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Reactor Effluents

Comment On: NRC-2014-0044-0003
Reactor Effluents; Extension of Comment Period

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Comment on FR Doc # 2015-21072

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General Comment

See attached file of Multi-Group Comments from 19 organizations regarding 10 CFR Part 50, Appendix 1 - Comments for ANPR on Reactor Effluents [Docket ID NRC-2014-0044]

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Attachments

Docket NRC-2014-0044_Multi-Group Comments on Reactor Effluents

Oct. 1, 2015
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U.S. Nuclear Regulatory Commission
ATTN: Rulemakings and Adjudications Staff

**Multi-group Comments on
Advance Notice of Proposed Rulemaking (ANPR) for
Radioactive Reactor Effluents Regulations (Docket ID NRC-2014-0044)**

We welcome the proposed elimination of the singular 'Standard Man' and acknowledgment of the far higher probability of ionizing radiation damage to women, children, infants and the unborn. These steps help build our confidence in the Nuclear Regulatory Commission (NRC) and its mission to protect the public from radionuclide exposures. Nonetheless, we urge the Commission not to weaken, but only to strengthen NRC dose protections in any Rulemaking and to delve into **more recent research than your ANPR basis recommendations** from the International Commission on Radiological Protection (ICRP) included in their 2007 ICRP Publication 103. Many significant studies have been conducted on health issues near nuclear power plants (NPPs) since 2007. We also call for modern effluents measurements via real-time monitoring posted online for the public, along with refueling dates and notice of both scheduled and unscheduled radioactive effluent releases.

First, we assert that the data upon which effluent limits and dose calculations are based is not accurate data, since NRC only requires nuclear reactor licensees to report averaged quarterly effluent releases – not actual release levels, which now can easily be recorded using real-time online monitoring. Repeatedly, science shows unexplained discrepancies between expected and observed cancer rates near nuclear power plants. Licensees and regulators know that radioactive effluent release spikes happen during refueling, as well as during routine batch releases; so, averaging data over 3 month periods misrepresents these spike exposures. Given current real-time monitoring technologies, there is simply no excuse for using averaged data for questionable estimated dose calculations, rather than using actual observed data for accurate measurements of exposure levels.

Second, we assert that this proposed Rulemaking is untimely, since it does not incorporate important research from numerous in-depth epidemiological studies published in the last nine years. Since the overwhelming majority of these recent studies show the public is more vulnerable to ill health due to ionizing radiation exposure than previously thought, the more current research should be thoroughly studied by the ICRP and the NRC before any reduction in public protection is proposed. As the Commissioners and NRC staff well know, the subtleties of bias and financial pressures can easily affect important decisions. We will always encourage you to increase environmental and public protections, since science clearly demonstrates that radiological exposure is harmful to human cells and DNA.

Basic Effluents Data is Averaged and Therefore Faulty

We assert that exposure levels cannot be known and that standards cannot be enforced when the actual data upon which the exposures and standards are based is faulty. As long as the basic U.S. radiological effluents data is averaged, rather than based on comprehensive observed data, your dose calculation methodologies will render false results. The technology is now cost-effective and reliable for real-time, accurate 24/7 online monitoring (see examples at International Medcom, Inc., <https://medcom.com/product/hawk-ems-monitoring-system/>). Concerned citizens have taken the lead in monitoring, since the Environmental Protection Agency (EPA) and NRC-regulated deficiencies in monitoring were revealed as the Fukushima plume spread radiation across our U.S. mainland in 2011.

