

## **RADON RISK COMMUNICATION WITH ATTORNEYS AND JURORS**

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### **ABSTRACT**

Attorneys and jurors will have their own ideas of radon health risks before hearing any testimony. For most people, without radiation training, radon is mysterious because they cannot detect the presence of radon with their five senses. For some, radon may not represent a significant danger because people do not see any direct evidence of lung cancer due to radon. For others, radon as a radioactive gas, may represent a sinister source of unknown danger. Many people intuitively assume that radiation (radon) equals cancer and death. They readily accept two word risk assessments, such as "deadly radiation" which assumes cause and effect. The role of the radon professional, as an expert witness, is to lead attorneys and juries through the scientific process of radon risk assessment which examines each step from cause to effect. Information should be presented on the properties of radon (naturally occurring radioactive gas, comes from uranium and radium, emits alpha particles, forms decay products which also emit alpha particles), behavior of radon as a gas, entry into homes from the ground, accumulation of decay products, exposure conditions, deposition of alpha particles in the lung, how exposure to decay products can lead to lung cancer, and evidence for lung cancer risk.

For effective communication, the radon expert witness needs to present the radon risk assessment process in a language that can be understood by attorneys and jurors. This means minimizing the use of jargon or else explaining radon terminology in terms that likely have meaning in the experience of the attorneys or jury. Studies with the Myers-Briggs Type Indicator show that most people do not want conceptual, abstract, or theoretical information. They want information that is concrete, specific, practical, sensible, real, and based on facts that they can verify in their own experience. We also need to take into account people's feelings about radon risks. Leading people to a feeling based decision requires a different approach than normally used by scientists who generally make decisions based on logical analysis.

### **INTRODUCTION**

This paper will provide insights learned in the process of presenting expert testimony for the plaintiffs in the landmark radon trial of Peter Radakovich and Sue Ann Radakovich, his wife as Plaintiffs vs Richard L. Fila and Sherry A. Fila, his wife, Phyllis Rosenfeld; Howard Hanna Real Estate Co.; Virginia Celland; Elaine DeBildt; the Prudential Preferred Realty, and Wayne Musser Property C., Inc., as Defendants., Pittsburgh, PA, April 29 - May 10, 1996. This paper will not present details of this particular case, but rather it will attempt to develop insights from this jury trial as an example for assisting anyone who might be invited as an expert witness in similar trials in the future. The paper will briefly review the author's background leading up to the trial, the role of an expert witness, the trial process which involves radon risk perceptions vs the truth, the best modes of persuasion for attorneys and jurors, and the courtroom as drama.

### **AUTHOR'S BACKGROUND**

To qualify as an expert witness usually requires special credentials such as advanced degrees in the subject field and extensive experience as evidenced by research, publications, and positions of responsibility, as well as a professional credentials such as honors, awards, licenses and board certifications. Since the author has advanced degrees and graduate studies at MIT, Harvard, Rensselaer Polytechnic Institute, and Johns Hopkins University, there

were no challenges on educational qualifications. Likewise with over 30 years of research and management on radiation and radon issues and Certification by the American Board of Health Physics, there were no challenges to technical experience or professional credentials. The only challenge raised by defense attorneys was regarding the author's role as President of Key Technology, Inc. The defense strategy was to show that the author had a profit motive in the radon industry.

The author's qualifications for drawing inferences from the trial process related to radon risk communication also go back more than 25 years. In 1976 the author was designated, as a representative of the U.S. Environmental Protection Agency, to develop all public information announcements on the health concerns of atmospheric nuclear testing. Since China was conducting a series of atmospheric tests in the late 1970's, the author was responsible for several hundred press releases interpreting the significance of nuclear fallout in the U.S. The text for these press releases was compiled from data provided to EPA from seven federal agencies as directed by the President. However, the author soon noted that having the data base was not assurance that the public received effective information. In those years no one knew how to best present fallout data in response to public concerns for radiation safety. The field of risk communication was not developed until the 1980's.

