

A Dose of Reality

Roentgen Shrugged

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“Who is John Gray?” The question was asked almost in a monotone by the homeless alcoholic begging coins in the covered store entrance, amongst the swirling flurries.

Randy just walked on, pretending not to notice her, although he actually recognized her as a nuclear medicine technologist who used to work at the same university hospital.

Might as well ask, “How low should a dose limit be?” Randy thought, and spat in disgust on the frozen ground. He stopped at the sidewalk Internet browser at the corner bookstore, tried to access a few of his best Web sites that might have health physics jobs, but there was little hope. There hadn’t been a serious listing in months, and these days their Web pages took three to four minutes to even load, and many times after waiting this prolonged period of time, all you would get is a “page not found” error. Randy tried typing the addresses a few times, with fingers quivering from the cold, then waved a dismissive hand at the plastic-covered terminal and walked on.

Maybe a cup of coffee, that would be nice. Reminded him of the days grabbing coffee on the run at work, when he was the radiation safety officer (RSO) at a sprawling university campus in Massachusetts. He laughed at himself as he remembered actually *complaining* at having to do a wipe test, clean up a spill, or review film-badge reports. Now how much would he give, what would he sacrifice, for these routine annoyances again? Well, who is John Gray?

It was amazing how quickly things changed; no one could have predicted the pace of the changes, although many were the voices predicting catastrophic changes ahead in the days preceding the Decline.

No one could really put a finger on when the spiral started ...

Randy really received the best of training to get him started in the business. He was no 4.0 student, but he had done well, his university professors were enthusiastic and knowledgeable, and he attained a master’s degree.

He then found a good job as an assistant RSO with no trouble and was promoted to head RSO after years of hard work. Back then, physics and mathematics defined how things worked.

Protecting people from radiation hazards was based on observed data and actual radiation effects observed in actual human beings. No one could really put a finger on when the spiral started, but now it felt like an irresistible undertow at the beach that was drowning everyone; there was absolutely no denying its reality and destructive force.

Radiation dose limits for workers had changed from the level of 50 mSv y⁻¹ held for decades to 20 mSv, then to 1 mSv, then to 0.1, and now potentially another 10-fold decrease to 0.01 mSv y⁻¹, with no particular rational basis for the changes, just the belief preached by the True Believers that lower is always better.

The “reasonableness” had been taken out of the ALARA doctrine years ago. In its place stands the philosophy of keeping doses As Low as UnReasonably Achievable (ALARA).

Medical uses of radiation had basically ceased, due to fears of cancer induction. Thyroid cancer patients received only surgery, with returns to historical rates of morbidity and mortality, as before the introduction of radioiodine therapy. Nuclear medicine, x rays, and CT scans were banned by the U.S. Congress in 2025, due to their “well established” carcinogenic potential.

Physicians returned to palpation to form most of their diagnoses, and imaging professionals, including nuclear medicine physicians, radiologists, technologists, and RSOs, were put out of work. Due to the shortage of operating medical centers as a result of the imaging ban, patients had to now undergo invasive diagnostic surgeries. Real people were actually dying from these operations, but the “experts” insisted that this was better than the potential risk of theoretical deaths predicted by the inviolable “Linear, No Threshold” (LNT) model of radiation carcinogenesis.

It didn’t just happen one day; it took years before Randy “woke up” to find that a consensus had been formed that all of his training in the objective science of health physics had no merit. At this time the “experts” pushed Randy to believe that:

- Gamma rays coming from medical patients were orders of magnitude more dangerous than those

coming from the concrete blocks in his basement safety office complex.

- A fetus of a pregnant radiation worker (provided that she does not declare her pregnancy) may receive a radiation dose that is equal to that of a male radiation worker.
- Radiation emitted from a radioactive spill is less hazardous to a person than that emitted from a nuclear medicine therapy patient.
- Radiation exposure received in Europe is 2.5 times more dangerous than exposure received in the United States (this internationally accepted fact would have eventually caused a mass migration of European patients to the United States for their imaging procedures. Fortunately this did not occur as most U.S.-based imaging centers were eventually forced to close their doors).
- X-ray machines and radiation-therapy machines should be shielded to dose-rate levels lower than experienced by children eating ice cream in sidewalk shops in Denver, Colorado.
- Models of reference bunnies and bushes should be developed, and massive expenditures should be made to protect animals and plants against radiation effects that were possible, but that no one had observed.

