MORE WARNINGS ON PROPOSED INTERNATIONAL WEAKENING OF RADIATION PROTECTION
Second in a Series on Radiation Standards

Comment to ICRP by 30 December 2004 via their website www.icrp.org

This second in NIRS' series on radiation impacts describes the International Commission on Radiological Protection's proposal, ICRP-2005, (1) to increase radically the allowable doses during and after radiological accidents or attacks; (2) ICRP's failure to improve nuclear worker doses; and (3) ICRP's failure to incorporate important recent research on low-level radiation health effects.

In the 11 November 2004 **Nuclear Monitor,** we alerted readers that draft ICRP-2005 recommendations are open for public comment. *Comment by the end of December 2004. To be considered, all comments must be submitted via the web* at http://www.icrp.org/remissvar/remissvar.asp

If terrorists do attack? Or there's another bad reactor accident? Or a load of radwaste crashes?

Some day another major nuclear reactor accident may occur, or terrorist detonation of a "dirty bomb" or other radiological device, causing widespread radiation contamination. ICRP should urge prompt evacuations and complete decontamination, but instead proposes to allow huge increases in radiation doses. ICRP will allow an annual dose of 100 milliSievert (mSv), or 10 rem (10,000 millirem or mrem) per year. (1 mSv = 100 millirem; 1 Sv = 100 rem.)

How dirty is clean enough? Why use "Standard Man"? Why not add up doses from all sources?

A reactor or bomb emergency would affect large areas that would be expensive to decontaminate. Therefore, ICRP uses a cost-benefit analysis to compare costs of cleanup with ICRP's estimates of adverse health and genetic effects and fatalities. If regulators require cheaper partial cleanup, residents would return to live with residual radiation. In the post-event 30-year span that ICRP assumes, a total individual dose could reach 300 rem (300,000 mrem; 3 mSv). That's estimated as equivalent to roughly 50,000 chest x-rays. It is officially estimated that ***one in four*** of the people exposed would develop cancer from such exposures.

Doses in the range of 400-600 rem may be lethal to one-half of those exposed ("LD-50"). Non-lethal health effects may be expected from a 300 rem cumulative exposure. Nonetheless, after the Chernobyl accident in 1986, international agencies adopted an ungrounded assumption that, unless public radiation exposures exceed 100 mSv (10 rem), there is no presumption of need for site decontamination. To the contrary, full decontamination should be required. ICRP should withdraw its 100 mSv/yr (10 rem)

allowable dose proposal. Preventing attacks and accidents should be the regulatory priority.

Below, ICRP Table S1 summarizes "Maximum Dose Constraints for Workers and Public from Single Dominant Sources for All Types of Exposure Situations that Can Be Controlled," given in annual maximum effective doses in rem and mSv.

-- 10 rem (100 mSv) -- Allowable in emergencies, and for emergency workers, public evacuation and relocation, high levels of controllable existing exposures. No societal or individual benefits above this constraint level

-- 2 rem (20 mSv) -- Applies to occupational exposures, sheltering, iodine prophylaxis during accidents, controllable existing exposures (radon), comforters and caregivers for irradiated patients. Assumes information, training, and monitoring.

-- 0.1 rem, or 100 mrem (1 mSv) -- For situations deemed to have societal benefit but none for the individual recipient, without information, training, or dose assessment in normal situations

-- 0.001 rem, or 1 mrem (0.01 mSv) -- Minimum value of any constraint threshold exclusion level below which no regulation may be required. No individual or societal benefits to regulating below this level, according to ICRP.

How much radiation is too much? More protection is needed, not less

Previously, we criticized ICRP for proposing a "trivial" threshold dose, a fraction of background radiation that ICRP claims needs no regulation. By "excluding" and "exempting" low-level radioactive materials and wastes from control, ICRP is supporting deregulation of radioactive wastes generated by nuclear power, weapons, and other atomic activities. This is a major step backward from ICRP's 1990 conclusion that the amount of natural radiation we receive "provides no justification for reducing the attention paid to smaller, but more readily controlled, exposures to artificial sources." Instead of deregulation, the many technologically produced radiation sources now in the environment need to be brought under control.

