

# PUBLIC SUBMISSION

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**Docket:** NRC-2009-0279  
Potential Changes to Radiation Protection Regulations

**Comment On:** NRC-2009-0279-0098  
Radiation Protection; Advance Notice of Proposed Rulemaking

**Document:** NRC-2009-0279-DRAFT-0145  
Comment on FR Doc # 2015-06244

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## General Comment

See attached file(s) Comments from 20 organizations (with additional to be added) regarding 10 CFR 20 NRC docket 2009-0279

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## **Attachments**

10 CFR 20 MultiGroup Comments NRC 2009-0279 22June2015

Email: [Rulemaking.Comments@nrc.gov](mailto:Rulemaking.Comments@nrc.gov) subject line Docket ID NRC-2009-0279

**Comments of Nuclear Information and Resource Service et al\***  
**June 22, 2014**  
**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 7/25/14**

**Inadequate Public Access to Information Essential to the Rulemaking**

“The goal [of this rulemaking] is to achieve greater alignment between the NRC’s radiation protection regulations and the 2007 recommendations of the International Commission on Radiological Protection (ICRP) contained in ICRP Publication 103 (2007).” (*Second line of the Advanced Notice of Proposed Rulemaking 79 FR 143 page 43286 July 25, 2014*)

ICRP 103, with which NRC seeks greater conformity, is a copyrighted document, not freely available to the public. This is also the case with many other documents upon which this rulemaking is based. The ICRP is a self-appointed group of nuclear advocates; it is (and has always been) inappropriate for US radiological regulation to be based in large part on ICRP’s recommendations. To propose public protection rules without making the ICRP (and NCRP National Council Radiological Protection and Measurements, or any underpinning) documents available to all is unacceptable. ICRP should be subject to the Federal Advisory Committee Act (FACA), Sunshine Act, Freedom of Information Act and Open Meetings Act since it serves as an advisor to US decision makers.

We object to the U. S. NRC, a federal agency in our democratic nation, seeking to adopt regulations that only the wealthy can afford to access and influence.

There are numerous other copyrighted documents that are not available and are integral to understanding ICRP 103 and the NRC’s development of the options it is considering to become a part of future 10 CFR 20 regulations (including ICRP 23, 56, 60, 61, 66, 67, 68, 69, 71, 72, 74,

75, 88, 89, 96, 110, and 118). The cost to purchase all of these documents is into the thousands of dollars. Even if purchased by one group, copyright prohibits sharing with other groups. Several organizations from across the country requested the information through Freedom of Information Act but were not provided all of the basic documents. We appealed, were again denied and are continuing to pursue this matter through various legal channels.

It is a violation of our rights for the US Nuclear Regulatory Commission (NRC) to proceed with this process until it corrects this basic inequity. If NRC cannot make arrangements for unlimited public access to those documents upon which it relies in developing its regulations, it must write its own fully descriptive documents (including all data, findings and citations) that all members of the public may read, share and incorporate into comments that NRC must consider in its rulemaking process.

In addition, there was not adequate public notice of public meetings regarding this rulemaking. In developing this rule over the years, the NRC has repeatedly, actively sought the involvement and perspectives of the licensees while ignoring and excluding those who are exposed to the radioactive pollution from those entities and groups that represent them. We know of only 1 meeting with public interest advocates among the dozens of meetings NRC held with nuclear advocates and no public interest advocates were included in the fall 2010 series of meetings.<sup>1</sup>

### **Radiation Recognized to be More Harmful but NRC fails to increase protection**

The NRC has not changed its risk estimates for radiation in the past 25 years or more, but has increased the allowable radioactivity in air, water, sewage and to workers. This is a relaxation of protection of the public, and an expansion of protection of licensees, corporate entities and contractors by allowing greater discharges to be legal. During those decades, knowledge that radiation is more dangerous than previously thought has grown. The U.S. Environmental Protection Agency (EPA  $1.16 \times 10^{-3}$  cancers per rem)<sup>2</sup> and National Academy of Sciences (NAS  $1.141 \times 10^{-3}$ )<sup>3</sup> cancer incidence risk conversion factors for radiation have increased. The

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<sup>1</sup> These are referenced in the April 25, 2012 SECY paper, SECY-12-0064 and described in more detail the 2011 pre-rulemaking comments of Nuclear Information and Resource Service, Committee to Bridge the Gap and Sierra Club Nuclear Issues Action Team/Nuclear Free Campaign.