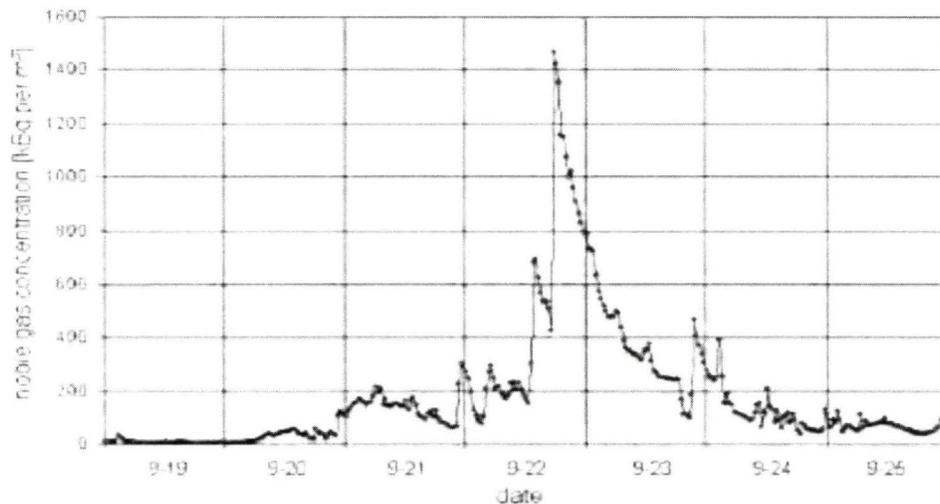


Fig. 3. Noble gas concentrations at Gundremmingen C. September 19- 25, 2011

Because there are larger releases during refueling and during batch releases and because radioactive isotopes are energetic and unstable, the current method of measuring effluents on a weekly, monthly or quarterly basis is highly inaccurate. In fact, the current quarterly averaging of effluent releases (and therefore assumed doses to the public) reported to NRC annually are seriously inaccurate and unscientific. According to radiation biologist Dr. Ian Fairlie, during the brief periods of nuclear refueling (Fig.3), the "people living near and downwind from nuclear power stations may be exposed to higher exposures during these emission spikes than from releases during the rest of the year: estimates range from 20 to 100 times higher." ¹ Our own group has recorded exposures 50 times higher than background levels downwind of Browns Ferry during rain events.

Given this knowledge of increased exposure to the public during refueling, as well as during routine effluent batch releases, we request on behalf of the public that any new effluent rules include online licensee postings of refueling and effluent release schedules.

¹ Fairlie, Ian, "A hypothesis to explain childhood cancers near nuclear power plants," *Journal of Environmental Radioactivity*, Vol 133, 2014, pgs. 10-17, 133 (2014) 10e17, Fig. 3, pg. 13.
<http://dx.doi.org/10.1016/j.jenvrad.2013.07.024>

Although there is “strong evidence” for the carcinogenic effect of protracted low-dose radiation exposures,² *the disproportionate effect on radiation risk is not yet understood. And though it is well established that “Ionising radiation causes leukaemia,”*³ *the official estimates of radiation dose levels from nuclear power plant effluents is “too low by orders of magnitude to explain the increased leukemias” internationally acknowledged to be inflicting children between the ages of 0-4 years living within 5 Km of nuclear power plants.*⁴ We suggest that these “official” exposure estimates may be based on faulty data.

In 2012, the Radiation and Public Health Project (RPHP) Board of Directors wrote a detailed analysis of your subsequently canceled NRC-commissioned National Academy of Sciences (NAS) study to the Committee on the Analysis of Cancer Risks in Populations Near Nuclear Facilities. RPHP *Methodological Comments* analyzed the following issues:

1. Citations Exclude Studies of Populations Near U.S. Nuclear Plants
2. Citations Exclude Studies of Harm from Low Dose Exposures
3. Lack of Cancer Incidence Data
4. Lack of Release/Exposure Data
5. Lack of In-Body Dose Data
6. Lack of Data on Population Mobility and Risk Factors and
7. Limitation of Study to Cancer

(Please note number 4.) The *Structural Comments* noted conflicts of interest with industry and that “NRC Lacks Health Professionals,” among other issues.⁵ The errors in the NRC-NAS study were correctable (one purpose of Phase I), and the relatively small \$8 million cost cannot justify the NRC ignoring evidence of increased cancer rates near nuclear plants by simply cancelling your own study.

In 2013, an international conference of radiological specialists (from France, Germany, Finland, Spain, Switzerland, USA, UK, and Belgium) reviewed existing studies of childhood leukemias near nuclear facilities and analyzed methodologies. In the Section titled 2.2.4. *Exposure indicators*, they state:

Distance can be easily and reliably determined, but it constitutes only a crude proxy for radiation exposure from nuclear installations. Better exposure indicators are needed for investigating health effects around nuclear sites. This recommendation is in accordance with that of the NRC report which calls for absorbed doses to individual organs to be estimated^[47]

Based on the results from exposure monitoring or dosimetric estimates, the orders of magnitude of the doses attributable to current routine discharges appear to be small. The so-called ‘radioecological studies’ conducted in the

² Klervi Leuraud, et al, “Ionising Radiation and risk of death from leukaemia and lymphoma in radiation-monitored workers (INWORKS): an international cohort study,” *The Lancet Haematology*, Volume 2, No. 7, e276-e281, July, 2015, pg e275.. [http://www.thelancet.com/pdfs/journals/lanhae/PIIS2352-3026\(15\)00094-0.pdf](http://www.thelancet.com/pdfs/journals/lanhae/PIIS2352-3026(15)00094-0.pdf)

³ Ibid, Leuraud, July 2015, e277

⁴ Op. cit., Fairlie 2014, pg. 10

⁵ Robert Alvarez, et al, “Letter to Committee on the Analysis of Cancer Risks in Populations Near Nuclear Facilities,” Radiation and Public Health Project (RPHP), May 23, 2012. <http://radiation.org/>

