PRM-51-11 (71FR67072)

ć

Comments on NRC Radiation Standards Joseph J. Mangano MPH MBA Radiation and Public Health Project February 5, 2007 Submitted via email – http://ruleforum.llnl.gov

DOCKETED USNRC

February 5, 2007 (2:57pm)

OFFICE OF SECRETARY RULEMAKINGS AND ADJUDICATIONS STAFF

SECY-02

The U.S. Nuclear Regulatory Commission (NRC) should update its standards at aging nuclear power plants to better protect local residents, especially the most vulnerable, i.e. fetuses, infants, children, the elderly, and those suffering with an immune compromising disorder. The NRC needs to base its standards on recent scientific discoveries by official organizations in the U.S. and abroad that contradict previously held beliefs, including

- releases from reactors are greater than previously believed
- the very young are more susceptible to radiation
- latency from exposure to cancer manifestation may be shorter in certain populations
- rates of cancer and other diseases near reactors are higher than expected

The following contains summaries of these new findings that the NRC should consider:

- 1. <u>High Cancer Rates Near Reactors</u>. There have been many descriptive studies in the medical literature in the past decade that document elevated rates of cancer near nuclear facilities. Many of these analyses focus on cancer in children, who are more susceptible to the biochemical effects of radiation exposure. They include
 - At least 11 studies showing elevated childhood cancer rates near different facilities in the United Kingdom
 - Articles indicating elevated childhood leukemia rates near reprocessing sites in Europe (Dounreay, Sellafield, La Hague, and Krummel)
 - A 2003 study showing childhood cancer rates exceeding the national rate near each of 14 U.S. nuclear plants studied
- 2. <u>Underestimation of Risk</u>. In 2004, the Committee Examining Radiation Risks of Internal Emitters (CERRIE), a blue ribbon panel convened by the British Environmental Minister, concluded that risks from radiation exposure to humans may have been underestimated by as many as 10 times. A minority of CERRIE members projected this underestimate to be as many as 100 times. The CERRIE based its conclusions on a variety of new findings in radiation biology such as the "bystander effect" in which a cell harmed by radiation may affect otherwise healthy cells in the vicinity.
- 3. <u>Miscalculation of Dose</u>. In 2003, the European Committee on Radiation Risk (ECRR) produced a report that directly challenged the prevailing understanding of dose. The ECRR, which arose from criticisms of the International Commission

Template=SECY-067

on Radiation Protection (ICRP) dose model presented at a European Parliament workshop, used over 500 professional references to support its conclusions, most of them recent. The ICRP model is lacking, states the ECRR report, because of recent discoveries in biology, genetics, and cancer research suggesting the ICRP model of cellular DNA is not a good basis for risk analysis. Thus, the maximum permissible dose to the public should be no more than 0.1 millisievert (mSv), rather than the ICRP "safe" dose of 100 mSv.