<sup>2</sup> EPA "Blue Book," EPA Radiogenic Cancer Risk Models and Projections for the U.S. Population (April 2011).

<sup>3</sup> NAS BEIR VII

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 (  $1.141 \times 10^{-3}$  per rem). The European Commission on Radiation Risk<sup>4</sup> (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.” It appears NRC has not addressed these recommendations in any way. In addition, concepts such as the bystander 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.

The BEIR VII data indicate that radiation causes 50% more cancer in adult females than males, much more in young people with female infants (0-5 years) at highest risk.

Despite increased understanding and documentation of radiation’s greater hazards and risks, NRC continues to allow higher radiation releases (that are often persistent and therefore become cumulative) and individual exposures to workers and the public. We support all NRC considerations of lowering the allowable amounts, but in most cases they must be lowered further than NRC is considering.

***New Dosimetry is not fully described: Do not increase Release Levels/ Exposure Levels***

In this ANPR, NRC is considering changing the way doses are calculated, but the specific method is not provided in the rulemaking materials and the effect on the allowable releases to air, water and sewage and to the occupational air and water levels have not been calculated or provided. The procedures, documentation and resulting concentrations need to be made publicly

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<sup>4</sup> 2003 Recommendations of the ECRR, The Health Effects of Ionising Radiation Exposure at Low Dosed 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)

available in order for us to comment specifically. Broadly, the dose methodology could potentially be changed but if it leads to increased concentrations, releases or exposures, we oppose it. Without access to the underpinning assumptions, methods, documents and proposed Appendix B concentrations, we cannot address this further.

### **Radionuclide concentrations in 10 CFR Appendix B**

We oppose any changes that increase the current 10 CFR 20 radionuclide concentration levels and call upon NRC to REDUCE the existing levels. As with all human-generated radioactivity, we support a goal of zero additional releases. We call on NRC to restore all the previous lower concentrations in Appendix B in effect prior to the 1991 rule change. Regarding newer dosimetry, if approved it should only be implemented to reduce allowable releases and concentrations; not to relax protections or increase concentrations. Currently, members of the public can legally receive 100 millirems (Effective Dose Equivalent or EDE)/year from a nuclear facility. This is way too high (orders of magnitude) for public exposures. That is a risk of 1 in 143 exposed getting cancer (based on NRC's own risk numbers). Using the National Academy of Sciences BEIR VII study, prepared at the request of the NRC, the risk would be 8.6 per thousand, or approaching **one cancer per hundred people exposed**.<sup>5</sup>

We oppose NRC's move in 1991 to add Table 3, sewage as a pathway for additional release on top of the 100 millirem annual public dose limit. Adding potentially 500 millirems EDE per year exposure *more* from sewage to members of the public is completely unacceptable. Even though NRC reduced the public annual dose from 500 millirems to 100 "millirems EDE (Effective Dose Equivalent)" in the 1991 rule change, the allowable concentrations of the majority of the radionuclides increased in air and water, because the definition and calculation of "millirems" changed. No amount of mathematical jujitsu can justify increasing contamination levels in air and water. To make matters even worse, NRC added the whole new sewage release pathway for effluent into sewage, without incorporating it into the 100 mr/year annual legal dose to members of the public but adding it to those already-too-high amounts.

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<sup>5</sup> EPA Federal Guidance Report 13 sets the dose-risk relationship as  $8.46 \times 10^{-4}$  cancers per personrem. The National Academy of Sciences Biological Effects of Ionizing Radiation report (BEIR-VII), which post-dates FGR 13, says the latest scientific evidence indicates radiation is even more dangerous than previously presumed and sets the effect size at  $1.14 \times 10^{-3}$  cancers per personrem.