UK [56 –58], in Germany [59] and in France [60 , 61] indicated that the levels of doses attributable to releases from the plants were well below those due to natural sources of radiation (100 to 1000 times, or more) and *could not explain the observed number of cases* [62 , 63]. The feasibility and *pertinence of measurements of radionuclides* (tritium and carbon-14 and possibly other radionuclides) *in environmental media or directly in children* (e.g. urine analysis), *or other dosimetric approaches* to evaluate individual doses should be investigated, as the direct measurement of the body contents of radionuclides such as caesium-137 and plutonium-239/240 have provided valuable information in the past (e.g. [58 , 64 , 65]). [Bracketed reference numbers from original document and *italic emphasis added.*]⁷

The majority of studies rely on monitoring data, unless rare tests of urine, blood, baby teeth, biopsies or autopsies are performed and recorded. Comprehensive monitoring data is sorely needed, with real-time monitors downwind and downstream. We agree that more radionuclide measurements in environmental media are needed, as well as studies of the children themselves; but we also suggest that the relatively simple installation of modern real-time online radionuclide monitoring equipment can be comprehensively implemented quickly and cost-effectively near U.S. nuclear power plants.

In July of 2014, the Electric Power Research Institute (EPRI) submitted recommendations to the proposed NRC-NAS Cancer Study (which NRC canceled in 2015) regarding both atmospheric and liquid effluent nuclear releases. EPRI stated:

*As discussed in an earlier EPRI report..., dose values reported by nuclear facilities should not be regarded as actual or estimated dose measurements to members of the public because the methodology, assumptions, and approaches used for nuclear facilities do not result in representative exposures to any real individual or population and vary greatly across facilities (EPRI 2011). Also, it is important that the NAS develop independent calculations of the releases and doses for the pilot study sites to establish the study's credibility. To make these calculations, it is necessary to establish exactly how much activity was released into the environment from each nuclear facility, what the activity was, and the temporal variations in releases. . . . [Emphasis added.]*⁸

We assert that Radioactive Effluent Release Limits cannot be regulated if the levels being released are unknown, yet this can be corrected since the levels of radioactivity surrounding the plants can now be known with accuracy and shared online in real-time. Isotope-specific, 24/7 online monitoring is now available and is cost effective. Combining comprehensive monitoring data with intelligent analytic software means verifiable dose measurements are now achievable. Actual real-time effluent levels can and should be posted online.

⁷ D Laurier, et al, "Childhood leukaemia risks: from unexplained findings near nuclear installations to recommendations for future research," *Journal of Radiological Protection*, June 18, 2014, J. Radiol. Prot. 34 (2014) R53–R68, <http://iopscience.iop.org/article/10.1088/0952-4746/34/3/R53/pdf>

⁸ Electric Power Research Institute, *EPRI Recommendations for the National Academies™ Pilot Study of Cancer Risks in Populations around Nuclear Facilities: Feasibility Study*, 3002003163, Final Report, July 2014, 4-1. <http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002003163>

We also assert that current monitoring data based on averaging effluent releases is simply inaccurate, and suggest that modern comprehensive real-time online monitoring, recording and reporting should be implemented. The data should be posted on licensee websites and on the EPA, NRC, and/or Homeland Security website, and should be required in Radioactive Reactor Effluents Regulations. This should be paid for with operating licensee fees.

We suggest that now is the time for the NRC to implement modern standards for Radioactive Effluents monitoring, i.e. comprehensive 24/7 recording and scientific evaluation of commercial reactor effluent releases; and we further assert that Radioactive Effluents monitoring data should be posted online in real-time for the public and scientists.

We firmly assert that the public should be informed of radioactive effluent release schedules, and that any Radioactive Effluents Rulemaking should require postings of refueling and effluent release schedules, as well as unscheduled releases and leaks on a dedicated Effluents Page of each licensee and an agency website, along with real-time monitoring data.

Effluents Proposal Based on Outdated Studies

This Advanced Notice of Proposed Rulemaking (ANPR) proposes updating NRC standards to more closely align with ICRP recommendations made over eight years ago in the 2007 ICRP Publication 103. We assert that these 2007 ICRP recommendations were formulated before some very important epidemiological studies on the actual health effects of radioactive effluents on nearby populations were analyzed. The U.S. National Academy of Sciences Report on “Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII - Phase 2,”⁹ published in 2006, was not mentioned in the ICRP Summary or free Excerpts or in the *Journal of Radiological Protection* review of the ICRP Publication 103,¹⁰ nor was it mentioned in this NRC Advance Notice of Proposed Rulemaking (ANPR) on Reactor Effluents Regulations.¹¹

The BEIR VII - Phase 2 Report was, of course, disliked by the nuclear community, which has gambled massive private and public monies on the nuclear power experiment. To learn that even very low exposures to ionizing radiation is harmful to humans and other living things, especially given the unsolved problem of radioactive waste sequestration, is difficult for investors, for licensees, for regulators and for workers; but this knowledge is highly relevant to any Rulemaking that involves the public’s exposure to Radioactive Effluents.

