



**AECL EACL**

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*Effects of Low and Very Low Doses of Ionizing Radiation on Health*

*World Council of Nuclear Workers (WONUC)*

*Versailles, France, 1999 June 16-18*

***Resolving the controversy over beneficial  
effects of ionizing radiation***

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## *Recognize the public fear of nuclear radiation*

- ~25% of Canadians die of cancer (one in four)
- people want cures for cancer
- people want to know the causes
- people want to avoid the causes
- people know almost nothing about nuclear radiation
- people believe radiation in any amount causes cancer
- a result of our continued use of linear no-threshold (LNT) model



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## *Keys to golden age of nuclear technology*

- wide awareness of the real effects of radiation on health
- controversy between scientists over beneficial effects resolved
- medical community acceptance of radiation hormesis
- recognition that LNT hypothesis is not based on science
- public acceptance of low-level radiation
- removal of radiation scare issue from anti-nuclear movements



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*Intense disagreement continues among scientists and analysts regarding:*

- validity of the LNT model
- reality of beneficial effects of radiation

*Controversy due to political, social, economic issues*

- cloud objective research and thinking
- increase resistance to change of established paradigms

*Extensive research already done over past century*

- disagreement not easily resolved by more scientific data
- scientists often do not look for beneficial effects
- they do not design experiments to find beneficial effects



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## *Scientific societies now challenge LNT scare*

- 1995 French Academy of Sciences - report
- 1996 Health Physics Society - position paper
- 1997 Council of Scientific Societies at Wingspread
- 1998 International Nuclear Societies Council
- 1998 US Dept of Energy funds new research on low-dose radiation
- 1999 American Nuclear Society - position paper



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## *Japanese research - health effects of radiation*

- Central Research Institute Electric Power Industry:
- organized Hormesis Research Steering Committee
- involved 14 universities and two research institutes
- found extraordinary bio-positive effects:
  - cell rejuvenation
  - psychological stress moderation - enzyme stimulation
  - suppression and therapy of adult diseases (diabetes and hypertension)
  - cancer suppression by immune system enhancement
  - cancer suppression - activation DNA repair, cell killing
- having difficulty communicating discoveries to the world



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## *Cooperation between Japan and Canada*

- Central Research Institute of Electric Power Industry of Japan urged University of Ottawa to review, duplicate and extend the Japanese studies, in Canada
- International Centre for Low Dose Radiation Research at University of Ottawa, Canada, is organizing:
  - attachment of scientists from Japan in Canada
  - participation of AECL's Chalk River Lab
  - hospitals in Ottawa
  - hospitals in Toronto



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## *Cancer patients, other life-limiting diseases*

- have a life-or-death interest in the controversy over beneficial effects
- low-dose radiation therapy to stimulate defense mechanisms would:
  - cure certain types of cancer, e.g. non-Hodgkin's lymphoma
  - treat diabetes and other adult diseases
- such patients would demand this therapy, if available





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## *Nuclear workers: vital concern in this matter*

- enjoy many interesting, well-paying jobs
- experience job satisfaction in providing tremendous benefits to humanity
- routinely receive low doses of radiation
- live with families near nuclear reactors
- aware that public concern about releases of radioactivity threatens their jobs



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## *Environmentalists define a “contaminant” as:*

- *“any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them, resulting from human activities, that may cause an adverse effect”*
- We need to discredit the LNT model because it defines an adverse effect for low doses of radiation.
- A threshold model is not good enough because a “zero effect” *implies* uncertainties = no change from today.
- We need to validate the beneficial effects model (radiation hormesis) to address the environmental constraints on our use of nuclear technologies.



## *Conclusions:*

- Current evolution to science-based regulation may be too slow to stop the phase-out of nuclear technologies, due to political activities.
- You have a vital concern on this subject. Learn about it!
- Nuclear workers are important and credible participants in resolving this controversy.
- Your recent public demonstrations reveal you have influence
- Use your influence to urge scientists and regulators to use scientific methods to quantify the actual benefits and risks of radiation.