

The Psychology of Radiation Safety – How to Answer Questions

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Presentation by

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When I ask workers which are the greatest day-to-day challenges when implementing a radiation safety program, 1) technical issues, or 2) people issues, they always say, “People issues.” While we may have prepared extensively by training to deal with technical issues, how well has that training prepared us for dealing with the psychology of radiation safety. For example, the question, “Is this radiation source or x-ray machine safe?” cannot be answered by a simple technical response. The most helpful answer to this question needs to consider, “What does safe mean,” “Who decides,” and “How do we know?” I have come to conclude over the years, that I cannot answer the question, “Is it safe?” Each person has their own ideas of what safety means for them, based on whatever they have heard or believe about radiation. Thus, the only credible answer to that question is the answer each person derives for themselves.

My best role is to provide technically defensible information and help dispel common views which are usually based on radiation mythology (common beliefs which are not technically true). Often members of the public and new radiation workers instinctively believe that radiation is dangerous. It seems that continuous repetition of messages about radiation dangers have instilled an aversion to radiation at a subconscious level in the population, such that avoidance of radiation is now an automatic response. Therefore, fears of radiation are as involuntary as fears of heights, snakes, and spiders. Since we know that we cannot talk a person out of their fear of snakes by saying, “It is only a harmless garter snake,” neither can we change a person’s fears of radiation by telling them, “You do not need to be afraid, its only like a chest x-ray.” Perhaps the least helpful response we can give to a fearful person is to say, “You do not have to be afraid.” This response discounts the person’s feelings. A better response is to use active listening and say, “Radiation makes you afraid.” We can be a resource of information and we can provide direct evidence (such as readings from a meter) to help people answer their own questions on radiation safety.



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- BS Civil Engineering (1961) University of Vermont
- MS Sanitary Engineering (1963) Massachusetts Institute of Technology (MIT)
- Prof. Sanitary Engineer Degree (1963) MIT and Harvard University
- PhD Studies, Radio and Nuclear Chemistry (1966–1972), Rensselaer Polytechnic Inst.
- Greater Washington Institute for Transactional Analysis - Counseling (1977–1980)
- American Board of Health Physics Certification (1983–present)
- Johns Hopkins Fellow, Organizational Systems (1984–1985)
- Past President and Fellow of the Health Physics Society (2000)
- President-elect Designate, American Academy of Health Physics (2011)
- Commissioned Stephen Minister – Counselor, United Methodist Church (2003–pres)

Experience

- 2010 – pres. Director, Radiation Safety Counseling Institute. Workshops, training, and counseling for individuals, companies, universities, or government agencies with concerns or questions about radiation safety. Specialist in helping people understand radiation, risk communication, worker counseling, psychology of radiation safety, and dealing with fears of radiation and nuclear terrorism for homeland security.
- 2007 – pres. VP, Training Programs, Dade Moeller & Associates, training and consulting in radiation safety.
- 1984 - 2007 Director, Radiation Safety Academy. Providing x-ray and radiation safety training, audits, and consulting to industry (nuclear gauges and x-ray), universities, research facilities, and professional organizations
- 1988 - 2006 Manager and Contractor to National Institutes of Health (NIH) for radiation safety audits of 3,500 research laboratories and 2,500 instrument calibrations a year, along with environmental monitoring, hot lab and analytic lab operations, and accelerators and x-ray inspections.
- 1990 - 2005 President of Key Technology, Inc. a manufacturer and primary laboratory for radon analysis with over 1,500,000 measurements since 1985. Primary instructor at Rutgers University 1990-1998 for radon, radon measurements, radiation risks, radiation instruments, and radon risk communication courses.
- 1986 - 1988 Laboratory Director, RSO, Inc. Directed analytical programs and Quality Assurance for samples from NIH, Aberdeen Proving Ground, radiopharmaceutical companies, and the nuclear industry.
- 1970 - 1985 Chief, Radiation Surveillance Branch, EPA, Office of Radiation Programs. Directed studies of radiological quality of US, coordinated 7 Federal agencies for nuclear fallout events, QA officer 8 years. Head of US delegations to I.A.E.A and N.E.A. on radioactive waste disposal. ANSI N-13, (1975-1985). Retired PHS Commissioned Officer (0-6) in 1985 with 29 years of service.
- 1963 - 1970 U.S.P.H.S. Directed development of radiation monitoring techniques at DOE National Labs, nuclear plants, and shipyards in the US and Chalk River Nuclear Laboratory in Canada.