The National Academy of Sciences/National Research Council BEIR VII Committee wrote:

⁹ National Research Council, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII - Phase 2*, National Academies Press, 2006, pg. 275.. <http://www.nap.edu/catalog/11340.html>

¹⁰ A.D. Wrixon, “Review: New ICRP Recommendations,” *Journal of Radiological Protection*, J. Radiol. Prot. **28** (2008) 161–168. <http://iopscience.iop.org/article/10.1088/0952-4746/28/2/R02/pdf>

¹¹ Nuclear Regulatory Commission, “Advanced Notice of Proposed Rulemaking on Reactor Effluents,” Docket ID NRC–2014–0044, May 4, 2015. <http://www.regulations.gov/#!documentDetail;D=NRC-2014-0044-0002>

The committee concludes that the current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose-response relationship between exposure to ionizing radiation and the development of cancer in humans.¹²

The report also suggested that genomic instability may be a significant factor in radiation cancer risk, stating because “error prone repair of chemically complex DNA double-strand damage is the predominant mechanism for radiation-induced gene or chromosomal mutation, there can be no expectation of a low-dose threshold for the mutagenic component of radiation cancer risk.”¹³ In other words, there is no safe dose.

This was the conclusion also reached by Dr. John Gofman regarding low dose exposures decades earlier.¹⁴ In 1954, Gofman was urged by his friend and colleague, Lawrence Livermore, to establish a Medical Department at the Livermore Radiation Laboratory. In 1963, another friend and colleague, chemist Glenn Seaborg, then chair of the Atomic Energy Commission (AEC), urged Gofman to develop a biomedical division at AEC’s Livermore Laboratory (now the Lawrence Livermore National Laboratory (LLNL)) to study the effects of ionizing radiation on human health. The Livermore team “concluded that the risk of cancer from radiation exposure was far greater than the estimates the government was using to set limits on public exposures.”¹⁵ It is up to this Commission to correct these long-term, ongoing underestimations and ensure that future research does not continue to err in the same way

The NAS BEIR VII Report was followed by several European studies. In 2008, the German government commissioned a meticulously conducted study, known as the KiKK Study, to determine if there was an increased incidence of childhood leukemia near nuclear power plants. The KiKK study found a 1.6 fold increase in the relative risk of total cancers and a 2.2 fold increase in leukemias among children under 5 years of age living within 5 km of all 16 nuclear power plants in Germany.¹⁶ When the findings were revealed, the Germans again commissioned a study to ensure the validity of the KiKK study, and it did indeed determine the validity of the earlier study. The KiKK study was followed by additional government-commissioned studies (in France, Switzerland, and England), whose findings echoed the increased cancer risks revealed in the KiKK study.

Four government sponsored studies conducted since the 2007 ICRP Publication 103 and after the 2008 KiKK study reveal the following increased observed leukemia cases near

¹² National Academy of Sciences, *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII - Phase 2*, National Academies Press, 2006, pg. 323.. <http://www.nap.edu/catalog/11340.html>

¹³ Ibid, National Academy of Sciences 2006, pg. 315.

¹⁴ John W. Gofman, *Radiation Induced Cancer from Low-Dose Exposure: An Independent Analysis*, 480 pp. San Francisco, Committee for Nuclear Responsibility, 1990. <http://www.ratical.org/radiation/CNR/RIC/indexT.html> (Note: an interesting *New England Journal of Medicine* review of both the NAS 1990 BEIR V Report and Gofman’s book can be read at <http://www.ratical.org/radiation/CNR/RIC/NEJM.html>)

¹⁵ UC Berkley News, “John Gofman, anti-nuclear activist & lipid researcher, has died,” September 4, 2007. http://www.berkeley.edu/news/media/releases/2007/09/04_GofmanObit.shtml

¹⁶ Peter Kaatsch, Claudia Spix, Irene Jung, Maria Blettner, “Childhood Leukemia in the Vicinity of Nuclear Power Plants in Germany,” *Deutsches Ärzteblatt International*, Dtsch Arztebl Int 2008; 105(42): pg. 725

nuclear power plants – 130% to 141% higher than expected leukemia rates (see Table 1) ¹⁷ These findings could make a case for reducing allowable radioactive effluent release levels by the same percentages.

Table 1
Studies of observed (O) and expected (E) leukemia cases within 5 km of NPPs.

Dataset	O	E	SIR = O/E	90%CI	p-value
Germany	34	24.1	1.41	1.04–1.88	0.0328
Great Britain	20	15.4	1.30	0.86–1.89	0.1464
Switzerland	11	7.9 ^a	1.40	0.78–2.31	0.1711
France ^b	14	10.2	1.37	0.83–2.15	0.1506
Pooled data	79	57.5	1.37	1.13–1.66	0.0042

^a derived from data in Spycher et al. (2011).

