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An Open Letter On Renewing Hope, for the Future: Divest From the Nuclear Power Industry

by David Ratcliffe

Supporting Documentation

Consider the following observations concerning the bottom-line consequences our species must confront and deal with if we are to not condemn the future of all life on Earth to increasing generation—for thousands of human generations—of cancer, leukemia, genetic mutations, inherited afflictions, genomic instability, birth defects, malformations and abortions at concentrations of man-made long-lived radionuclides almost below human recognition and comprehension. When we are dealing with such impossible-to-grasp time spans as those manifesting in the radioactive trash being generated from nuclear power plant operations, in the human time scale we are essentially talking about *forever*.

> "They [citing 3 other studies] leave, we believe, no escape from the conclusion that there is no threshold dose [of irradiation from X, gamma, or beta -rays], and that the individual mutations result from individual 'hits', producing genetic effects in their immediate neighborhood....
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> "[T]he great majority of mutations being undesirable, ... their further random production in ourselves should so far as possible be rigorously avoided....
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> "[W]ith the coming increasing use of atomic energy, even for peace-time purposes, the problem will become very important of insuring that the human germ plasm — the all-important material of which we are the temporary custodians — is effectively protected from this additional and potent source of permanent contamination."
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> — Hermann J. Muller, Recipient, Nobel Prize in Physiology or Medicine 1946;
> "The Production of Mutations," Nobel Lecture, December 12, 1946

> "[With nuclear power w]e are taking responsibility for 100,000 years for our descendants. We cannot escape from the fact already."
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> —Akio Matsumura, former special advisor to UN Development program, founder and Secretary General of the Global Forum of spiritual and parliamentary leaders for human survival, and the Secretary General of the 1992 Parliamentary Earth Summit Conference in Rio de Janeiro;
> "Fighting a dragon I cannot see," Fairewinds Energy Education podcast, June 5, 2013

> "[When humans] turn a nuclear power plant on, there is no off switch. The heat [from the spent fuel rods] remains for 10 years and the radiation remains for 100,000 years. So you can't change your mind. Throwing that switch on is a 100,000 year commitment. There is

no off switch with nuclear power."

—Arnie Gundersen, Fairewinds Chief Engineer;
"Fighting a dragon I cannot see," Fairewinds Energy Education podcast, June 5, 2013

"[M]ost people have no understanding of the intensity of the radioactivity created in the core of the reactor during normal operation.... the uranium that goes in is not nearly as radioactive as the stuff that comes out. The stuff that comes out is millions of times more radioactive than what goes in. And the reason for that is because the uranium atoms are split and it is all those broken pieces of uranium atoms which are so intensely radioactive, ... when you hear words like cesium-137 and so on, those are little broken pieces of uranium atoms. And that is the stuff that is going into the ocean at Fukushima and that is the stuff that would happen here in Canada or in the States."

—Dr. Gordon Edwards, President, Canadian Coalition for Nuclear Responsibility, Right Livelihood Award, 2006, *'for his enduring role in demystifying nuclear technology helping the public to understand its radioactive predicament'*;
"Nuclear Contamination Knows No Borders," Fairewinds Energy Education podcast, May 1, 2013

"[I]onizing radiation is not like a poison out of a bottle where you can dilute it and dilute it. The lowest dose of ionizing radiation is one nuclear track through one cell. You can't have a fraction of a dose of that sort. Either a track goes through the nucleus and affects it, or it doesn't. So I said 'What evidence do we have concerning one, or two or three or four or six or 10 tracks?' And I came up with nine studies of cancer being produced where we're dealing with up to maybe eight or 10 tracks per cell. Four involved breast cancer. With those studies, as far as I'm concerned, it's not a question of 'We don't know.' The DOE has never refuted this evidence. They just ignore it, because it's inconvenient. We can now [in 1994] say, there cannot be a safe dose of radiation. There is no safe threshold. If this truth is known, then any permitted radiation is a permit to commit murder."