***NRC should stop permitting radioactive releases into sewers and sewage.*** Sewage releases (10 CFR 20 Appendix B Table 3) can be *an order of magnitude higher than and in addition to* allowable releases into water for public exposure (10 CFR 20 App B Table 2). In addition to air and water releases from a nuclear site based on 100 millirems/year, 500 more millirems are permitted from radioactive releases to sewers from every licensed facility. **We call on NRC to remove *Table 3 Releases into Sewers* from 10 CFR 20 Appendix B and require all liquid releases to comply with Table 2. Furthermore, **Table 2 allowable concentration levels should be lowered** to the levels that were in place before the last 10 CFR 20 update (1991) or less. The last update of the regulation resulted in increasing legal concentrations for most of the isotopes in Table 2, whereas no increases in concentrations are acceptable or justified. The new “update” could increase the concentrations further—we won’t know until ICRP does more copy written calculations.**

The new (in 1991) Table 3, allowing 500 more millirems per year to the public from sewage, was added without justification allowing releases into sewers at concentrations based on 500 millirem annual exposures, thus allowing nuclear facilities to deliberately release more radioactivity into the environment. This is a give-away to the polluters, completely undercutting the claim that NRC is upholding a “safe” limit of radiation exposure to the public. NRC’s rules allow up to 100 + 500 millirems per year, per license to any member of the public with no specificity about *who* that member of the public is (male, female, child or adult); the default being the only member of the public ever factored in the past by NRC: adult males.

When tritium was found to be leaking at most of the nuclear reactors in the US, the public was furious. By allowing those same releases through pipes into sewage, NRC has legalized it.

Studies in Europe have shown that it is causing children and the developing fetus to get sick [see: <http://www.nirs.org/radiation/radhealth/ianfairlieepalecture415.ppt>]. It is completely unacceptable for NRC to allow releases to sewage (or any additional pathway without including it in the dose and risk calculations). NRC, in order to fulfill its mandate to protect the public must regulate a single total exposure level; not create new allowable pathways. If 10 CFR 20 is

updated, the allowable release concentrations should be reduced to the previous levels or lower and any sewage release must be included in the limits to water.

**NRC Must Prohibit Averaging of Releases Over Time and Require Publicly Accessible Real-Time Reporting and Radiation / Radioactivity Monitoring**

Currently NRC allows its licensees to report “routine” releases and “planned” releases once a year, and to use the entire reporting period to “level” spikes across the time period and thereby show compliance with NRC’s regulations. The problem is this: during those planned and routine release times, the spikes may far exceed the stated dose limits; sometimes by many orders of magnitude. We call on NRC to require or provide real-time, continuous, publicly reported monitoring of all radioactive and radiation releases into air, water, sewage and other pathway from nuclear power reactors and all NRC and Agreement State Licensed nuclear fuel chain facilities.

**NRC’s current radiation standards are not protective—Lower the doses and concentrations for public and workers.**

All changes NRC makes must be in the direction of greater protection of the public, workers and the gene pool, especially women, who when exposed as adults get 50% more cancer than men from the same amount of radiation. Exposures during childhood result in far greater risk of cancer over their lifetimes. BEIR VII shows that an exposure to girls in the 0-5 age group results in 7 times more cancer when compared to the same dose to an adult (30 year old) male. It is well understood that the Life Span Study from Hiroshima and Nagasaki survivors (the primary data reported in BEIR VII) reports on a stronger-than-typical population and therefore is a poor model for the general public; particularly now that there are so many multiple exposures to the US population that may have a synergistic effect in the opposite direction, weakening people). Simply put, this means any changes to 10 CFR 20 must reduce (with a goal of eliminating) legal releases of radioactivity into the public realm and reduce the exposures to radiation workers, with a goal of preventing exposures to pregnant workers.