Despite the concerned voices of many true radiation experts and some professional medical-imaging societies and the professional Health Physics Society's pronouncement that low-dose effects are either nonexistent or simply not measurable, the push to lower dose limits was unabated. Many health physicists disagreed, but if you spoke about these problems out loud, Becquerel forbid, you would be forcibly silenced and branded as a

threat to a safe society. And work again? Well let's not make jokes about it, shall we?

It was maddening, simply maddening, but all simply ... true because the International Committee on Relative Dosimetric Relationships, the International Council of Atomic Priestesses, and the United World Council on the Theoretical Effects of Radiation—all deemed undeniable experts in the field—had all proclaimed it thus, and almost everyone had simply gone along.

The regulatory bodies were all too eager to continually ratchet downward the dose-limit requirements. In addition, many nuclear medicine and radiology professionals who professed to understand the inviolable LNT rule—which was responsible for the misguided ALAURA principle and established essentially by drawing a straight line through cancer induction data with a wooden ruler—believed, however, that drawing a straight line through three data points on a whole-body retention curve was either irrelevant or too much work to go through to optimize cancer therapy for non-Hodgkin's lymphoma patients. They advocated that this practice of radiation dose-based activity prescription for radionuclide therapy should be abandoned, at least in the United States.

Now the imposing figure of Sir Lawrence Olivier as Dr. Szell in the movie *Marathon Man*—holding an implement of torture in one hand and a salve of numbing balm in the



Is it safe?

other, and asking with insistence “IS IT SAFE?”—haunted Randy's dreams. It caused him to wake in alarm from his tormented sleep several times a week in sweat-soaked sheets (this, even though winter held its icy grip on his city ... and apartment ... as the heat system was poor).

Who could really say anymore what was safe? Well, certainly not the expert committee members who had become political ideologues, forsaking their scientific knowledge base. Further lowering of the dose limits for workers and the public was again being considered.

One area remaining to be addressed by the world's governments was people's constant exposures to daily background radiation. There were bills in various committees proposing to massively shield all homes, workplaces, and outdoor spaces with low-activity materials to reduce these “frightening” background exposures. Money was being appropriated to airline companies to redesign their airplanes to better shield cosmic radiation, but for now the only acceptable designs added too much weight and the planes would not be able to get off the ground.

International tensions were high—countries like Iran, India, and Brazil, which had significant numerical representation on the committees and contained regions of high natural-background dose rates (of course with no known effects on their populations), had been able up to now to block or table most of the proposed measures.

But much hand-wringing and backroom maneuvering (along with much brandy consumption) continued among the more “enlightened” members of the world councils, who were certain of their ability to eventually prevail in this matter.

Meanwhile, many leading

radiation experts and productive radiation physicists refused to be exploited by society. They watched the scientific society collapse around them as the government increasingly asserted control over the radiation and medical imaging industry, and they were progressively silenced by the votes of committees whose members showed years of experience on their résumés, but had no ability to understand objective data presented in opposition to their many rambling, unsubstantiated theories.

Professionals of competence began steadily withdrawing from society because they believed that rational radiation protection and medical imaging cannot exist if “society” and government are allowed to dominate scientific debate. The International Council of Atomic Priestesses stated that radiation protection of the public is the responsibility of society at large as different dose limits imposed by governments around the world reflect variations in legal systems and underlying social attitudes to radiation risk, objective data about radiation dose and effect be damned.

But those who believed in the value of data, reason, and evidence tired of the endless circular political nonscientific arguments, and much more of pointing out errors in peer-reviewed publications and fixing mistakes in “experts” calculations, after working 14-hour days gaining their own honest livings.

So slowly, one by one, they turned in their resignations or just disappeared and began working in a small community of radiation safety professionals that formed in Frostbite Falls, Minnesota, organized by a mysterious man known as John Gray. He had sent emails to seven professional men and women whom he knew, inviting them to form a professional radiation protection society based on rational thought and objective data.

Then he and the group sent emails to others they deemed able to participate productively in the group. The group slowly grew, and members shut down their own helpful Web sites that they had previously made freely available to the free world and only allowed members of the group to have access to these massive databases of useful objective data.

Then they began networking secretly to selected hospitals, universities, and industries of the world, offering their rational expertise to guide these interested parties in their day-to-day radiation protection problems in order to allow patients safe and effective access to medically important imaging and treatment capabilities.

This was all of course quite illegal, but the data channels were expertly protected and the records electronically sealed in ways that the best experts of the outside world couldn't crack. Most U.S.-based imaging centers had been forced to close their doors because the radiation involved was deemed too dangerous, and it became too expensive to continually hire more people to perform the unending required radiation surveys and maintain the mountains of paperwork needed to comply with ever-changing and increasingly burdensome radiation regulations. But those in Frostbite Falls were treating patients with high efficiency and flourished as patients paid their own money to travel from far and wide to receive life-saving and extending medical imaging tests and appropriate radionuclide treatments. These patients refused to be subjected to diagnostic, but truly life-threatening,

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surgeries and preferred their diagnoses to be obtained through noninvasive imaging procedures.