Here we're also challenging ICRP's failure to recommend greater protection for nuclear workers, as well as the public, from exposures to single and multiple sources of human-generated ionizing radioactivity. Dose numbers are expressions of biologic damage to tissue, not easily verified or enforced. They serve as a design basis to permit nuclear facilities to release radiation that gives doses which are in addition to natural background sources. National regulations are usually based on a combination of ICRP recommendations and the nuclear industry's powerful influence, permitting routine releases and exposures to workers and the public. These doses may not be accurately estimated or measured.

As for occupational exposures, ICRP-2005 fails to reduce permissible worker dose limits, despite old and new evidence that exposures are too high. The 1990 ICRP recommendations were criticized by the British National Radiological Protection Board (NRPB) for failing to reduce worker doses and public limits at that time. ICRP-60 did recommend lowering worker doses from an average of 5 rem (50 mSv) per year to an average of 2 rem/yr (20 mSv), whereas NRPB in 1987 had called for reduction of worker exposures to 1.25 rem/yr (12.5 mSv). ICRP has not done so. The U.S. had adopted neither NRPB nor ICRP recommendations to reduce worker doses, despite more than a decade of research indicating the need for stricter standards.

The more we learn about radiation impacts, the more we need better protection

Scientific epidemiological studies of radiation and health often find increases of cancer in areas contaminated by radiation, but many conclude the doses were too low to cause the diseases manifest in the exposed populations. Recent microbiological research results are suggesting that doses from internal emitters may have been underestimated. A British Committee Examining Radiation Risks of Internal Emitters (CERRIE) was formed to investigate this apparent and pervasive discrepancy. The report examines disease increases in many communities, including leukemia cases near the UK Sellafield reprocessing facility.

Although the committee was charged to reach consensus whenever possible and outline clearly spheres of disagreement, rifts were evidently too great and resulted in a dissenting report by some committee members. The dissenting report concludes that the ICRP risk model, based on atomic bomb survivor data, under-represents damage inflicted by chronic exposure to internal radiation emitters. While refusing to rule out other non-radiation explanations for the incidence of diseases, the final report of the full CERRIE committee does conclude that some ICRP risk models for some radionuclides may underestimate risk.

In reaching their conclusions, both the committee and the dissenters (who are also listed as members in the final report) examined both epidemiological and biological studies. The CERRIE Report identifies some ICRP risk model problems. The dissenters' minority report says that ICRP could be underestimating radiation risks for some internal emitters by two to three orders of magnitude. ICRP does not adequately account for evidence of the research findings of a bystander effect, genomic instability, or certain kinds of cellular mutations called "minisaltellite." Dissenters further conclude the likelihood of this underestimation requires that we exercise the Precautionary Principle in the use of nuclear technologies. More on these studies and reports and their significance for radiation protection will be described in future issues of the **Nuclear Monitor**.

Conclusions for Commenting to ICRP and national officials NIRS urges ICRP to

1. Reject any increases in allowable doses to workers or public; instead, lower

permissible doses. Recognize that these doses may not be sufficiently protective for some individuals.

2. Prohibit deregulation of nuclear materials, wastes and activities. Reject "exclusions" and "exemptions" for manmade radioactive materials and practices. Reject use of a "safe threshold" to deregulate nuclear materials or wastes.

3. Take into account increased risks found in recent research on low-level radiation impacts, including bystander effect and genomic instability.

4. Recognize the greater damage associated with internal emitters, including the greater biological effectiveness of alpha emitters. Account fully for organ impacts from inhalation and ingestion.

5. Replace "Standard (or "Reference") Man" or "Most Exposed Individual" with "most sensitive members" of potentially exposed populations in calculations and regulations.

6. Expand consideration of radiation impacts to include all deleterious effects, not just fatal cancers and gross genetic effects.

7. In calculating doses and risks to individuals, include all sources of exposure ("routine" and accidental releases from reactors, industrial, medical and military facilities, "recycled" wastes in consumer products, etc.)

8. Support NIRS nominations to ICRP's new Committee #5 on nonhuman environmental exposures Drs. Judith Johnsrud and Dennis Nelson to represent U.S. stakeholders. (This final recommendation, not all the comments on ICRP 2005, can be made directly to Dr R. Jan Pentreath, Chairman ICRP Committee 5, pentreath@supanet.com.)

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