^b acute leukemia cases.

We call on the NRC to protect us from the long-term damage that ionizing radiation is known to cause to the structure of DNA by improving Radioactive Release Standards. Because ionizing radionuclides are among the most toxic pollutants known to man, some remaining harmful for millions of years, and because we know that they can damage us at even the smallest doses, we call on you to adhere to protecting the people, not the industry, with your Radioactive Effluents Release Standards.

One specific way in which we ask you to protect the public is for NRC to require reporting of verifiable release levels, not hypothetical dose calculations. We want actual data for real health protection for the public.. The NRC should require radiation reporting in terms of scientifically verifiable radiation concentration levels (and total amounts) not, more easily manipulated dose calculations. Radioactive Effluents cannot be regulated if the quantity and duration of effluent releases and environmental exposures are not known at any given time. Effluents can now be measured in real-time, so NRC regulations should require online real-time effluents data be made available to the public and the scientific community. Scientific knowledge is based on verifiable observed evidence.

Local Citizen Monitoring and Epidemiological Studies

It is important to remind everyone considering these issues surrounding nuclear waste radioactive releases into our air and water from nuclear power plants, that these emission standards affect real people in our communities. In the Tennessee Valley, where BEST/MATRR is monitoring radionuclides and studying the effects on our environment and the people of our valley, evidence shows patterns of ill health surrounding nuclear facilities. These local, independent studies don't prove cause and effect, as additional factors may be involved; but the patterns observed do raise serious concerns, which real-time monitoring would help answer, and these patterns deserve further investigation. Given the number of

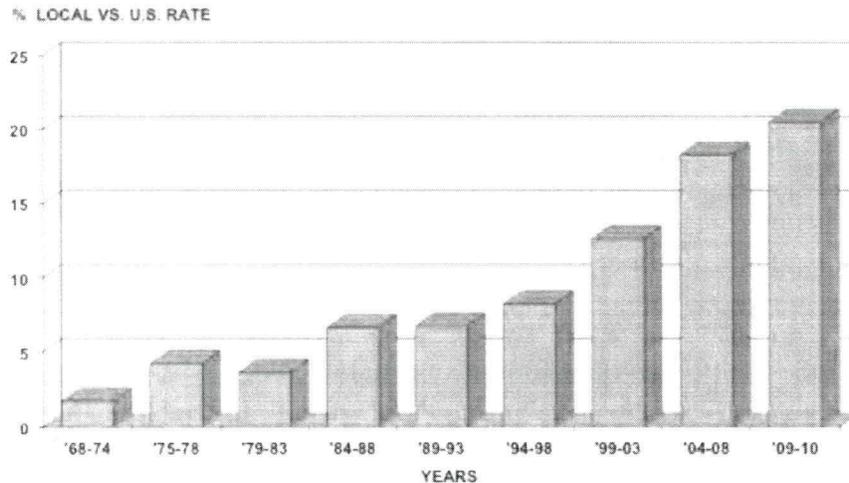
¹⁷ Ian Fairlie, "A hypothesis to explain childhood cancers near nuclear power plants," *Journal of Environmental Radioactivity*, 133 (2014) 10e17, Table 1. pg. 11. <http://dx.doi.org/10.1016/j.jenvrad.2013.07.024>

aging reactors in the area, and the extreme mortality rates and health issues surrounding multiple nuclear plants, these patterns are certainly worthy of note when discussing limits to effluent radionuclide pollutants in our environment.

MORTALITY RATE, 1968 - 2010

7 Alabama Counties

Downwind of Browns Ferry vs. U.S.



After Browns Ferry Nuclear Power Plant (BFN) first began releasing radioactive waste into our environment (1973), the mortality rate in seven counties near and downwind of the north Alabama plant rose from under 2% to over 20% higher (2010) than U.S. rates. Local mortality rates in these seven counties have become especially high for young people. The (2010) rate for young persons who died at age 0-24 was 27.4% above the national rate, and the rate for adults aged 25-44 was 25.7% higher than average U.S. communities.

We are also seeing a pattern of increased infant mortality near multiple nuclear facilities in the Tennessee River Basin. In our 2013 study of counties surrounding the Browns Ferry Nuclear Power Plant, we saw a classic “bathtub pattern” of infant mortality. In the seven proximate/downwind counties, we found infant deaths rose in the first decade after the three GE Mark I Boiling Water Reactors (BWRs) began producing radioactive waste, then the rates seemed to settle into numbers more aligned with the U.S. rates, even going below the national infant mortality rates (during reactor shutdown periods) until the reactors were restarted, began to age, and TVA began High Burnup Fuel usage.