Similar exciting things were happening at the few networked centers that accepted the help of the isolated experts, and word spread

quietly of where help could be found.

Outside “expert” committee members

howled for intervention, even military action, to stop these illegal activities. Fortunately, consensus in such committees was difficult to reach in a timely manner and the paperwork needed to authorize any agreed-upon action took several more months to approve. Whenever these groups of putative experts were assembled to evaluate a particular situation and prescribe a remedy, the meeting would generally go on for days with lengthy circular and inconclusive discussions, leading to no resolution of any particular solutions, only agreements to meet again in a few months and have more expensive dinners and drinking sessions, of course at others' expense.

Randy sipped his coffee at the Internet café and gazed at the only public Web page that the Frostbite Falls group allowed public access to, the RADIATION DOSE ASSESSMENT RESOURCE (RADAR) home page. This page had once had dozens of useful links to information, data, and teaching resources, but now showed just one short paragraph, with no active links. The paragraph stated simply and directly that the site would return to full operation and access whenever the scientific world acknowledged that 50 mSv y⁻¹ is a perfectly safe dose limit for workers (and perhaps that this dose limit could probably even

be raised and still ensure safety) and that dose limits for pregnant workers, the public, and so on, should be set at reasonable and internally consistent levels that are based on actual observed data on radiation effects and not on undocumented predictions and estimates of risk, as yet unobserved or even measurable, based on the blind belief in the LNT/ALARA religion.

On one hand, Randy longed for the old days when he kept track of every disintegration and scattered photon, even though he suspected at times that this was a total waste of time. He had always felt comforted by those voices always proclaiming that every single radiation interaction could be lethal and that even femtosievert dose levels were dangerous. Deep down,

however, he knew he should have fought the continual ratcheting down of dose levels beyond what even he considered to be safe levels. It was simply job security at the time and he didn't realize what would happen if he did not join and get other RSOs to join forces with the true radiation experts and oppose these reductions.

Now there were almost no jobs to be had in health physics, at least not in the United States. On the other hand, he wondered how he could somehow get to Frostbite Falls and meet with members of the newly formed professional society and maybe find gainful work protecting people from meaningful levels of radiation or help with dosimetry in the medical treatments of patients.

But Randy did not know how to reach the group in Frostbite Falls and did not expect to hear from them any time soon. He smiled fondly as he recalled his trusty survey meter, which contained unique markings for "ALARA," "LALARA" (Lower than ALARA), and "JPDL" (Just Plain Damn Low). He supposed that he would need to remove these markings if he could ever get to Frostbite Falls. In any event, coffee prices at least had returned to some level of sanity. The pricey cafés serving \$7 cups of coffee had gone out of business years ago, and even being unemployed, Randy could afford a second cup today. He watched the light snowfall and wondered what would be the future of his once-proud profession. ☒

Agency News

NRC News

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NRC Unveils First-Ever External Blog to Enhance Dialogue with the Public

To enhance its ongoing communication with the public and support Open Government, the Nuclear Regulatory Commission's (NRC) first-ever external blog went live on 31 January 2011 on the third-party site WordPress. The blog will feature posts from staff members throughout the agency writing about various topics of interest to the public, and moderated public comments as well.

"We are excited about using this new communications tool and hope

it will increase our collaboration and interaction with the public," said Chairman Gregory Jaczko. "The blog is intended to build upon our extensive efforts to explain and clarify the actions, roles and responsibilities of the NRC, raise awareness about our agency and its mission, and—most importantly—give us an opportunity to hear from the public."

The blog can be reached directly at <http://public-blog-nrc-gateway.gov> or by clicking on the

blog icon on the NRC Web site, www.nrc.gov. It can also be accessed on mobile devices such as smart phones by entering the Web site address in the mobile devices' Web browser.

The new blog does not replace formal communications, such as *Federal Register* notices or meeting notices, and will not accept allegations or comments on rulemakings. The complete comment guidelines are available on the blog.

News releases are available through a free listserv subscription at the following Web address: <http://www.nrc.gov/public-involve/listserver.html>. The NRC home page at www.nrc.gov also offers a SUBSCRIBE link. Email notifications are sent to subscribers when news releases are posted to NRC's Web site. ☒