To learn how to better present radiation risk information, the author sought training in communication and listening skills which led to a three year program of study with the Greater Washington Institute for Transactional Analysis. From this program the author qualified to lead groups and individuals in psychological counseling. After practicing psychotherapy for several years, the author enrolled in graduate studies at Johns Hopkins University in organizational systems and behavioral sciences. During this program the author decided to discontinue psychotherapy practice and to apply insights gained from training and experience to the broader issues of radiation risk communication.

In 1983, the Baltimore-Washington Chapter of the Health Physics Society set up a committee, which the author chaired, to develop a training program to assist health physicists in presenting effective public information on radiation issues. Since then the author has led over 100 workshops on radiation risk communication based mainly in the Myers-Briggs Type Indicator (MBTI), a personality profile instrument. Over 1,500 health physicists and an equal number from other professions have participated in these workshops. Studies based on insights from the MBTI have led to over 75 publications, including a monthly column, *Insights in Communication*, in the Health Physics Society Newsletter.

Although the author has presented testimony to congress and other interest groups on many occasions, he has had only one opportunity to serve as an expert witness for a jury trial. Therefore, much of what is presented in this paper is based on observations from this one trial and general insights in communication developed over the past 25 years.

## RISK PERCEPTIONS VS THE TRUTH

Since each witness in a trial is sworn under oath "to tell the truth, the whole truth, and nothing but the truth," it could be helpful to recognize that "scientific truth" and "radiation risk perceptions" can be very different. However, each person's perception of radiation or radon risk is the truth as far as that person knows. Consequently, attorneys and jurors will already have ideas about radon risks based on whatever sources of information they have been exposed to (Johnson 1993). People's ideas about radiation in general depend upon the images that come to mind in response to the word "radiation." For many people the common image is one of a mushroom cloud representing a nuclear weapon detonation. This image carries with it ideas of terrible consequences and devastation that support people's fears of radiation.

On the other hand, radon does not generally result in any particular fearful image. Radon, as an inert noble gas, cannot be detected by any of our five senses (Johnson 1994). When our senses fail to give us a warning, we do not know that we may be in danger. When we have no sense of danger, it is easy to assume that no danger exists. Consequently, homeowners often do not perceive radon as a significant risk (Johnson 1990). People generally know

that radon can lead to lung cancer, but they also believe that lung cancers are primarily due to tobacco smoking. No one knows of a single person who has died of lung cancer due to radon.

While people often do not seem overly concerned for radon risks, they are usually very concerned about other sources of radiation. Since radiation does not give our bodies any signal for exposure, people often rely upon their imagination of the worst possible consequences of radiation exposure, which is cancer and death. Therefore, it is common to assume that if radiation is there, it is bad for you. Cause and effect are often directly related in two word risk assessments, such as "deadly radiation," "lethal radiation, " or "toxic substance."

In the face of the range of perceptions related to radon and radiation risks, what is the real risk or the truth? How can an expert witness communicate "the truth" or the "scientific truth" which may differ from attorneys and juries perceptions of risk that are the same as reality to them? Also, how can the expert present effective testimony to the truth, when the opposing attorneys will do everything in their power to cast a reasonable shadow of doubt on the testimony?

### **ROLE OF THE RADON EXPERT**

The role of the expert for radon risk assessment is to present the scientific basis for determining radon health risks. This means presenting the process of risk assessment from cause to effect. For radon the process would include the following steps:

- 1) description of radon and its origins
- 2) description of radioactive properties of radon and behavior of alpha particles
- 3) the movement of radon gas into homes and formation of radon decay products
- 4) the inhalation and deposition of radon decay products on the bronchial epithelium
- 5) the deposition of alpha particle energy and damage to cells
- 6) what is known about radon exposures and lung cancer
- 7) what are the risks from radon based on miner exposure
- 8) what are the action levels for reducing radon risks.

