



MAKE RADIATION VISIBLE

White Paper

Nothing is more frightening than an unseen danger. After the 2011 Fukushima Daiichi explosions, as 300,000 people were evacuated from the area, Prime Minister Naoto Kan said the Japanese were fighting an "invisible enemy." They had state-of-the-art computer models for tracking radiation plumes, but because someone in middle management did not trust the models and agencies hesitated to direct costly evacuations, school children were sent directly into the path of the plume, rather than away from it. This can be a lesson to not wait for a nuclear disaster in the U.S. before acting to prevent a similar outcome.

It took a Texas school explosion killing nearly 300 children in 1937 before odor markers were required for natural gas and propane. Much like people before odors were put in gas, we have accepted unknown levels of man-made radiation around us – an invisible danger that can be made visible in multiple ways.

Emergency Release Dye-Markers

First, we propose the NRC can MAKE RADIATION VISIBLE by requiring visible dye-markers be dispersed with emergency radioactive plume releases. When radionuclide releases exceed permitted levels, a dye-release-valve can be activated to disperse visible tracers to travel with the gas or liquid release plume. Uranine florescent dyes were already used to trace water pollutants and were successfully tested as aerosol tracers making atmospheric pollutants visible up to eight miles in 1959, so advancements in dispersal technologies and dye compositions should make this safety feature far more effective now. Many studies have been done on more complex (hind-cast and network dependent) methods of plume detection, from computer modeling to post-incident Air Force and robot sensor tracking; but the sensible, economically sound, and immediate solution (critically helpful to first-responders and the public) is to use a simple system of direct florescent dye dispersal at release points.

No doubt, there will be continued industry resistance to the prospect of direct plume viewing by the populace, and attempts will be made to delay this relatively simple improvement in preparedness. Industries will champion more expensive and less direct technologies; nevertheless, we call on the NRC to remember the Texas children before gas had an odor and the victims of Fukushima Daiichi who could not see the radioactive plume as they tried to escape it, and to expedite the use of these visible dyes to prepare for an emergency release of radiation. We can learn about invisible hazards from these tragedies in Texas and Fukushima, and take steps to MAKE RADIATION VISIBLE in a straightforward way, thereby increasing the safety and confidence of our citizens.

Public Health Alerts

We also propose the NRC require notice for Public Health Alerts when radioactive releases are scheduled and/or detected. There are weather alerts, other toxic spill alerts, even pollen alerts for U.S. citizens, yet no public health alerts for these known carcinogens and mutagens routinely released into our communities. This is one more way to MAKE RADIATION VISIBLE for public health and safety. The research has been done, now it is time to inform the public of potential exposures. The NRC can avoid costly state-by-state legal battles by adding these new regulations.

Over 60 studies worldwide have examined childhood cancer near nuclear plants, and “over 70% of them revealed pronounced cancer increases.”¹ Of those, about 40 studies specifically indicate increased leukemia risks among children living near nuclear power plants. The important 2007 KiKK case-control

¹ Ian Fairlie, MD, “Infant Leukemias Near Nuclear Power Stations,” CND London, Jan. 2010, www.cnduk.org/campaigns/anti-war/item/download/42

study, commissioned by the German Government, found a 2.2 fold increase in leukemia risks among children living within 5 km of its 16 German nuclear reactor locations.² “This authoritative report led to geographical studies [“all very large studies commonly with over 100,000 data points”] sponsored by the governments of France, UK, Switzerland and Germany. These have now been published and all four had similar findings, ie 30% to 40% increases in child leukemias near NPPs [nuclear power plants]...”³

Our current understanding of radiation risks, especially for infants and children, may be incorrect and as Dr. Fairlie concludes, “public radiation limits and constraints may need to be revised”. It is important to remind ourselves, lest we lose sight of our government agency missions, that in regards to human exposure to radioactivity, ‘permissible’ is not the same as ‘safe’, and the accepted ALARA standard of ‘As Low As Reasonably Achievable,’ is based on ‘estimating’ not ‘measuring’ the number of excess fatal cancers and severe genetic diseases caused by radiation exposures. U.S. citizens, especially pregnant women and mothers of young children, deserve to be informed of health hazards, so they can protect themselves with appropriate measures,

Online Real-Time Monitoring

One in three Americans now lives within fifty miles of a nuclear power plant, yet the United States does not have a comprehensive radiation monitoring network. When the aerosol plume from Fukushima moved across our continent, less than 100 Environmental Protection Agency (EPA) monitors recorded the radioactive plume. Since then, hundreds of concerned U.S. citizens have been uploading real-time radiation data online, yet the agencies charged with protecting citizens have not cooperated to create a comprehensive national network for radiation monitoring. The NRC only assumes responsibility for commercial plant operators, requiring them to report averaged emission release levels annually and allowing gaps in the data and questionable averages. The EPA has a RadNet network online, but only thinly scattered monitors across the country and few are downwind of nuclear power plants. We propose the agencies coordinate and upgrade to modern equipment for accuracy, expediency, and compatibility to ‘connect the dots’ and keep relevant agencies and the public informed of radioactivity levels nationwide.

The 100 million Americans living within fifty miles of nuclear power plants deserve to know when and where they are being exposed to potentially toxic radioactive poisons. Because multiple studies have determined there is no safe dose of radiation, no threshold for danger to humans, we ask the NRC and EPA to protect the health and safety of the public by providing real-time radionuclide information online. The technology is solid, and accurate information will increase public confidence and safety.

It is time for the NRC to join the 21st century, to upgrade its outworn monitoring requirements, as well as the quality of both its online presence and its attitude toward transparency. Most operators have existing real-time radionuclide monitors in place (inside containment structures, at guard stations, and around perimeters), and some operators have monitors which cover wide-ranges surrounding the plants, but they are only required to record averaged radionuclide readings quarterly, then report the levels annually. This inadequate exposure data and public disclosure being delayed for a year, does not benefit the people exposed. It would cost very little (compared to the benefit in public confidence and safety) for operators to link the data going to emergency services, to add additional real-time monitors that automatically upload data to the internet, and to replace area dosimeters (that require manual removal of filters to be sent to a laboratory for analysis) by upgrading to modern detectors capable of identifying and uploading the levels of hundreds of radionuclides online in real-time. The existing system is simply antiquated.

It seems so clear that modern technology can now MAKE RADIATION VISIBLE with real-time online monitoring, emergency dye-markers, and public health alerts, and can thereby actually simplify the NRC and EPA tasks to protect and inform the public. Please visit www.MakeRadiationVisible.org for more information, and contact info@MakeRadiationVisible.org with questions and/or suggestions.

² Peter Kaatsch, Claudia Spix, Irene Jung, Maria Blettner, “Childhood Leukemia in the Vicinity of Nuclear Power Plants in Germany,” *Dtsch Arztebl Int* 2008; 105(42), <http://www.aerzteblatt.de/pdf.asp?id=62000>

³ Ian Fairlie, “Recent Evidence of the Risks of Low-Level Radiation,” Jan. 2013, pg. 4. <http://www.ianfairlie.org/news/recent-evidence-on-the-risks-of-very-low-level-radiation/>