- 4. <u>Elevated Risk to Fetus and Infant</u>. In 2003, the U.S. Environmental Protection Agency issued draft paper EPA/630/R-03/003. It concludes that harm from radiation exposure is considerably higher in young persons than in adults (children age 2-16 have three times the risk, while children under age 2 have ten times the risk). This paper officially acknowledges that use of risk models based on "average" humans minimizes risk to those who are especially vulnerable.
- 5. <u>New Findings on Fetal/Infant Susceptibility</u>. Since 1956, when Dr. Alice Stewart demonstrated that prenatal pelvic X-rays yielding a dose as low as 10-20 mSv significantly raised the risk of cancer deaths by age ten, the risk radiation poses to the fetus and infant has been a focus of research but largely ignored by standard setting bodies. In the most recent document the ICRP stated that below 100 milligrays, lethal effects to the fetus are "infrequent" (100 mGy equals 100 mSv). The following are among the more recent studies to identify radiation risks to the fetus and infant (other than childhood cancer):
 - The October 23, 1999 *Lancet* published research showing that every additional 100 mSv of radiation exposure to external ionizing radiation before conception added a 25% risk of a child being stillborn.
 - An article in the January 2004 *British Medical Journal* documented that males irradiated for cutaneous hemangioma under 18 months had a progressively lower attendance rate in high school, documenting lower rates even at doses of under 20 mSv.
 - The April 28, 2004 *Journal of the American Medical Association* presented a study associating risk of low weight births with prenatal dental radiography at a dose of over 0.4 mGy (0.4 mSv).
- 6. <u>New Findings on Bomb Fallout Risks</u>. In 1991, U.S. public health officials had not admitted that fallout from 1945-1963 atmospheric nuclear weapons tests caused any harm. However, the release of a 1997 report by the National Cancer Institute estimated that Iodine-131 from tests still considered low dose exposure caused between 11,000 and 212,000 Americans to develop thyroid cancer. No acknowledgement of this landmark research study was made by the NRC.
- 7. <u>New Findings of Nuclear Worker Risks</u>. In 2000, the U.S. Department of Energy released a report summarizing many research studies, and concluding that

2

workers at American nuclear weapons plants suffer from disproportionately high rates of various cancers. Congress subsequently passed a law entitling affected workers to compensation. Again, the NRC made no note of this important development and its implications for radiation safety standards.

- 8. <u>New Findings on Short Latency Period</u>. Much has been recently learned about risk to humans exposed to Chernobyl fallout. Perhaps the most striking finding has been the short latency between exposure and onset of thyroid cancer in children (as little as four years), and leukemia in infants (under one year). In the latter case, areas far from Chernobyl (Germany, Greece, Scotland, U.S., Wales) were affected, even though exposures were much lower than near the plant.
- 9. <u>New Findings on In-Body Radioactivity</u>. Beginning in the 1990s, the first studies of in-body (baby teeth) radioactivity of humans exposed to reactor emissions have been published. Studies in Germany, Greece, and the Ukraine showed elevated levels of Strontium-90 after Chernobyl. Another showed Plutonium-239 levels decreasing with distance from the Sellafield plant. Another showed Strontium-90 highest in counties near 7 U.S. nuclear plants, and rising since the late 1980s. These studies, all documented in the medical literature, constitute the research community's "gold standard" for dose estimates, but were first ignored, then opposed by the NRC, which has yet to conduct or commission such a study.

The importance of NRC standards cannot be emphasized enough. Since 1991, the number of nuclear power reactors worldwide has grown to 439, the amount of highly radioactive waste generated by these reactors has soared, and medical uses of radiation have proliferated. Moreover, the terrorist threat since the September 11, 2001 attacks make potential harm from radiation exposure even greater, in the event a reactor is attacked, a nuclear weapon strike is launched, or a "dirty bomb" is used.

The overriding theme of these recommendations should be the so-called Precautionary Principle, which states that if consequences of an action are unknown but have potential for negative consequences, it is better to avoid that action. In the health field, this belief has existed since the Hippocratic principle of "first do no harm" of over 2,000 years ago. The series of assumptions that radiation exposure carries no risk that were later reversed by empirical research – for pelvic X-rays to pregnant women, atomic bomb test fallout, and occupational exposures in nuclear weapons plants – suggests strongly that the NRC re-evaluate health risks of low-dose exposures, and lower the current limits.