### **THE RADON EXPERT AS WITNESS**

The role of the radon expert is not only to inform, but also to persuade. In a courtroom there is no place for information alone. All testimony is presented to persuade the attorneys, judge, and jury in the direction of the desired outcome, depending on whether the testimony is for the plaintiff or the defense. Efforts to develop the desired perceptions by the jury are also hampered by the courtroom format which is not designed for teaching. Although the author has many years of experience teaching radon fundamentals and radon risk assessments, this experience was of limited application because normal classroom approaches could not be used. For example, there was very limited allowance for use of visual aids. A few printed charts were prepared in advance to illustrate only a few key points. The witness also cannot use the normal prerogative of an instructor for dialogue with the class. Thus, the witness has very limited feedback on which to evaluate if the class (jury) understands what he is presenting. Some jurors provide visual cues in the form of an understanding nod, or a faint smile, or other indications of interest in the testimony.

The witness also cannot simply move ahead on a prepared agenda as in a classroom. The witness can only answer questions. Therefore each new topic requires a question from the attorney for response by the witness. Usually the questions posed by the attorney are leading questions, i.e. they are designed to lead to a response that is favorable for either the plaintiff or the defense. The questions posed by attorneys also are often designed to achieve a "Yes" or "No" response. Such responses may be difficult when a simple "Yes" or "No" is not an adequate reply. For example, how would you answer the question, "Do you know of anyone who has died from lung cancer due to radon exposures?" A "Yes" cannot be defended as of yet. However, a "No" answer would greatly weaken the case

for concern about radon health risks. Therefore, the answer has to be "No" with qualifications. One could add that about 150,000 people die each year in the U.S. from lung cancer of which 85% are believed to be due to tobacco smoking according to the U.S. Surgeon General. Furthermore, based on the evidence of above normal lung cancer incidence in miners exposure to radon compared to radon exposures in homes, the U.S.E.P.A. and the National Cancer Institute estimate that about 10% of the overall lung cancer incidence, or about 15,000 lung cancer deaths a year, are related to radon exposures.

It is important that the expert witness take the opportunity to qualify answers when that will support his position. It is also important to emphasize the context of the question and the corresponding answer. Not all answers need to be qualified. Some questions raised by your own attorney should be answered with a definite "Yes" or "No" and presented firmly with conviction. For example, if you are asked, "Do believe that radon represents a significant source of lung cancer risk in homes?" then you can say "Yes" with firm conviction.

Preparation as an expert witness involves two factors. First, in order to be effective as an expert you need to be the master of your subject. This includes not only your expertise based on years of training and experience, but also tens or hundreds of hours of detailed preparation. Since you cannot take notes or references with you on the witness stand, all questions have to be answered entirely by memory. For the Radakovich case the author prepared for testimony is if he was preparing for an oral doctoral qualifying examination. This included intensive review of several dozen textbooks, research reports, and related radon publications. Once you have mastered the necessary technical material, the next important factor is to practice with your attorney.

Practicing with the attorney accomplishes two goals. One is for the witness to practice presenting clear, easy to understand, and technically accurate answers. The other is to assist the attorney in sufficiently mastering the material in order that he can ask good questions to appropriately lead you in the desired sequence of your testimony. Part of courtroom strategy is to avoid surprises. Your attorney does not want to surprise you with unexpected questions and you do not want to surprise your attorney with unexpected answers. Your attorney will also work with you to address likely questions that may be raised by the opposing attorneys. Again, you hope to avoid any surprises.

## **PRESENTING EFFECTIVE INFORMATION**

To be effective, expert testimony needs to be presented in terms that are easily understandable by attorneys and juries. This means that we should minimize technical jargon. That is not easily done. For example, if you give the common definition of radon as "a naturally occurring radioactive gas which is invisible and odorless" then most of those words are technical jargon. Most people would not know the meaning of "naturally occurring," "radioactive," or "gas." To communicate effectively requires that the testimony be presented in terms of experience that is likely common among the members of the jury.