Worker doses, Occupational Values, 10 CFR 20 App B Table 1, should be reduced. Even the international pro-nuclear establishment limits worker doses to less than half of the dose

permitted US nuclear workers (2000 millirems EDE per year versus 5000 millirems EDE per year). The US nuclear industry and NRC claim the actual doses to most US nuclear workers are not nearly as high as permitted but refuse to lower the allowable limit despite most of the world doing so. NRC was willing to adopt international recommendations that *increased* the concentrations and exposures but is not willing to adopt more protective worker dose limits that have been recommended. We support NRC's consideration of limiting doses to the fetus of pregnant workers, but recommend that NRC require licensees to provide the option for much lower or completely preventing any dose during gestation, without loss of pay, privacy or career opportunities for the pregnant worker. This is really a basic human right.

**100 Millirems Per Year to the Members of the Public is Too High especially for Reproductive Life Phase**

NRC's current allowable dose to members of the public from a nuclear power reactor is 100 millirems EDE per year (plus background, *plus sewage*) despite the EPA's 40 CFR 190 calling for no more than 25 millirems per year from nuclear reactors and fuel chain facilities. These are referenced in the April 25, 2012 SECY paper, SECY-12-0064. Since EPA uses the old definition of "millirem," it allows less radioactivity per millirem, depending on the radionuclides. NRC calculated, back in 1990 that 100 millirems per year for a lifetime results in a cancer risk 1 in every 143 young, healthy men so exposed. That is based on assuming less risk from radiation than is now known to exist. Women and youth are at higher risk of cancer. There are many other health effects in addition to cancer as well such as reduced immunity, heart disease, mental retardation, birth defects, etc. Since 1990 (a) it has been shown that the cancer risks from radiation are higher than realized then, (b) NRC changed the dosimetry to allow more radioactivity per dose for many of the radioisotopes, (c) public knowledge is increasing that females, children, babies and the embryo/fetus are at much greater risk than the "standard man." For these reasons, the 100 millirems limit should be dramatically reduced to a few millirems or less per year with a goal of prevention.

The US Environmental Protection Agency is charged with protecting the public from radiation. It limits exposures to 25 millirems to members of the public per year from nuclear fuel chain facilities (40 CFR 190). EPA has an "allowable" risk range of 1 in a million to 1 in 10,000

cancers from regulated pollutants. According to the EPA “Blue Book” (EPA Radiogenic Cancer Risk Models and Projections for the US Population, EPA 402-R-11-001, April 2011; <http://www.epa.gov/radiation/assessment/pubs.html#blue-book>), the Cancer Incidence Risk Conversion Factor for radiation is:  $1.16 \times 10^{-3}/\text{Rem}$ . The National Academy of Sciences Biological Effects of Ionizing Radiation BEIR VII risk Factor is  $1.141 \times 10^{-3}/\text{Rem}$ . Thus, whether by EPA or NAS BEIR VII, the cancer risk is that a little more than 1 in a 1000 exposed to a rem (1000 millirems) will get cancer.

At 100 millirems/yr for 30 years (total dose 3,000 mr or 3 R) the cancer incidence risk would be greater than 1 in 10,000 which is higher than EPA’s risk range. Radiation exposure to a female infant will result in 4-5 times the cancer risk than the age- and gender-averaged risk, 7 times more than standard man. This doesn’t take into account that the same amount of radioactivity ingested or inhaled can result in a much higher dose in an infant because of the small body size or the rapid rate of cell division.

Any standard that allows doses greater than ~100 millirems to an adult or ~20 millirems to a child exceeds EPA’s cancer incidence risk range for an entire lifetime from just that one year’s dose. NRC allows this amount every year for entire lifetimes.

Other scientists and reports, estimate the risks are 10 or more times higher than NRC.

The EPA Blue Book is the basis for radiation risk used by all the federal agencies. NRC sets limits for the facilities it licenses, and based on the risks indicated in the Blue Book, as well as the National Academy of Sciences BEIR reports, should reduce its limits.

The Lifetime Attributable Risk (LAR) by Age at Exposure based on EPA Blue Book shows exposures to younger people result in much greater risk of cancer and fatal cancer than adults. BEIR VII shows females at greater risk than males and baby girls at greatest risk.