—Dr. John Gofman, Ph.D. in nuclear/physical chemistry and a medical degree, worked in the Manhattan Project, co-discovered protactinium-232, uranium-232, protactinium-233, and uranium-233, proved the slow and fast neutron fissionability of uranium-233, co-inventor of uranyl acetate and columbium oxide processes for plutonium separation, received several medical awards for pioneering work on the chemistry of lipoproteins and their relationship with heart disease (Modern Medicine Award, 1954; American Heart Association's Lyman Duff Lectureship Award, 1965; Stouffer Prize (shared) for outstanding contributions to research in arteriosclerosis, 1972; American College of Cardiology, 1974, selected as one of twenty-five leading researchers in cardiology of the past quarter-century), Founder and first Director, Biomedical Research Division of the Lawrence Livermore Laboratory, Chairman, Committee for Nuclear Responsibility, Professor Emeritus of Molecular and Cell Biology, UC Berkeley, Right Livelihood Award, 1992, *'for his pioneering work in exposing the health effects of low-level radiation'*, author of more than one hundred scientific papers in peer-review journals in the fields of nuclear / physical chemistry, coronary heart disease, ultracentrifugal analysis of the serum lipoproteins, the relationship of human chromosomes to cancer, and the biological effects of radiation, with especial reference to causation of cancer and hereditary injury as well as seven books, *Poisoned Power, The Case Against Nuclear Power Plants Before and After Three Mile Island* (1971, updated in 1979), *Radiation And Human Health* (1981), *X-Rays: Health Effects of Common Exams* (with Egan O'Connor, 1985). *Radiation-Induced Cancer From Low-Dose Exposure: A Independent Analysis* (1990), *Chernobyl Accident: Radiation Consequences for This and Future Generations* (in Russian, 1994), *Preventing Breast Cancer: The Story Of A Major, Proven, Preventable Cause Of This Disease* (1996), *Radiation from Medical Procedures in the Pathogenesis of Cancer and Ischemic Heart Disease: Dose-Response Studies with Physicians per 100,000 Population* (1999);
"Gofman on the health effects of radiation: 'There is no safe threshold'," *synapse*, January 1994

Just One Part in a Thousand ?

"It may sound like a trifle to put only one part per thousand of a poison into the environment, but we will show what one part per thousand means with respect to radioactive cesium.

"The cesium-137 produced each year by a 1000-megawatt (electrical) nuclear power plant amounts to nearly 4 million curies. Since its radioactive half-life is 30.2 years, very little of it decays during a year.

"The Chernobyl reactor contained a two-year cesium-inventory of about 8 million curies. Recent estimates are that the Chernobyl reactor released about 2.5 million curies of cesium-137, which is equivalent to (2.5 / 4.0) or 62.5 % of a ONE-year inventory.

"Now let us consider 100 large nuclear power plants each operating in the USA for a lifespan of about 25 years each. Call "A" the yearly cesium-137 production by one plant. Then 100A = the yearly production by 100 plants. Lifetime production = 25 yrs x 100A/year = 2,500A. 99.9 % containment = release of 1 part per 1,000. With 99.9 % perfect containment, loss = 2.5A. Chernobyl lost 0.625A. The ratio of 2.5A and 0.625A is 4.0.

"This ratio, 4, has an enormous meaning. It means that achieving 99.9 % PERFECT containment of the cesium-137 produced by 100 plants during 25 years of operation, through all steps of the cesium's handling up through final burial, would STILL result in cesium-137 contamination equivalent in curies to 4 Chernobyl accidents.

"Worldwide, there are about 400 plants underway, so the same scenario (99.9 % perfection in containing cesium) would mean cesium-loss equivalent to 16 Chernobyl accidents per 25 years of operation. And this assault on human health could occur without blowing the roof off any single plant."