3

 From:
 <Odiejoe@aol.com>

 To:
 <SECY@NRC.gov>

 Date:
 Mon, Feb 5, 2007 11:58 AM

 Subject:
 PRM-51-11

Comments on NRC Radiation Standards Joseph J. Mangano MPH MBA Radiation and Public Health Project February 5, 2007 Submitted via email – http://ruleforum.llnl.gov

The U.S. Nuclear Regulatory Commission (NRC) should update its standards at aging nuclear power plants to better protect local residents, especially the most vulnerable, i.e. fetuses, infants, children, the elderly, and those suffering with an immune compromising disorder. The NRC needs to base its standards on recent scientific discoveries by official organizations in the U.S. and abroad that contradict previously held beliefs, including

releases from reactors are greater than previously believed

the very young are more susceptible to radiation

- latency from exposure to cancer manifestation may be shorter in certain populations

- rates of cancer and other diseases near reactors are higher than expected

The following contains summaries of these new findings that the NRC should consider:

High Cancer Rates Near Reactors. There have been many descriptive studies in the medical literature in the past decade that document elevated rates of cancer near nuclear facilities. Many of these analyses focus on cancer in children, who are more susceptible to the biochemical effects of radiation exposure. They include

- At least 11 studies showing elevated childhood cancer rates near different facilities in the United Kingdom

- Articles indicating elevated childhood leukemia rates near reprocessing sites in Europe (Dounreay, Sellafield, La Hague, and Krummel)

- A 2003 study showing childhood cancer rates exceeding the national rate near each of 14 U.S. nuclear plants studied

Underestimation of Risk. In 2004, the Committee Examining Radiation Risks of Internal Emitters (CERRIE), a blue ribbon panel convened by the British Environmental Minister, concluded that risks from radiation exposure to humans may have been underestimated by as many as 10 times. A minority of CERRIE members projected this underestimate to be as many as 100 times. The CERRIE based its conclusions on a variety of new findings in radiation biology such as the " bystander effect" in which a cell harmed by radiation may affect otherwise healthy cells in the vicinity.

Miscalculation of Dose. In 2003, the European Committee on Radiation Risk (ECRR) produced a report that directly challenged the prevailing understanding of dose. The ECRR, which arose from criticisms of the International Commission on Radiation Protection (ICRP) dose model presented at a European Parliament

workshop, used over 500 professional references to support its conclusions, most of them recent. The ICRP model is lacking, states the ECRR report, because of recent discoveries in biology, genetics, and cancer research suggesting the ICRP model of cellular DNA is not a good basis for risk analysis. Thus, the maximum permissible dose to the public should be no more than 0.1 millisievert (mSv), rather than the ICRP "safe" dose of 100 mSv.

Elevated Risk to Fetus and Infant. In 2003, the U.S. Environmental -Protection Agency issued draft paper EPA/630/R-03/003. It concludes that harm from radiation exposure is considerably higher in young persons than in adults (children age 2-16 have three times the risk, while children under age 2 have ten times the risk). This paper officially acknowledges that use of risk models based on "average" humans minimizes risk to those who are especially vulnerable.

New Findings on Fetal/Infant Susceptibility. Since 1956, when Dr. Alice Stewart demonstrated that prenatal pelvic X-rays yielding a dose as low as 10-20 mSv significantly raised the risk of cancer deaths by age ten, the risk radiation poses to the fetus and infant has been a focus of research – but largely ignored by standard setting bodies. In the most recent document the ICRP stated that below 100 milligrays, lethal effects to the fetus are "infrequent" (100 mGy equals 100 mSv). The following are among the more recent studies to identify radiation risks to the fetus and infant (other than childhood cancer):

- The October 23, 1999 Lancet published research showing that every additional 100 mSv of radiation exposure to external ionizing radiation before conception added a 25% risk of a child being stillborn.

- An article in the January 2004 British Medical Journal documented that males irradiated for cutaneous hemangioma under 18 months had a progressively lower attendance rate in high school, documenting lower rates even at doses of under 20 mSv.

- The April 28, 2004 Journal of the American Medical Association presented a study associating risk of low weight births with prenatal dental radiography at a dose of over 0.4 mGy (0.4 mSv).

New Findings on Bomb Fallout Risks. In 1991, U.S. public health officials had not admitted that fallout from 1945-1963 atmospheric nuclear weapons tests caused any harm. However, the release of a 1997 report by the National Cancer Institute estimated that lodine-131 from tests – still considered low dose exposure - caused between 11,000 and 212,000 Americans to develop thyroid cancer. No acknowledgement of this landmark research study was made by the NRC.