Based on EPA’s most recent official radiation risk numbers: ~1.7 mrem/year over one’s first 30 years  $\approx 10^{-4}$  risk Any standard higher than ~1.7 millirem per year would exceed a  $1 \times 10^{-4}$  risk,

and anything above about 5 millirem per year (for 30 years) would exceed  $3 \times 10^{-4}$ , based on EPA's Blue Book figures.

***Thus, no radiation standard should exceed a few millirem/year, as it would result in risks greater than 1 in 10,000 (the riskier end of the EPA risk range).***

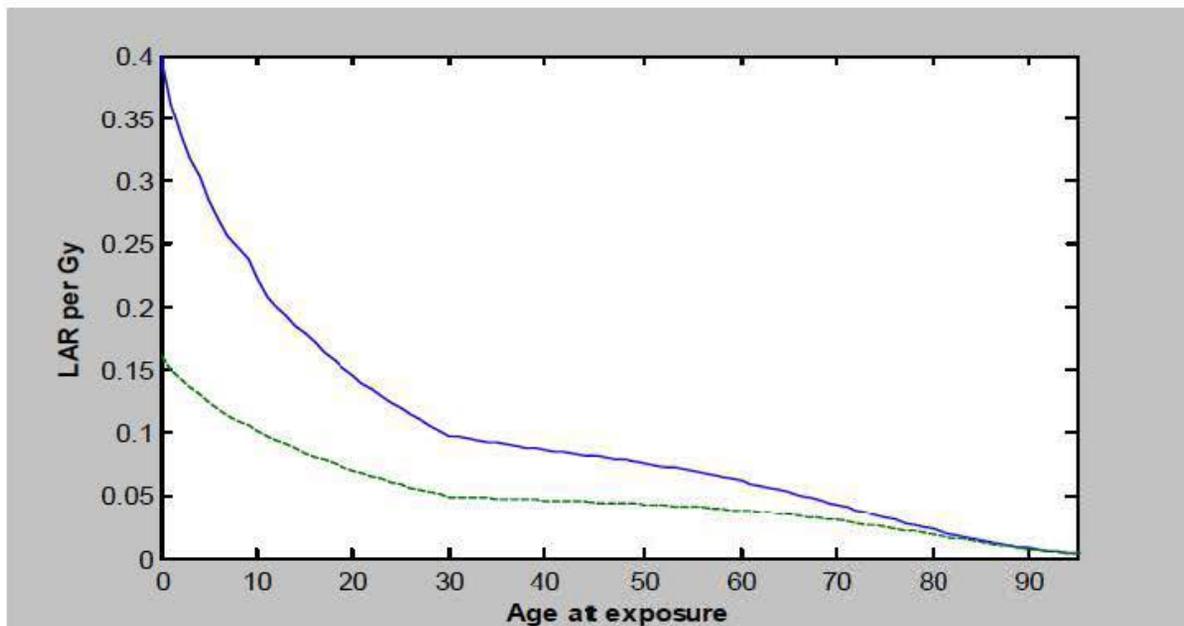


Figure 3-9: LAR for all cancers combined by age at exposure for exposures at low doses and/or dose rates for incidence (solid) and mortality (dashed)

These reports do not provide information on the fetus or embryo but other reports including ICRP 103 and the seminal Oxford Survey of Childhood Cancer (1958) by Stewart, et al indicate that the risks are even greater.

### **Refocus the Regulations to Support Survival of the Species**

The science indicates radiation is more dangerous than previously thought. It is also clear that the impact on the reproductive phase of our lifecycle, which had not been previously incorporated into the calculations, is significant. New regulations must protect (minimize or prevent exposure to) individuals, populations and ***all phases of our lifecycle***. Limiting exposure during pregnancy to 450 millirems or 100 millirems total or after declaration is not protective enough. Women who smoke or drink often quit while pregnant. The same is needed with regard to radiation exposure.

We must encourage employers and radiation professionals to set up systems to enable pregnant workers to continue in their careers without penalty while protecting the fetus/embryo from the known (although not fully quantified) detriment of ionizing radiation exposure including weakening of the gene pool.

