



## Bellefonte Efficiency & Sustainability Team

B.E.S.T.

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April 18, 2013

re: Nuclear Power is Not Clean - The Dirty Secret

Dear Directors,

First, we at BEST/MATRR want to remind you that we are here today in order to assist you in your important decision making process by providing you with facts that you may not see otherwise. We are concerned citizens who work hard to stay abreast and to present you with studies regarding nuclear issues that may be relevant to your decisions, and we humbly hope that you do take the time to peruse our summaries and even sometimes read the primary sources from the links we provide.

As you know, nuclear power plants use enriched uranium for fuel, and you may also know that the fission in reactors multiplies the enrichment of that uranium and creates some 200 man-made radioactive poisons in the process – radioactive trash with no known means of disposal. After 50 years of research, there is still no solution for the disposal of this highly toxic trash – trash that actually remains hazardous to human health for billions of years. Twentieth century nuclear power leaves a radioactive trash legacy that will burden future generations both biologically and financially.

A half-life is the time it takes for half of any one of these waste elements to decay into the next step toward stability. Some waste products of nuclear power plants (called radionuclides) decay in a single step, but others, like uranium, may have long and complex paths towards stability. Uranium-238 has a half-life of 4.5 billion years, and it has 17 decay steps before it becomes a stable form of lead. Radionuclides may also decay into different radioactive elements. Xenon-135, for instance, which is regularly released by nuclear reactors, has a half-life of only 9 days, but it decays to Cesium-135 which has a half-life of 3 million years.<sup>1</sup>

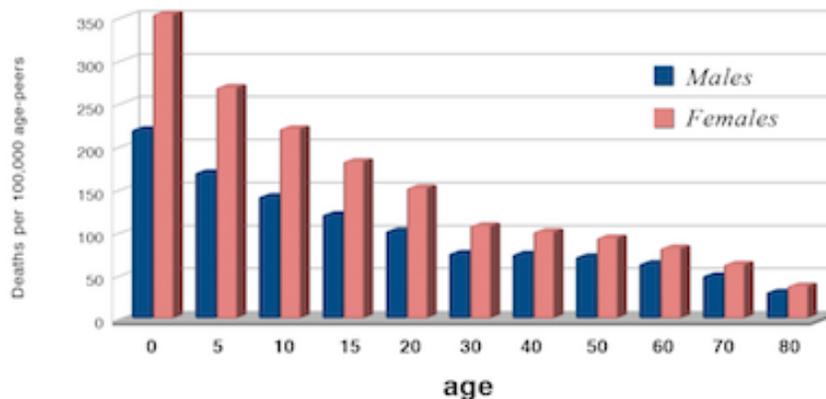
So often, nuclear scientists view the waste products of nuclear power plants in terms of chemistry and physics alone, and they seem to be unaware of the biology of these radioactive poisons. But we live in a biological world, a world vulnerable to the carcinogenic and the mutagenic effects of these man-made poisons.

Because these poisons are not found in nature, when an organism is exposed to them, it tries to make sense of them and treats them as the elements they most closely resemble in nature. For instance, Strontium-90, found in the baby teeth studies,<sup>2</sup> is similar to calcium, so our bodies collect it in our bones, which is where we make new blood cells. There, unfortunately, it can irradiate bone and blood cells leading to both bone cancer and blood cancers such as leukemia. Multiple peer-reviewed studies<sup>3</sup> in Germany<sup>4</sup>, France<sup>5</sup> and England<sup>6</sup> have shown that children living within 5 kilometers of nuclear power plants are twice as likely to have childhood leukemia as children living elsewhere. In fact, 60 studies around the world have examined childhood cancer near nuclear

power plants and “over 70% of them revealed pronounced cancer increases.”<sup>7</sup> We believe it is clearly immoral to knowingly increase suffering in children for the sake of profit.

There are also Cesium-135 and Cesium-137, potassium analogs that accumulate within and irradiate muscle cells and nearby organs. The Japanese soil contamination with Cesium-137 was presented at the National Academy of Sciences proceedings of Dec.6, 2011.<sup>7</sup> And the National Oceanic and Atmospheric Administration (NOAA) tracked the atmospheric path of Fukushima Daiichi's release of Cesium-137 as it circled the globe in the northern hemisphere after the explosions (March 12-31, 2011)<sup>8</sup> in a stunning video that you can view on the [Nuclear Disasters](#) page of our website.<sup>9</sup> We want to help you ensure that such a disaster does not both decimate and emanate from our valley.