Over the course of teaching radon and radiation fundamentals for many years the author has noted that,

**"learning occurs when you are able to connect new information to knowledge or experience which you already have (Johnson 1995)."**

This means for a jury to acquire a new understanding of technical material, each person must be able to connect the new information from testimony to their existing knowledge. They can also acquire new information from direct experience, such as direct observation. Based on these insights, the author believes the most effective communication of technical topics is by "show-and-tell." For example, the author attempted to demonstrate the properties of alpha particles by showing the response of a radiation meter (Geiger-Mueller detector) to a source of pure alpha particles. The demonstration showed the absorption of alpha particles in a thin layer of materials represented by a business card or by about two inches of air. This demonstration also showed that the meter response (clicks) increased very rapidly as the alpha source was brought closer to the detector. This demonstration was done with the radiation meter sitting on a shelf at the front of the jury box about three feet from the jurors.

Unfortunately, as the alpha source was brought nearer to the detector the meter clicks turned into a scream and two lady jurors in the front row just about jumped out of their seats. This may not have been a desirable response from the jury.

### MYERS-BRIGGS TYPE INDICATOR

One of the currently most popular and powerful tools for understanding ourselves and our communication styles is the Myers-Briggs Type Indicator (MBTI)( Johnson 1990) . This is a set of 126 questions that measure our preferences for gathering information, making decisions and relating to other people based on concepts defined in the 1920's by the Swiss psychologist, Dr. Carl Jung. The MBTI was developed by two Americans, Isabel Myers and her mother, Katherine Briggs. Insights for effective courtroom testimony are developed in this paper on the basis of two measures of preference; 1) how we prefer to gather information by Sensing (S) or Intuition (N), and how we prefer to make decisions on that information by either Thinking (T) or Feeling (F). The characteristics of each of these preferences are defined by key words as shown below:

#### Two Ways to Gather Information

##### Sensing (70%)

Five Senses  
Actual  
Practical  
Specific  
Details  
Present  
Facts  
Repetition

##### Intuition (30%)

Hunches  
Possible  
Imaginative  
Abstract  
Patterns  
Future  
Guesses  
Variety

Sensing types like to gather information through their five senses for specific, detailed, measurable, factual, concrete data. For them the real world is primarily what they can see, touch, taste, smell, or hear. Since 70% of the population prefers this approach to gather data, you can begin to appreciate people's reactions to radiation or radon which is not tangible to any of their five senses. Intuitives on the other hand, prefer to see patterns, relations, possibilities, and they tend to have less difficulty with concepts, abstract theories, and models. These two preferences will see each other in negative terms. Intuitives see Sensing types as having no imagination, picky with details, and slow to grasp concepts. Intuitives may be seen as dreamers, vague, impractical, and careless with details.

Since 70% of the general population prefers to gather information by Sensing, the chances are this will be the primary preference of a typical jury. This means that the jury will not relate well to conceptual, abstract, or theoretical information. Instead, the jurors will want information that is concrete, specific, practical, sensible, real, and based on facts that they can verify in their own experience.

#### Two Ways of Making Decisions

##### Thinking (50%)

Logical  
Analytical  
Objective  
Principles  
Firmness  
Criticize  
Cool  
Truth

##### Feeling (50%)

Personal  
Empathic  
Subjective  
Values  
Persuasion  
Appreciate  
Caring  
Goodness

These two preferences are not a measure of your ability to think or feel, but which process will you naturally apply for making important decisions. Thinking types prefer logical analysis, based on scientific principles and laws. They tend to ask about "why" and "how" the world works. For them truth is the determining factor for decisions, even when it hurts. In contrast, Feeling types base their decisions on sentiments and a hierarchy of values, usually involving concern for the well being of people. For them, what is good for the people involved takes precedent over all else. These two preferences also see each other in negative ways. For example, Feeling types are seen as sentimental, irrational or illogical, because they cannot defend their value based decisions to the satisfaction of the analytical Thinking types. On the other hand, Thinking types may be viewed as cold, calculating, and uncaring.