Mutations to the genetic material can have an immediate visible impact and they can have less obvious detrimental impacts. Radioactivity and its effects can build up, changing the basic building blocks of life. Continual radiation exposure can change our genetic material, weakening it. By weakening the genetic material and continuing to increase radiation exposure from the environment, future generations will face more stress which is not considered in the decisions to irreversibly release radioactivity. Other pollutants and stressors can act synergistically to magnify the negative impacts on species health and survival. Radiation regulations fail to consider the species-survival impacts.

**Do Not Average Gender and Age Risks—**

**Rather Protect us all at the level needed to protect the most vulnerable.**

We adamantly oppose averaging the risks—neither gender nor age averaging is acceptable, as this leaves those at highest risk still at risk. This is not about protecting a “subgroup.”

We call on NRC to set new standards that protect the entire human lifecycle. Primary germ cells, embryos, the fetus, little girls are not sub-populations; they are you... and everyone you have ever known in your life. There can be no adult males without a little girl first. The primary germ cells are an unbroken chain; there is no male or female who can still make a child that should not be fully protected; their primary germ cells are present at all times.... Set the “allowable” levels so that every phase of the lifecycle is protected and their risks limited to the lowest possible levels. Those levels should be determined by those exposed. It is not credible to allow the same experts that support the radiation-generating and polluting industry to decide what the “acceptable” risk is for others and for the globe into the future. That is a conflict of interest.

NRC’s job is to protect the whole population; the only way to do that is to set levels needed to protect the entire lifecycle all the time. The EPA has a goal of limiting risk from carcinogens to 1 in a million (and if that cannot be met they can go no greater than 1 in 10,000). The public never agreed to that EPA risk range (one in a million was born on Madison Avenue as a way to sell

risky business), and we certainly never agreed to NRC's much higher imposed radiation risks. NRC should publicly identify the "allowable" risk level to which it will protect members of the public and protect ALL members, all life stages, ages and genders of the public to at least that level. NRC must involve the public, whose members are insensitively but accurately called "dose receptors," in determining both the risk and dose, and even more important, release levels and the development of independent, credible monitoring that would allow enforcement of the allowed release levels. By protecting the most vulnerable, it might appear that the less vulnerable would have greater protection from cancer, but this is necessary if the protection levels are geared for the most vulnerable individuals and phase of our lifecycle. Since there is so little information on the real effects of internalized radioactivity and internal radiation harm, we don't really know if there is any gender or age difference (regarding internal exposures). It is possible that all phases are the same, and it is possible that all are as harmed as the female 0-5 cohort is by external radiation. NRC has no basis upon which to say that there is a "Standard" man, woman or child when factoring internal doses.

In addition, the NRC should protect the integrity of species by preventing exposure during the reproductive phase of the lifecycle. Damage to the germ cells or genetic material from even low dose exposures can have consequences for generations to come, affecting the viability of the species to survive. In addition, widespread contamination of the environment and food chain (even if governments and polluters refuse to monitor and report it), reduces the ability of species to survive and thrive. Researchers including Drs. Tim Mousseau and Anders Moller have shown genetic damage, mutations, cancer and sterility in animals, genetic damage and mutations in plants around Chernobyl, Three Mile Island and Fukushima after the beginning of the serious nuclear accidents at those locations. Although some mutations are not dominant in the first generation some can be observed. Mousseau and Moller observed minor changes in some individuals and species that cause them to be unable to reproduce or to survive. The effects were greater in higher contamination areas but present even in lower contamination areas. A major reason for the misimpression that animals were thriving around Chernobyl is that the predators are gone.

**Do Not Average Annual Releases from Nuclear Power—**

**Provide or Require Real Time Publicly Reported data**

It was revealed in Germany, much to the industry and regulators disappointment, that nuclear power refueling outages cause enormous spikes in radioactivity releases. Since US reactors are allowed to average all of their emissions over the year, it is difficult or impossible to know when and how much is being released during these times. We call on NRC to require or provide real time monitoring and reporting and public notification in advance of these high release activities.