In the late 1980’s and early 1990s, infant mortalities fell below the U.S. rate after all three Browns Ferry Nuclear Power reactors were shut down (1985), then death rates began a steady climb as the reactor Units 2 and 3 restarted (1991 and 1995), reaching a precipitous rise concurrent with Browns Ferry’s beyond-design-basis High Burnup Fuel usage and the third reactor restart in 2007 (Unit 1, after a 22 year shutdown) with infant mortality reaching 21.6% above the U.S. rate by 2010. ¹⁸

¹⁸ Joseph Mangano, MPH and Gretel Johnston, *Radioactive Emissions and Health Hazards Surrounding Browns Ferry Nuclear Power Plant in Alabama*, BEST/MATRR, June 4 2013, pgs. 12, 27-30. http://best-matrr.org/pdfs/AL_BFN_Report_2013-final-dig2.pdf

Infant Mortality 1968 to 2010

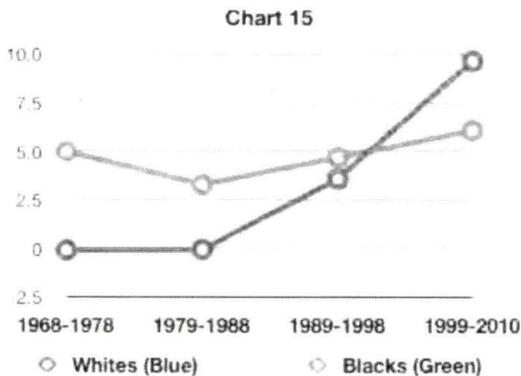
in 7 Browns Ferry Nuclear Power Plant Proximate/Downwind Counties

3 Browns Ferry Reactors Started Up 1973-1975 by 2004 they were - 30 years old



Our current study of 23 counties located near nuclear plants in Tennessee also reveals a disturbing pattern of cancer rates rising over the last four decades; and a sad, precipitous rise in infant mortality rates. Again, we acknowledge additional factors may be involved, and we cannot say there is a direct causal relationship, since the data is not available to draw that conclusion, but we think these patterns deserve further study.

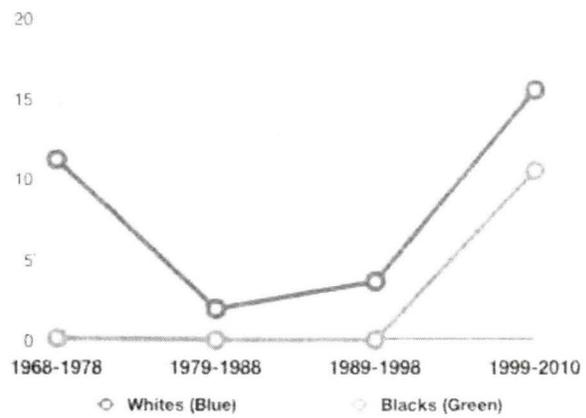
Cancer Mortality Rates (All Ages)
23 East TN Counties vs. U.S.



Based on CDC data

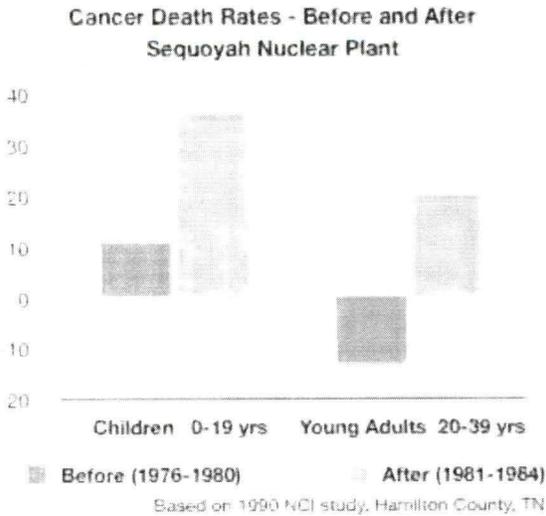
23 TN Cos.	1968-1978	1979-1988	1989-1998	1999-2010
Whites	-6.20%	-2.60%	+3.6%	+9.7%
Blacks	-5%	+3.3%	+4.7%	+6.1%

Infant Mortality Rates (<1 Year)
23 E TN Counties vs. U.S.