**Increased Cancer Mortality by Age at Exposure to 20 mSv Radiation**



U.S. National Academy of Sciences BEIR VII Phase 2 Risk Model



The above graph plots the data of the National Academy of Sciences, Biological Effects of Ionizing Radiation BEIR VII Phase 2 report, "Health Risks from Exposure to Low Levels of Ionizing Radiation",<sup>10</sup> where the Table is for a single dose of 0.1 Gy, which is equal to 100 mSv, and Goddard follows the BEIR report instructions to adjust the numbers for 100 mSv down to 20 mSv, which is one fifth the NRC annual dose limit. Radiation exposure is cumulative and ionizing radiation is released routinely by nuclear power plants.

There have been three major nuclear power accidents within the industry's 50 year history. You may say that sounds like a fairly good safety record, until you look at the number of deaths and displacements caused by these accidents. We know that most of the public, and probably you yourselves, are not aware of the casualties. The industry misinformation machine was extremely effective with the 1979 Three Mile Island accident, where the 1991 Columbia University finding of a doubling of all observed cancers after the accident (including lymphoma, leukemia, colon, breast, ovary, testis, and prostate) within 10 miles of the accident were somehow attributed to stress rather than radiation. Even so, by 1996 the plant's owners had paid over \$80 million in health, economic and evacuation claims, including a \$1.1 million settlement for a baby born with Down's Syndrome.

In 1986, after the Chernobyl disaster, the Soviet government claimed that only 31 rescue workers had died. 20 years later, the World Health Organization, the International Atomic Energy Agency and other groups finally admitted to 9,000 cancer deaths attributable to Chernobyl worldwide. Then in 2009, the New York Academy of Sciences published the findings of a Russian team of doctors, led by Alexey Yablokov, who studied 5,000 articles and reports produced closer to the region and they estimated 985,000 deaths (and rising) worldwide from the Chernobyl fallout. Many experts in the field agree with this figure. There were also 220,000 people permanently displaced from their homes, and 2,759 square miles of agricultural land plus 4,237 square miles of forest were rendered a wasteland.<sup>11</sup>

When the Fukushima-Daiichi disaster began in 2011, the Japanese government (as well as industry) were quick to cover up and minimize the damage. John Boice of Vanderbilt University rather brashly declared, "“there is no

opportunity to conduct epidemiologic studies that have any chance of detecting excess cancer risk. The doses are just too low.” And the World Health Organization, concluded that cancer rates would not increase measurably from Fukushima, except for a small rise in exposed children living closest to the site. Many experts disagree.<sup>12</sup> American nuclear engineer Arnold Gunderson "calculates that the meltdown will cause 1 million cancer deaths"<sup>13</sup> , and given the data that has come to light at Chernobyl that seems plausible. Chemist Jan Beyea predicts future cancer deaths just from the long-term gamma radiation on the ground (like Cesium-135 and 137) will be close to 1,000.<sup>14</sup>

Leading expert, Dr. Helen Caldicott (former professor at Harvard Medical School, pediatrician at Children's Hospital in Boston, Mass, and current member of the International Scientific Advisory Board), has said that Japanese doctors will begin seeing lung cancer and leukemias 2 to 5 years after the accident and solid cancers in 15 to 17 years.<sup>16</sup>

Nuclear energy is dirty, not only because of its role in increasing the incidence of cancer, but also because of the long-term and irreversible damage to future generations in terms of gene mutations and subsequent malformations and diseases. According to a leading expert, Dr. Herbert Abrams of Stanford University School of Medicine, “High radiation doses tend to kill cells, while low doses tend to damage the genetic code (DNA).”<sup>17</sup>

We simply cannot let your CEO stand and declare that nuclear power is 'clean' without providing you with data showing that this declaration by nuclear proponents is not just a simple comparison of nuclear to coal carbon emissions. There are current and future lives at stake here, not just carbon credits, in your decision whether to continue following your current management’s path to nuclear destruction – destruction in terms of TVA's financial security and in terms of the lives of we citizens who live here and future generations.

Thank you for your time and consideration, and for your service to our valley.

Sincerely,

Gretel Johnston, co-founder  
Mothers Against Tennessee River Radiation (MATRR)

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## References

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