecure data platform by NYPD standards)
3. Current NYC Responder Perception:
 - Do SI conversion at a higher level e.g., by state partners or federal ROSS (FDNY position)
 - Motive to use SI minimal if: Rad Responder not used &/or if data not shared outside jurisdiction



Practical Considerations: Training

Reporting Up & Out - II

- NYPD does not use Rad-Responder instead relying on a robust, secure custom-made data platform
 - Estimate NYPD system cost \$8 M to build
 - If NYPD adopts SI, the NYPD data platform would have to be modified to accommodate; \$\$ needed again (?)
- NYC collaborates with partner agencies such as those in the Secure the Cities (STC) initiative & with NY State agencies
 - A regional adoption of SI (w/ STC partners in NJ, CT, NYS, etc.) will need coordination
- NYPD (and other city agencies) have limited health physics expertise on staff
 - **If NYPD physicist is not available (e.g., in helicopter or reporting to incident), others would have to be trained to make measurement conversions to SI unless alternative provided (ROSS?)**





Practical Considerations: Training

Instrument Calibration

1. Commercial vendor-calibration not affected if SI adopted
 - Calibration certificates and calibration curves would be printed in SI units - No anticipated problems
2. NYPD has own calibration facility: saves NYC money & keeps instruments within the department (for security)
 - **Change to calibration spreadsheets and other paperwork needed**
 - **Physical calibration of instruments not affected by SI conversion**
3. No associated training issues with calibration
 - Training calibration staff to use SI not considered an issue
 - In rare cases, the calibration information on the certificates may be used for calculations or “back of envelope” assessments by personnel unfamiliar with SI units but usually the only person adept at this would be the NYPD health physicist

Practical Considerations: Training

Transport Accidents



1. For a transport accident response, the identification of the radionuclide, the activity and exposure rate from package labels are important
 - Since the shipping labels and placards use SI units, there is no “adoption of SI” issue
2. Measurements of radiation exposure also matter in an accident
 - First approach to a radiological transport accident requires measurements of exposure (even before the labels are examined)
 - If SI adopted, familiarity w/ SI would make exposure or contamination measurements easier to compare with label information (apples will be compared with apples)
 - Training: Transport accident training includes SI now and can be viewed as means (if limited) to help the transition process

Practical Considerations:

Training for Service in Community Reception Centers (CRCs)

In NYC, a joint venture between FDNY and DOHMH

1. Contamination Surveys -

- Pre-screening public with PRDs unaffected (PRDs are digital; can read out in SI) but responders need retraining to read SI and to interpret
- Portal Monitors used to survey public read out in cpm (do we report Bq?)
- Hand held devices read out in cpm - would need to reconfigure to cps (Bq)

2. CRC documents will need to be revised to use SI-units:

- CRC Base Plan
- CRC Field Guide
- CRC Health & Safety Plan

- All public rad-info documents that would be distributed at CRCs

3. DOHMH personnel training to operate in a CRC is about to start and now must consider use of SI



Practical Considerations:

Training for City-Wide Radiological Health & Safety Plan (HASP)



- Planning now to create a HASP for late phase (decontamination) operations post- Radiological Dispersion Device
- Plan is a framework for radiation safety of NYPD, FDNY, DEP and other agency personnel supporting decontamination of city infrastructure
- Training of agency safety specialists is anticipated; Issues affected by SI change:
 - Personnel exposure data
 - Contamination data of incident area and infrastructure
 - When plan implemented: Reporting to local partners and federal agencies

Practical Considerations: First Responder Training

Summary

Overlap period (SI and classic units used simultaneously) considered “vulnerable period”

- For reporting out, FDNY and NYPD data would have to be converted by knowledgeable expert (not necessarily within the agency)
- Rad-Responder complicates situation because it could be a window into the incident (SI would be expected)
- Expenses incurred to revise training and all relevant internal documents
- Must overcome confusion that new units may cause veteran responders
- Reporting internal to the City could become a potential problem (city agencies should coordinate and so should regional law enforcement departments in the “STC”)
- Could safety of first responders be compromised by the confusion? Potentially, yes - during the “overlap period.” Keep that period as short as possible; i.e. get responders & their HP experts trained on SI units ASAP
- Is adoption of SI do-able? Yes, over a hopefully short time but not without some “resistance” or some reporting out issues