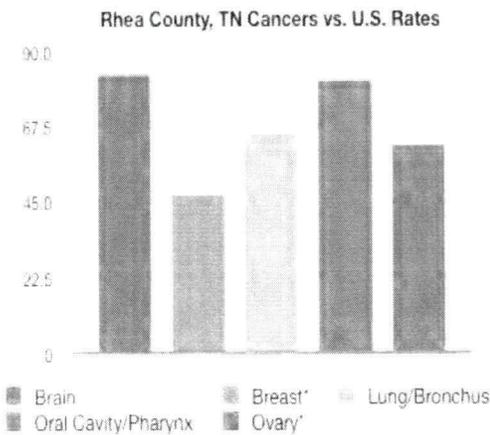
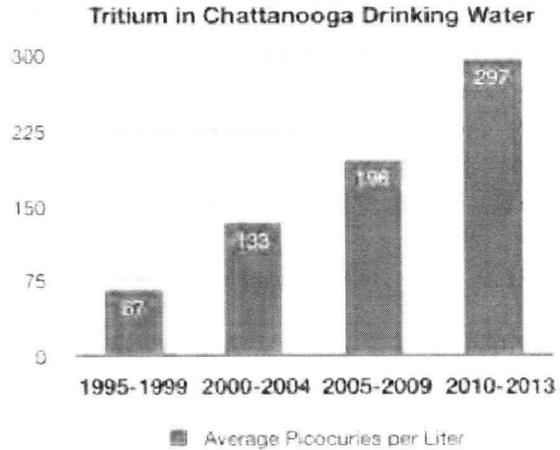
Based on CDC data

23 TN Cos.	1968-1978	1979-1988	1989-1998	1999-2010
Whites	-11.2%	+1.9%	+3.6%	+15.5%
Blacks	+0.1%	-15.1%	-14.5%	+10.5%



Following the start-up of the reactors at the Sequoyah Nuclear Power Plant (SQN), cancer death rates in Hamilton County, TN, rose dramatically among young people. The population very near the Sequoyah Nuclear Plant has increased in the last two decades, and the population within 50 miles is well over one million.

The city of Chattanooga is only 17 miles downstream of SQN, and the un-filterable tritium, which bonds with water to become tritiated or H3 radioactive water, has been rising steadily in Chattanooga's drinking water over the last two decades.



In Rhea County, which is near both the Watts Bar Nuclear Power Plant and the Oak Ridge Nuclear Reservation, we found the highest cancer rates in Tennessee, and the 19th highest cancer rates of all 2,727 U.S. counties reporting to the National Cancer Institutes (NCI). As you can see, the brain cancer rate is an astounding 83% higher than U.S. rates, breast cancer is 47%, lung cancer is 66%, oral or pharynx 61%, and ovary cancer is 62% higher than the overall U.S. rates

Cancer Type	Brain	Breast*	Lung* Bronchus	Oral Cavity/ Pharynx	Ovary*
Rhea Cancers vs. U.S. Rate 2006-2010	+83.3%	+47.2%	+65.7%	+81.5%	+61.7%

Based on NCI State Cancer Profiles

(Note: These five Tennessee study charts will appear in a forthcoming BEST/MATRR publication, *Radioactive Pollution and Health Risks near Nuclear Plants in Tennessee*.¹⁹)

¹⁹ Joseph Mangano, MPH, Garry Morgan, Gretel Johnston, *Radioactive Pollution and Health Risks near Nuclear Plants in Tennessee*, BEST/MATRR, forthcoming publication.

Conclusion

Averaging effluent release levels is an inaccurate and possibly hazardous assessment of actual dose exposures for the public. We strongly assert that you cannot regulate exposure levels, if you do not know what those levels actually are at any given time.

In the papers, "Make Radiation Visible,"²¹ (presented to NRC Commissioners, January 2014), and "Monitoring Matters,"²² we propose (1) real-time monitoring posted on licensees' websites, along with (2) release dates (3) and scheduled refueling dates, (4) all made available to the public online. We are simply asking that the public be informed of existing current levels of ambient radioactivity, scheduled refueling time periods, and effluent release dates. In addition, we made a suggestion for effluents protection in the case of an emergency release, whereby simply dispersing an emergency dye would alert the public and first responders to the plume flow direction.²³

We applaud the proposed inclusion of different age groups; however, we again point out that dose models are based on the fundamental data available for analysis. We suggest that your basis data is flawed and incomplete, if it is not truly comprehensive, and that effluents data can and should be gathered in real-time. We suggest that the "effective dose" cannot be calculated without real-time monitoring data and biological measurements.

Since the radiation dose limits are tied to the effluent limits, we think it is appropriate to quote the Nuclear Information Resource Service (NIRS) organizational letter submitted to you earlier this year regarding another Proposed Rulemaking on Radiation Protection:

"The NAS Biological Effects of Ionizing Radiation Studies (BEIR) V found radiation ~3-4 times more dangerous per unit dose than previously assumed and BEIR VII found cancer incidence risks 35% higher than BEIR V (1.141×10^{-3} per rem). The European Commission on Radiation Risk2 (ECRR) report came out in 2003 enumerating the many ways the International Commission on Radiological Protection (ICRP, in which NRC plays a leadership role) underestimates and incorrectly calculates radiation risks including inappropriately using external dose information to extrapolate internal dose risk estimates without scientific foundation. The ECRR recommends "the total maximum permissible dose to members of the public arising from all human practices should not be more than 0.1mSv [10 mr], with a value of 5 mSv [500mr] for nuclear workers."²⁴ It appears NRC has not addressed these recommendations in any way. In addition, concepts such as the bystander