### **MODES OF PERSUASION - The Thinking Expert Witness**

Most expert witnesses with a technical or scientific background will likely present their testimony in the Thinking language. In fact, the scientific process for determining the truth is basically the Thinking approach, beginning with fundamental principles, logical analysis of the facts, and objective criticism leading to the truth. This is the normal approach for radon risk assessment which carefully analyzes each step from the origins of radon, its radiological properties, the exposure conditions, and lastly the health risk. The whole approach is based on logical analysis where each step can be itemized and presented for criticism. The Thinking approach is the basis for the expert witness to draw expert conclusions that are defensible by the scientific process. It might be helpful to recognize, however, that as few as 50% of a typical jury of non-technical people would primarily use the Thinking approach.

### **MODES OF PERSUASION - The Feeling Expert Witness**

Most technical experts will not use the Feeling approach. But, 50% or more of a jury may very likely prefer Feelings as a basis for making decisions. To persuade these people depends not on logical analysis, but on building rapport and establishing credibility. These people are more sensitive to factors that convey empathy, such as your looks, tone of voice, mannerisms, choice of Feeling words, and body language. For these people, impressions count for more than technical and professional credentials. You will be seen as more believable if you come across as more likeable.

### **SCIENTIFIC TRUTH VS COURT TRUTH**

The normal scientific approach to radon risk assessment not only presents the details for logical analysis of the risks, but also presents the uncertainties inherent in any limitations of the data or the analysis. Research reports usually conclude with questions which still remain and an evaluation of the limitations of the research. This normal approach in science is fertile ground for cross-examination by attorneys. For example, the strategy of the defense attorney in the Radakovich case was to focus on the questions raised by scientific studies, rather than the reported conclusions. His favorite reference was the small book published by the National Research Council which is a compilation of issues and questions on radon risks for evaluation by BEIR VI (Committee VI on the Biological Effects of Ionizing Radiation) (NRC 1994).

The attorney's approach was to address a question, by asking the witness to read the question, and then asking if the question was true. For example, he would ask, "Are there questions about the extrapolation of radon lung cancer risks in miners to radon risk in homes?" Of course the answer is yes, but focusing only on the question does not present the validity of the comparisons between mine and homes. As the attorney repeatedly used this strategy to discredit scientific findings, it soon became apparent that he did not really care what answers the witness gave. The reason was that the answers required more technical details and logical analysis, which very likely the jury was not able to follow. No matter what answer the witness gave, the attorney would come back with the same or

a similar question. It appears that what the attorney was doing was raising a simple non-technical question at least three times to impress the jury about the questions, not the answers.

### **THE ATTORNEY'S ROLE**

The primary role of both plaintiff and defense attorneys is to lead the testimony of witnesses to create the desired impressions in the minds of the jurors. The attorney's job is to make the best legal case possible for his client. This involves building a picture of the truth that will persuade the jury in favor of his client. However, the author noted in the Radakovich case that while all testimony is given under oath as "the truth," there is a wide latitude of interpretation on what represents the truth. For example, the "whole truth" can be represented by a pie chart as a total of many truths. Each piece of the pie chart is a truth which adds to create a larger truth. The strategy of the attorney is to lead or control the testimony to focus on only one part of the truth which is most favorable for his case. To accomplish this goal the attorney will keep pointing to part of the truth to maintain emphasis on that perspective for the jury.

Since the jurors do not take notes, then they primarily store impressions. Over the course of a two week trial, they will likely retain only those impressions that were most memorable. The most memorable impressions are probably not going to include the details of a complicated radon risk assessment. Instead, the jurors may remember the believability of a witness based on his rapport, empathy, sincerity, and other measures of credibility, while technical details fade in memory. The jurors will probably retain their feelings about issues in the case more than the best logical analyses presented by an expert witness. The closing arguments of the attorneys are intended to simplify, summarize, and highlight the essential details to make the case for their clients. The jurors will primarily arrive at their decisions based on the stored impressions and the few details that they are able to recall.