**Occupational dose limit to lens of the eye**

We support the most protective limits. Not all cataract surgery is easy and successful. The fact that there is a possible surgical fix should not be a justification to allow exposures to workers' (or members of the public's) eyes.

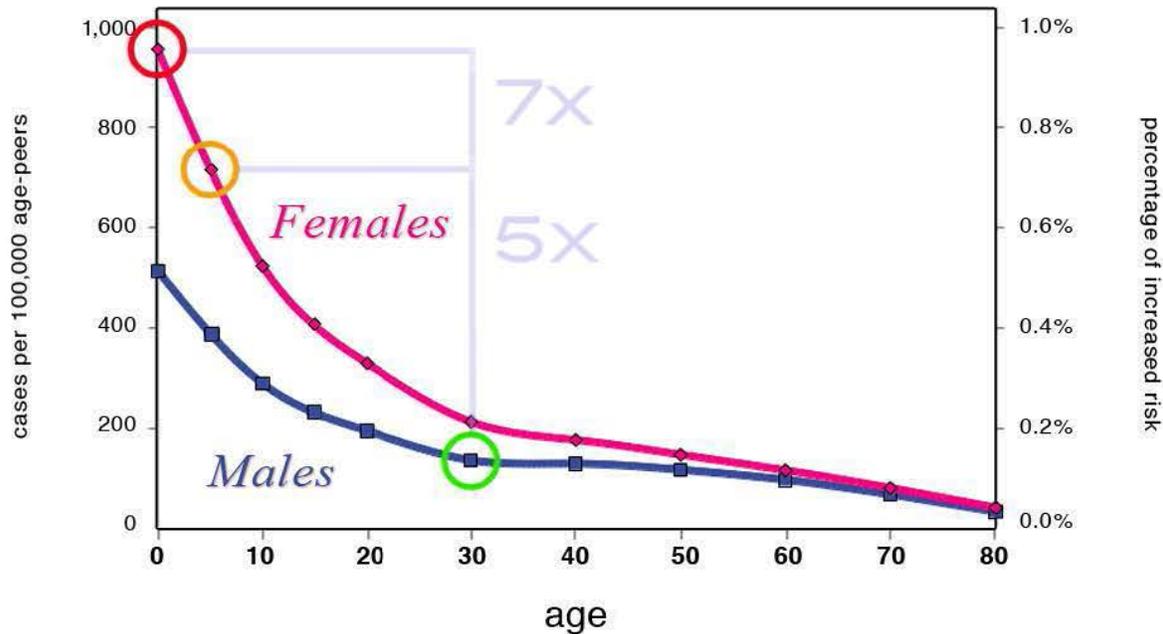
**Dose limit to embryo /fetus**

It is good that NRC is now considering protecting the embryo fetus from radiation, but it needs to be to less than the 450 NRC has mentioned and the 100 mr under consideration by ICRP and NRC. The goal is prevention.

The NRC staff cites a 1906 document stating that it was well known then that ionizing radiation is more harmful to the embryo, the fetus and to children. [*Comptes Rendus des Seances de l'Academie des Sciences*, 143:983–985, 1906]. It should be observed that harm to the primary germ cells (ova, sperm and the prior spermatogonia) is a possibility at any point, from in utero all the way up to loss of reproductive capacity in the adult. Even with 110 years, NRC fails to demonstrate that it is regulating to protect these more vulnerable stages in the general public. By publishing a generalized “dose” in millirems or milliSieverts, there is no indication that the reproductive phase in the general population is being protected. In addition, 100 years after the citation above, the US National Academy of Science, in 2006 published data from the Life Span Study of the Hiroshima and Nagasaki survivors 60 years after the youngest victims of the Bombs were born. NIRS supports those who challenge broad generalizations from external (only) radiation to all radiation; nonetheless the Life Span Study is the largest data set of all ages and

both genders (that we are aware of). Dr Arjun Makhijani (2006: <http://ieer.org/wp/wp-content/uploads/2006/10/Science-for-the-Vulnerable.pdf>) and Mary Olson (2011: <http://www.nirs.org/radiation/radhealth/radiationwomen.pdf>) independently reviewed of the Life Span Study data, and arrived at the same findings:

### Increased Cancer Risk by Age at Exposure to 20 mSv Radiation



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

Shown graphically here by NIRS, based on the NAS BEIR VII data: Little girls are significantly more harmed by radiation exposure over the course of their lifetimes compared to little boys, and also compared to adults. The rate of lifetime cancer to those exposed as little girls is 7 times greater than when the exposure was to a male at age 30. Adult women have a 50% higher rate of cancer over their lifetime compared to adult males.

