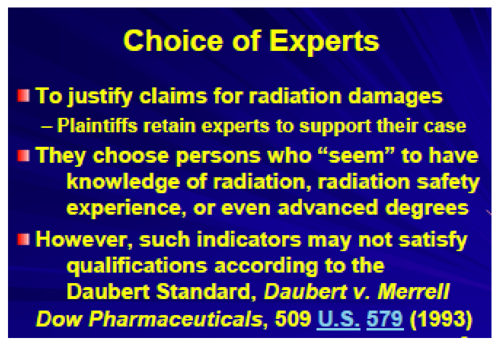
Radiation Safety Counseling News

November 7, 2016

Technical Presentations at HPS Mid-Year Meeting

Failures of Plaintiff's Experts in Radiation Litigation

February 3, 2016



To justify their claims for radiation related damages plaintiffs retain persons as experts who will support their case. They may chose persons who seem to have knowledge of radiation, radiation safety experience, or even advanced degrees. Unfortunately, these indicators may not adequately qualify a person as an expert according to the Daubert Standard (validated methods, peer reviewed, known errors, follows standards, and wide acceptance). A person may be an expert for some subjects but not necessarily in the topics central to the plaintiff's case.

For example, in a case claiming damages from exposures to elevated levels of radon, one of the plaintiff's experts had a PhD in toxicology and experience as a pulmonary pathologist, was a college professor, and sat on various advisory boards and panels. However, this expert got all of the information for his expert's report from public websites and did not refer to a single scientific publication. He was not a member of any professional radon organization, such as the American Association Radon Scientists and Technologists (AARST) or the HPS Radon Section. He also had never written or presented a paper on radon measurements or radon health risks. Using the result from a single radon measurement in an unoccupied basement, he proceeded to estimate a homeowner's risk from radon based on EPA estimates for lifetime exposures when the homeowner only lived in the house about seven months.

In an another case, the plaintiff's expert, retained to collect radon and NORM measurements, failed to follow EPA and AARST testing protocols for radon. He had no training for radon measurements and was not certified by any state or EPA as a radon measurement specialist. He assumed anyone could place activated charcoal detectors for radon. Although he owned a NaI detector and had done radiation measurements before, he failed to maintain uniform geometry in field measurements for NORM. He also did not understand that a NaI detector calibrated with Cs-137 will likely over respond to gamma rays attributed to Ra-226.

Both of these people had enough knowledge to sound like experts but they could not stand up to rigorous scrutiny. Lessons learned for anyone who may serve as an expert: 1) only offer expertise in areas of extensive experience and knowledge and 2) question whether what you say or do will be defensible in court. When unsure, seek confirmation from others who are well known experts.

A copy of Ray's presentation handout for this 15-minute Technical Paper presentation is available on his website at http://radiationcounseling.org/docs/Expert2016.pdf

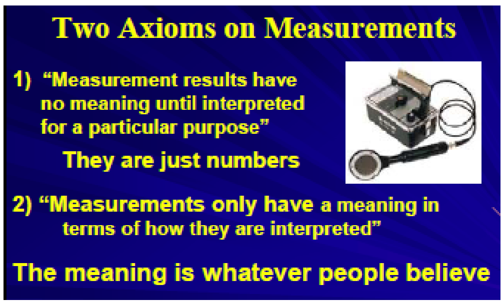
Is Your Radiation Instrument Telling You What You Think It Is?

February 3, 2016

Misunderstandings abound when it comes to the interpretation of radiation measurements. There are two key factors governing such interpretations:

1. measurements have no meaning until interpreted and
2. measurements only have meaning in terms of how they are interpreted.

Thus, recorded or reported radiation measurements have no inherent meaning by themselves, they are just numbers. Interpretation of radiation measurements may have as much to do with attitudes and perceptions of radiation risks as it does about technology. For example, a worker at an industrial facility observed the RSO taking readings with a Geiger counter and saw the meter go off scale. That was enough information for this worker to start an uproar that eventually involved several hundred other workers, the union, and management. Another worker at a food production facility heard a GM meter in use for surveying the installation of a new x-ray machine for product quality control. He raised concerns and when the company manager heard there was radiation in his facility, he told the x-ray company to remove their machine. This resulted in the loss of a $4 million sale for 20 x-ray machines.



Radiation safety specialists have the advantage for interpreting radiation measurements based on knowledge of comparative readings from background and other sources. Most people without this specialized knowledge do not know that we live in a sea of radiation which surrounds us all the time. Furthermore, a screaming Geiger counter may sound alarming, but radiation risks depend on many other factors, such as the type of radiation, the proximity of people, the duration of exposure, and dose actually delivered. A Geiger counter reading is only one piece of information which specialists would use for assessing potential risks. Unfortunately, all radiation measurements have many potential sources for errors which people may not know about and may therefore assume the measurements represent the real world. For interpreting radiation measurements, how much do we rely on technical understanding and how much or our interpretation is an emotional reaction regarding safety?