²¹ Gretel Johnston, "Make Radiation Visible – Whitepaper," January 2014, <http://best-matrr.org/MakeRadiationVisible-WhitePaper.pdf>

²² Susan Shapiro and Gretel Johnston, "Monitoring Matters," March 2014. http://best-matrr.org/MONITORING_MATTERS-g3.pdf

²³ MakeRadiationVisible.org

²⁴ *2003 Recommendations of the ECRR, The Health Effects of Ionising Radiation Exposure at Low Dose for Radiation Protection Purposes, Regulators' Edition*, Published on behalf of the European Committee on Radiation Risk, Comite European sur le Risque de l'Irradiation, Green Audit, Brussels, 2003 (ISBN: 1 897761 24 4)

effect and genomic instability have shown that mechanisms for harm exist that are not reflected in the ICRP models. Unfortunately our organization(s) was (were) not invited to the NRC meeting(s) on the radiation risk aspects of the rulemaking. " ²⁵

In response to your ANPR for Radioactive Effluents, the following signatory organizations submit these current comments and call for comprehensive real-time monitoring posted online, as well as refueling and effluent release schedules, to ensure the public is both informed and protected from ionizing radiation exposures.

Given your recent cancellation of the NRC commissioned National Academy of Sciences study of cancer near nuclear plants, we think it is all the more important that you avail yourselves of the several excellent studies on this subject commissioned by European countries, studies that were not incorporated into the ICRP 103 Recommendations.

We know that radioactive contaminants are extremely complex, since they often transform into progenies in their attempts to stabilize; however, this does not diminish the health hazard posed by even the smallest of exposures to ionizing radionuclides. We also know that they can damage human cells and break both strands of the DNA chain in even the smallest known dosages. And we know that young children suffer an increased risk of leukemia near the plants. If the Radioactive Effluents release limits are to be changed at all, they should certainly be reduced to protect the public, not increased to protect nuclear industry financial profits.

The proposals we make – to post real-time monitoring online, as well as refueling and effluent release schedules – are fairly simple and inexpensive measures that we, the following organizations, request the NRC add to any Radioactive Effluents Rulemaking.

We thank you for your careful consideration of our proposals, and for your work to protect the people and the environment that sustains us all.

- | | |
|--|---|
| 1. Gretel Johnston, Garry Morgan
Bellefonte Efficiency & Sustainability Team/
Mothers Against TN River Radiation
(BEST/MATRR)
Scottsboro, AL | 2. Joseph Mangano, MPH
Radiation and Public Health Project
(RPHP)
Ocean City, NJ |
| 3. Diane D'Arrigo
Nuclear Information & Resource Service
(NIRS)
Takoma Park, MD | 4. Susan Shapiro
Indian Point Safe Energy Coalition
(IPSEC)
New York, NY |

²⁵ Nuclear Information Resource Service (NIRS), "Comments of Nuclear Information and Resource Service et al, June 24, 2015, on Nuclear Regulatory Commission (NRC) 10 CFR 20, [NRC-2009-0279] RIN 3150-AJ29 Radiation Protection, Advanced Notice of Proposed Rulemaking on development of a draft regulatory basis. 79 FR 143: 43284-43300 7/24/14," submitted to Regulations.gov Docket ID NRC-209-0279, Tracking No. 1jz-8jkr-s9n8, June 24, 2015, pg 3.

5. Ruth Thomas, Ellen Thomas
Environmentalists, Inc.
Columbus, NC
6. Mary Lampert
Pilgrim Watch (PW)
Duxbury, MA
7. Linda Seeley
San Luis Obispo Mothers for Peace
(SLOMFP)
San Luis Obispo, CA
8. John McFadden, PhD, CEO
TN Environmental Council
(TEC)
Nashville, TN
9. Lou Zeller
Blue Ridge Environmental Defense
League (BREDL)
Glendale Springs, NC
10. Cecile Pineda
No Nukes Action Committee
Berkeley, CA
11. Kathleen Ferris
Citizens to End Nuclear Dumping in TN
(ENDIT)
Murfreesboro, TN
12. Gail Payne
RadiationTruth.org
Centerport, NY
13. Cindy Folkers
Beyond Nuclear
Takoma Park, MD
14. Manna Jo Greene
Hudson River Sloop Clearwater, Inc.
Beacon, NY
15. Christine Grice
Green Coalition
Coalition for a Greener Huntsville...
Huntsville, AL
16. Don Safer
Tennessee Chapter Sierra Club
Nashville, TN
17. Leslie Sullivan Sachs
Safe and Green Campaign
Brattleboro, VT
18. Susan Hito Shapiro
Public Health and Sustainable Energy
(PHASE)
Nanuet, NY
19. Michel Lee
Council on Intelligent Energy &
Conservation Policy (CIECP)
Scarsdale, NY