New Findings of Nuclear Worker Risks. In 2000, the U.S. Department of Energy released a report summarizing many research studies, and concluding that workers at American nuclear weapons plants suffer from disproportionately high rates of various cancers. Congress subsequently passed a law entitling affected workers to compensation. Again, the NRC made no note of this important development and its implications for radiation safety standards.

New Findings on Short Latency Period. Much has been recently learned about risk to humans exposed to Chernobyl fallout. Perhaps the most striking finding has been the short latency between exposure and onset of thyroid cancer in children (as little as four years), and leukemia in infants (under one year). In the latter case, areas far from Chernobyl (Germany, Greece, Scotland, U.S., Wales) were affected, even though exposures were much lower than near the

plant.

New Findings on In-Body Radioactivity. Beginning in the 1990s, the first studies of in-body (baby teeth) radioactivity of humans exposed to reactor emissions have been published. Studies in Germany, Greece, and the Ukraine showed elevated levels of Strontium-90 after Chernobyl. Another showed Plutonium-239 levels decreasing with distance from the Sellafield plant. Another showed Strontium-90 highest in counties near 7 U.S. nuclear plants, and rising since the late 1980s. These studies, all documented in the medical literature, constitute the research community's "gold standard" for dose estimates, but were first ignored, then opposed by the NRC, which has yet to conduct or commission such a study.

The importance of NRC standards cannot be emphasized enough. Since 1991, the number of nuclear power reactors worldwide has grown to 439, the amount of highly radioactive waste generated by these reactors has soared, and medical uses of radiation have proliferated. Moreover, the terrorist threat since the September 11, 2001 attacks make potential harm from radiation exposure even greater, in the event a reactor is attacked, a nuclear weapon strike is launched, or a "dirty bomb" is used.

The overriding theme of these recommendations should be the so-called Precautionary Principle, which states that if consequences of an action are unknown but have potential for negative consequences, it is better to avoid that action. In the health field, this belief has existed since the Hippocratic principle of "first do no harm" of over 2,000 years ago. The series of assumptions that radiation exposure carries no risk that were later reversed by empirical research – for pelvic X-rays to pregnant women, atomic bomb test fallout, and occupational exposures in nuclear weapons plants – suggests strongly that the NRC re-evaluate health risks of low-dose exposures, and lower the current limits.

CC:

<AceActivists@Comcast.net>, <no-new-nukes-yall@yahoogroups.com>

¥

Mail Envelope Properties (45C7623E.AEE : 16 : 27374)

Subject:	PRM-51-11	
Creation Date	Mon, Feb 5, 2007 11:57 AM	
From:	< <u>Odiejoe@aol.com</u> >	

Created By:

Odiejoe@aol.com

Recipients

nrc.gov TWGWPO02.HQGWDO01 SECY (SECY)

yahoogroups.com no-new-nukes-yall CC

Comcast.net AceActivists CC

Post Office

TWGWPO02.HQGWDO01

Files	Size	
MESSAGE	8272	
TEXT.htm	21035	
NRC Comments, Feb. 2007.doc		
Mime.822	83773	

Options

Expiration Date:	None
Priority:	Standard
ReplyRequested:	No
Return Notification:	None

Concealed Subject:NoSecurity:Standard

Junk Mail Handling Evaluation Results

Message is eligible for Junk Mail handling This message was not classified as Junk Mail

Junk Mail settings when this message was delivered

Route

nrc.gov yahoogroups.com Comcast.net

Date & Time Monday, February 5, 2007 11:57 AM

36864

c:\temp\GW}00001.TMP

v

Page 2

Junk Mail handling disabled by User Junk Mail handling disabled by Administrator Junk List is not enabled Junk Mail using personal address books is not enabled Block List is not enabled