A copy of Ray's presentation handout for this 15-minute Technical Paper presentation is available on his website at http://radiationcounseling.org/docs/Instrument2016.pdf

How to Help a Person Frightened by Radiation

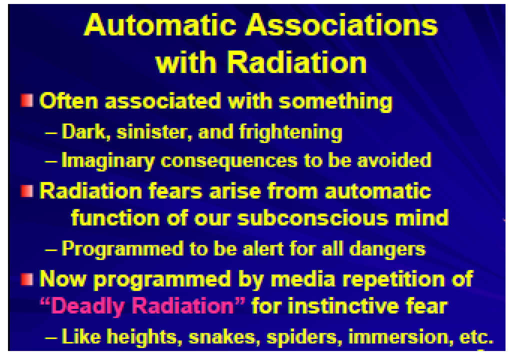
February 3, 2016

The word radiation is often associated with something dark, sinister, and frightening, and something to be avoided. Fears of radiation arise as an automatic function of our subconscious mind which is programmed to be constantly on the alert for dangers. Because of media repetition of the words "deadly radiation" for over 60 years, most everyone now has an instinctive fear of radiation similar to fears of heights, snakes, spiders, immersion, and loud noises. People may not know the consequences of radiation exposure, but instinctively feel for safety it should be avoided (better to be safe than sorry). Because fears of radiation are so common, in our work as specialists in radiation safety, we will encounter frightened persons and want to be helpful. What can we do?

Because of our understanding and acceptance of radiation we may want to tell the frightened person, "It's OK, you do not have to be afraid." While this may seem helpful, most frightened persons will tell you it is not, for several reasons. 1) Telling a fearful person not be afraid is discounting or making them wrong for their fears (psychologists know that fear is just a feeling and all feelings are OK). 2) Fears arise from subconscious processes that do not hear qualifiers. Thus, the subconscious does not hear the word "not." Instead the subconscious hears "be afraid." 3) Telling a person not to be afraid is inviting them to make a conscious decision (that it is OK) when the fear decision comes from subconscious processes that are not in the person's awareness. Psychologists call this confronting the subconscious and it is usually not helpful.

Perhaps the first step in helping a frightened person is to affirm, "It's OK to be afraid." You may find this response difficult if you believe the person's fears are not justified. Once a person hears their fears are OK, they may be ready to consider the question, "How fearful is appropriate for the circumstances?" This question will invite the frightened person to begin a conscious process for evaluating the basis of their fears (if they want to). The subconscious images supporting fears can be replaced by new images and information which a person accepts consciously. The best way for people to accept new information is for them to discover it themselves (not by us telling them our answers).

The best thing we can do is to serve as a resource for a frightened person to gain new insights on the safety of radiation. There are two possible ways to do this. 1) Have the person perform their own measurements of radiation. I do this by having them measure the signal from radioactive antiques and compare those measurements with the signal from sources of their concern (such as nuclear gauges or industrial x-ray). Invariably, they discover that my antiques give readings 10, 100, or 1,000 times greater than their radiation sources. The other option that may be helpful is to invite the frightened person to go through the same steps that you would use to make decisions on radiation safety. These steps from "cause to effect" include characterizing the source, determining its location, exposure rate, duration, and occupancy time, and how much radiation energy is deposited in the body and where. This information can then be evaluated by reference to studies on actual exposures and observed effects.

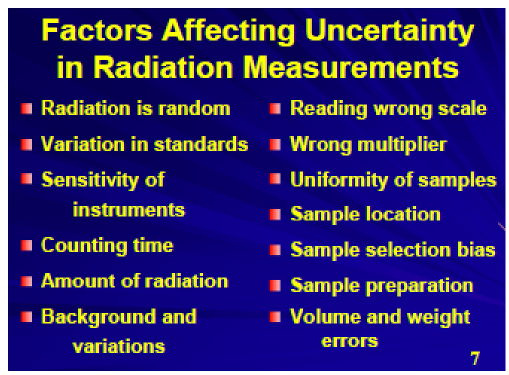


A copy of Ray's presentation handout for this 15-minute Technical Paper presentation is available on his website at http://radiationcounseling.org/docs/Frightened2016.pdf

Serious Questions about Radiation Measurements

February 3, 2016

How often do we find ourselves interpreting data based on someone else's radiation measurements without really knowing if the data are valid? Do we know for sure that the data justify our decisions for radiation safety or possibly expensive actions? Defensible decisions for radiation safety should begin with good radiation measurements. Unfortunately, many safety decisions are based on measurements with great uncertainties which are either unknown or neglected. Once a measurement is written down it seems to take on a life of its own and all uncertainties are lost. People commonly take the written measurements as gospel and proceed to interpret the numbers as absolute values, as if they were real. We may not ask questions to verify the data, especially if the number is above an action level. However, before measurements are interpreted, they are just numbers. Once interpreted the numbers mean whatever people believe, often related to their fears of radiation.



There are over 20 errors which can result in measurements that do not represent the real world. Since radiation is a random phenomenon, even with great care, radiation measurements are only "best estimates" from a random distribution. When uncertainties are reported for measurements, in most cases they only account for the randomness of radiation. They do not include uncertainties due to calibration, energy response, and numerous operator judgment factors (geometry, location of measurement, speed of probe movement, etc.). Measurements are often made in contact with a source without taking into account the location of potentially exposed people and occupancy time. Measurements are made for gamma ray exposure without knowing that most gamma ray sources will also have a beta component and exposure in mR/hr is not defined for beta particles.

Other common errors include reading the wrong scale multiplier. For some analog instruments the switch setting is a multiplier and for others it is to choose a full scale reading. Errors have been made with digital instruments where people do not understand the symbol for micro. Because of fears of consequences, people may want to quickly implement safety decisions without confirming the initial measurements. The golden rule for measurements should be to repeat the sample and measurement for confirmation, ideally with different people and instruments, before making an expensive decision. We will review several case studies where protective actions were implemented based on erroneous measurements that would not justify the safety decisions.

A copy of Ray's presentation handout for this 15-minute Technical Paper presentation is available on his website at http://radiationcounseling.org/docs/MeasurementsQuestions.pdf

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Providing accurate and unbiased information regarding radiation safety

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