—Dr. John Gofman;
Radiation-Induced Cancer from Low-Dose Exposure: An Independent Analysis, 1990, Chapter 25, "Main Text: A Closing Statement"

"Many people think nuclear power is so complicated it requires discussion at a high level of technicality. That's pure nonsense. Because the issue is simple and straightforward.

"There are only two things about nuclear power that you need to know. One, why do you want nuclear power? So you can boil water. That's all it does. It boils water. And any way of boiling water will give you steam to turn turbines. That's the useful part.

"The other thing to know is, it creates a mountain of radioactivity, and I mean a *mountain:* astronomical quantities of strontium-90 and cesium-137 and plutonium — toxic substances that will last — strontium-90 and cesium for 300 to 600 years, plutonium for 250,000 to 500,000 years — and still be deadly toxic. And the whole thing about nuclear power is this simple: can you or can't you keep it all contained? If you can't, then you're creating a human disaster....

"So I find nuclear power this simple: do you believe they're going to do the miracle of containment that they predict? The answer is they're not going to accomplish it. It's outside the realm of human prospects.

"You don't need to discuss each valve and each transportation cask and each burial site. The point is, if you lose a little bit of it — a terribly little bit of it — you're going to contaminate the earth, and people are going to suffer for thousands of generations. You have two choices: either you believe that engineers are going to achieve a perfection that's never been achieved, and you go ahead; or you believe with common sense that such a containment is never going to be achieved, and you give it up.

"If people really understood how simple a problem it is — that they've got to accomplish a miracle — no puffs like Three Mile Island — can't afford those puffs of radioactivity, or the squirts and the spills that they always tell you won't harm the public — if people understood that, they'd say, 'This is ridiculous. You don't create this astronomical quantity of garbage and pray that somehow a miracle will happen to contain it. You just don't do such stupid things!'

"Licensing a nuclear power plant is in my view, licensing random premeditated murder. First of all, when you license a plant, you know what you're doing — so it's premeditated. You can't say, 'I didn't know.' Second, the evidence on radiation-producing cancer is beyond doubt. I've worked fifteen years on it [as of 1982], and so have many others. It is not a question any more: radiation produces cancer, and the evidence is good all the way down to the lowest doses."

—Dr. John Gofman;
Nuclear Witnesses, Insiders Speak Out, Chapter 4, "John W. Gofman, Medical Physicist," by Leslie Freeman, (New York: W.W. Norton, 1982), pp. 110-111.

"Long-lived radionuclides, such as cesium-137, are something new to us as a species. They did not exist on Earth, in any appreciable quantities, during the entire evolution of complex life. Although they are invisible to our senses, they are millions of times more poisonous than most of the common poisons we are familiar with. They cause cancer, leukemia, genetic mutations, birth defects, malformations and abortions at concentrations almost below human recognition and comprehension. They are lethal at the atomic or molecular level.

"They emit radiation, invisible forms of matter and energy that we might compare to fire, because radiation burns and destroys human tissue. But unlike the fire of fossil fuels, the nuclear fire that issues forth from radioactive elements cannot be extinguished. It is not a fire that can be scattered or suffocated, because it burns at the atomic level – it comes from the disintegration of single atoms."

—Steven Starr, Clinical Laboratory Science Program, University of Missouri, Senior Scientist, Physicians for Social Responsibility;
"The Implications of Massive Radiation Contamination of Japan with Radioactive Cesium," Helen Caldicott Foundation Symposium, "The Medical and Ecological Consequences of the Fukushima Nuclear Accident," Co-Sponsored by Physicians for Social Responsibility, March 11 and 12, 2013
See Also: "Costs and Consequences of the Fukushima Daiichi Disaster," Steven Starr, *PSR - Environmental Health Policy Institute*, October 31, 2012; Steven Starr maintains a web site on the long-term environmental consequences of nuclear war: Nuclear Darkness, Global Climate Change & Nuclear Famine

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