Health Physics and Professional Activities

Health Physics Society (HPS) plenary member 1966; President-elect, President, Past President (1998-2001), Fellow (2000), Treasurer (1995-1998); Secretary (1992-1995); Executive Cmte. (1992-2001), Chair, Finance Cmte. (1996-1998); Head of U.S. delegation to IRPA X (2000). RSO Section Founder and Secretary/Treasurer (1997-2000); Co-founder and President, Radon Section (1995-1996). Co-Chair Local Arrangements Cmte. Annual Meeting in DC (1991); Public Info. Cmte. (1985-1988); Summer School Co-Chair (2004); Chair, President's Emeritus, Cmte (2006); Chair, Awards Cmte. (2002); Chair, History Cmte. (2005-Pres.); Continuing Education Cmte. (2005-Pres.). Academic Dean for HPS Professional Development School on Radiation Risk Communication (2010). PEP, CEL and AAHP Instructor; Journal Reviewer; Treasurer, AAHP (2008 – Pres.). AAHP President-Elect Designate (2011). Baltimore-Washington Chapter: President (1990-1991) and Honorary Life Member; Newsletter Editor (1983-2005); Public Info. Chair (1983-1991), Science Teacher Workshop Leader (1995 – Pres.). New England Chapter: Newsletter Editor, Board of Directors, Education Chair (1968-1972). President, American Association of Radon Scientists and Technologists (1995-1998) and Honorary Life Member, Charter Member; Board of Directors; Newsletter Editor (1990-1993). Founder and first President, National Radon Safety Board (NRSB) (1997-1999). Member of Sigma Xi (1966-Pres.); ANS (1983-Pres.), Society for Risk Analysis (1984-Pres.); AIHA, CRPA, CRCPD (1997-Pres.), Studied H.P. communication styles and presented Myers-Briggs seminars to over 3500 H.P.s since 1984. Over 30 professional society awards. Registered Professional Engineer since 1965. Certified Health Physicist since 1983.

Publications

Authored over 500 book chapters, articles, professional papers, training manuals, technical reports, and presentations on radiation safety. Author of monthly column, "Insights in Communication" HPS Newsletter 1984 - 1989 and 1994 -2001.


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What Is the Greatest Challenge in the Workplace?


- Technical Issues ?
 - Lack of technical understanding
 - Inadequate equipment or facilities
 - Inadequate staffing
- People Issues ?
 - Dealing with upset and fears
 - Emotional issues - anger
 - Communication problems



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Why Will People Issues Be So Difficult ?


- Would it be better if people left their feelings at home ?
- Are we stressed by emotional issues at work ?
- Is fear a factor in the workplace ?
 - Examples – Fear of radiation ?
- How many of us have had training in dealing with feelings ?
- How well do we understand feelings ?
- How much of our lives are affected by feelings that we do not understand ?



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How Are We Prepared ?


- We are trained in the technology of radiation protection
- What training do we have for people issues ?
- Do we know how to provide a helpful response to an upset (angry) or fearful person?
- Do we know how to deal with our own fears ?
- Are we perplexed by people's fears of radiation ?
 - Is everyone afraid of radiation ? YES



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Is this Radiation Safe ?