### **THE COURTROOM AS DRAMA**

A trial is a carefully choreographed drama or theater designed to create the desired impressions on the jurors. Each witness and each question raised by the attorneys is purposely selected to lead to the desired goal. As noted earlier in this paper, there are not intended to be any surprises. In fact the legal system aids this purpose by the process of discovery. This is a process in which attorneys for both sides share information about witnesses. In the case of expert witnesses, each witness submits a report of his intended testimony which is then provided to the opposing attorneys.

Attorneys and their respective expert witnesses review these expert reports very carefully to find any holes or discrepancies which can then be used to discredit or nullify the testimony of the opposing witnesses. The primary strategy is to make your case and your witnesses look good in the eyes of the jury and to make the opposing witnesses look bad. The courtroom drama is like a game of chess. And like any game, the first strategy is to learn the rules of the game. Then you proceed to play out the game plan to maximize the wins and minimize the losses. Anticipating the direction of the opponents strategy is part of the challenge. After months or even years of preparation, the actual trial is a time of drama, nerves, stress, adrenaline, hope, and despair. In other words, its very exciting.

If you ever have the opportunity to testify as an radon expert, you are encouraged to do so. The experience is both demanding and rewarding.

### **CONCLUSIONS**

Even before hearing any expert testimony most attorneys and jurors will already have their own ideas about radiation or radon health risks. Whatever perception a person has about radon risks is the truth to them. Since lung cancers due to radon exposures in a home are not obvious, and since radon cannot be detected by our five senses, it

is common for people to assume that radon is not a real health risk. The role of a radon expert is to present the normal steps in radon risk assessment to establish the scientific basis for radon as a significant health risk. As a witness, the radon expert has to not only inform attorneys and jurors about radon risks but also persuade them in favor of either the plaintiff or the defense.

A witness can only answer questions, which are normally phrased by the attorneys to lead to their desired goal. Unlike a classroom, the witness does not have access to the same visual aids or the opportunity for dialogue with the jury. All answers have to be from memory since the witness does not bring notes or references to the witness stand. Therefore, the preparation for an expert witness requires not only years of experience and training, but also extensive detailed preparation, as if preparing for an oral doctoral qualifying exam. It is very important to hold extensive practice sessions with your attorney.

The most effective testimony is presented with minimum use of technical jargon. Since learning only occurs when you are able to connect new information to existing knowledge or experience, then it is important to present information which jurors can identify with in their experience or better to present technical facts by demonstration, or show-and-tell. Insights from the Myers-Briggs Type Indicator show that most people prefer to gather information using their five senses. This means they want information that is concrete, specific, practical, sensible, real, and related to direct experience.

The MBTI also shows that the usual expert witness who uses the Thinking approach to decision making will likely communicate poorly with a typical jury where 50% or more may prefer a Feeling approach to decisions. The normal analytical method for radon risk assessment may not persuade jurors who rely upon feelings for making judgements. For those who prefer Feelings, persuasion may be more a matter of rapport, empathy, and a sense of caring.

The attorney's role is to lead witnesses and jurors towards impressions that are favorable either to the plaintiff or the defense. One way to accomplish this goal is to repeatedly draw the attention of the jury to some aspect of the truth which will lead to the desired impression. This is different than the normal scientific method which considers the larger picture including the limitations of a radon risk assessment and the uncertainties as well as the positive results.

The courtroom is carefully orchestrated theater or drama to impress the jury towards a desired decision. By the process of discovery, each attorney shares information with opposing attorneys. Ideally everyone's part is known and no surprises are welcomed. The choices of witnesses and questions are carefully selected to achieve the desired outcome. The trial is scripted and played out like a programmed drama or game. The tension is high as points are won or lost. A trial is a time of hope and despair, it is exciting and stressful, and the adrenaline will flow. If you have an opportunity to serve as an expert witness, you are encouraged to do so. Hopefully, the insights in this paper may help in your preparation.

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