The NRC must show the public how it is providing disproportionate (GREATER) protection for females. The finding that females are disproportionately harmed cannot be dismissed.

In addition, since we have no large data-set for internal exposures that has lifetime outcomes and includes all ages and both genders (that NIRS is aware of), NRC and all radiation regulators should take the view that it is possible that if there is no gender difference internal exposures,

that all ages and both genders are at a risk that corresponds to a juvenile female. Taking the assumption that the adult male is the basis for risk from internal exposures to radiation is not conservative.

Finally, the regulator should make transparent all the assumptions made in any dose calculation or projection—including how the very units are formulated. It is our understanding that the calculations that underpin the Rad and the Rem date back into the era when the Standard/Reference man was the individual considered. At that time, military and paramilitary males were sent into contained, secret radiation zones. Now we are talking about releasing radionuclides in a completely unrestricted way. The cumulative impacts of these releases, along with the multiple opportunities for exposure that are not tracked by the regulator make the entire undertaking far less than credible.

**No de minimus, clearance, exemption, release from regulatory control**

In the United States, the public opposition to “Below Regulatory Concern” or deregulation of radioactive waste to regular trash or recycling has been clear and repeated at least a dozen times when federal agencies (NRC, EPA, DOT, DOE) attempt it. Some state laws require continued regulatory control if NRC deregulates. Resolutions passed in communities across the country against deregulating and dispersing nuclear waste and materials to unregulated destinations. Industry and workers at solid waste facilities and metal recyclers opposed the NRC’s Below Regulatory Concern (BRC) policies. Congress overturned them both NRC’s 1986 BRC Policy and 1990 Expanded BRC Policy in 1992 (Energy Policy Act). US organizations and individuals, states and local governments still oppose allowing nuclear waste to be released from radioactive control.

ICRP (encouraged by NRC over the years) supports this immoral concept although the terminology changes. We object to the NRC carrying out any form of clearance and deregulation and continue to oppose any effort to do so generically. We understand NRC does allow this on a case by case basis and we object to that, ask NRC to cease doing so and to provide better public information about when such requests are made and under NRC considering.

There was no express mention of adopting clearance levels in the ANPR but ICRP 103 refers to it and to other ICRP documents that promote the concept. Our comment to NRC is to NOT ADOPT any type of clearance, exemption, exclusion, deregulation standard or policy and we ask that NRC stop deregulating nuclear wastes, materials, emissions and practices. Keep all manmade radioactive wastes, materials and practices under radioactive controls and reduce with a goal of eliminating radioactive emissions.

### **Decommissioning**

10 CFR 20 Subpart E is the NRC's License Termination Rule adopted by NRC in August 1997. Although no suggestion is made in this ANPR regarding this section, we remind NRC of our concerns on it which were expressed repeatedly by dozens of organizations across the country during the Enhanced Rulemaking on Residual Radioactive—the ERORR process—that preceded its publication. NRC allows 25, 100, or 500 millirems per year to members of the public from CLOSED, decommissioned (unrestricted and restricted) nuclear sites. This is higher than some operating facilities (unless they are releasing the maximum amount of radioactive sewage). It is less protective than EPA's standards. We are aware of the Memo of Understanding between NRC and EPA on closed sites to address the differences. If NRC changes 10 CFR 20, we ask that NRC require more protective cleanup levels at closed sites and involve the local community and the state in guaranteeing continued protection and stricter release criteria.

\*These comments represent the views of the following organizations, with the complete list to be provided in the next several days.

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