- No simple technical answer
- Answer needs to consider
 - What does safe mean?
 - How safe is safe?
 - Who decides ?
 - How do we know ?
- We cannot answer the question "Is it safe?"
 - Either has no answer
 - Or, multiple answers



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Answers to Questions on Safety

- Can only be answered by each person
 - Related to their concerns, fears, and images
- We cannot answer for another person
- We cannot say "It is safe!"
 - With any expectation that "our answer" will be accepted by others
- What can we do ?



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Only Credible Answer

- The answer each person derives for themselves
- Our role is to be a resource to help people answer their own questions on radiation safety
- We can help to dispel common views often based on radiation mythology
 - Common beliefs about radiation that are not technically true.
- Provide direct evidence – radiation meter

Fear Comes from Subconscious

- Our subconscious mind (gut feeling) is the source of fears
- Our subconscious mind does not consult with our conscious mind (rational thinking) before raising the alarm of fear
- Speaking to the rational thinking mind does not reach the subconscious (gut feeling)
- Giving facts may not change the feelings

Most Believe Radiation is Dangerous

- Gut feeling based on what they have heard
- Continuous repetition of messages about radiation dangers have instilled an aversion to radiation at a subconscious level (gut feeling level)
- The role of our subconscious mind is to protect us from danger, before we can even think about it.
- Thus, avoidance of radiation is now an automatic response

Fears of Radiation are Involuntary

- Similar to fear of heights, snakes, spiders
- Can we talk a person out of their fear of snakes ?
 - by saying, “Its only a harmless garter snake.”
- Can we change a person’s fears of radiation ?
- By saying, “ You do not need to be afraid, its only like a chest x-ray.”
- If we ask, “Why are you afraid?”
 - They do not know - unconscious mind
 - They will try to rationalize an answer

Fears Are Based on Images

- People are afraid of what they imagine as consequences of radiation exposure
- Fears are based on imagination of what will happen next.
 - The next step, not what is happening now
 - Example - fear of heights
- Providing technical data may not change the images behind a person’s feelings

Least Helpful Answer

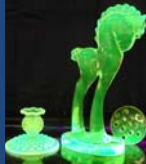
- “You do not need to be afraid”
- This response discounts the person’s feelings.
- All feelings are OK. Its OK to be afraid.
- Better response is to use *Active Listening*
- Active listening
 - Paraphrase content
 - Reflect the feeling
- “Radiation makes you afraid”



The Psychology of Radiation Safety - How to Answer Questions

Rather Than Saying "It is Safe"

- Provide information and evidence
 - From which people can derive their own answers of what safe means for them
 - Show-and-tell, common radioactive items
 - Fiesta ware, lantern mantels, K-40, depression glass, and Vaseline glass
 - Compare with radiation sources
- Acceptance of what is safe
 - Involve feelings and
 - Values developed over a lifetime
 - Based upon what everyone knows

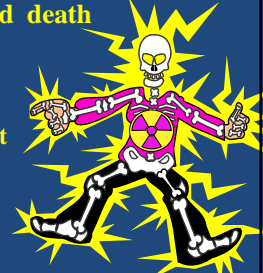


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Instinct vs Science

- Many people instinctively assume:
Radiation = cancer and death
- What is missing?
 - Scientific approach
 - Steps from cause to effect
 - Tools for evaluating radiation risks



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Evaluating Risk – Steps from Cause to Effect

1. What are properties of RAM (α , β , γ , x-ray)?
 - form and quantity?
2. Where is it located?
3. How is it contained?
4. How will it move in the environment?
5. What are the exposure conditions?
6. How much energy is deposited in body?
7. What doses are known to produce effects?
 - Is it actually very difficult to seriously harm someone with radiation ?



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Answers to Questions on Safety

- Workers, families, and public want to know "Is it safe?"
 - For peace of mind
 - For making good decisions for safety
 - To avoid being afraid
- We may not be able to answer directly by speaking to the conscious thinking mind
- We can be a resource to help people answer the question for themselves
- Provide tools to help people make their own decisions



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