

# Center for Radiation Protection Knowledge

K. F. Eckerman  
Environmental Sciences Division

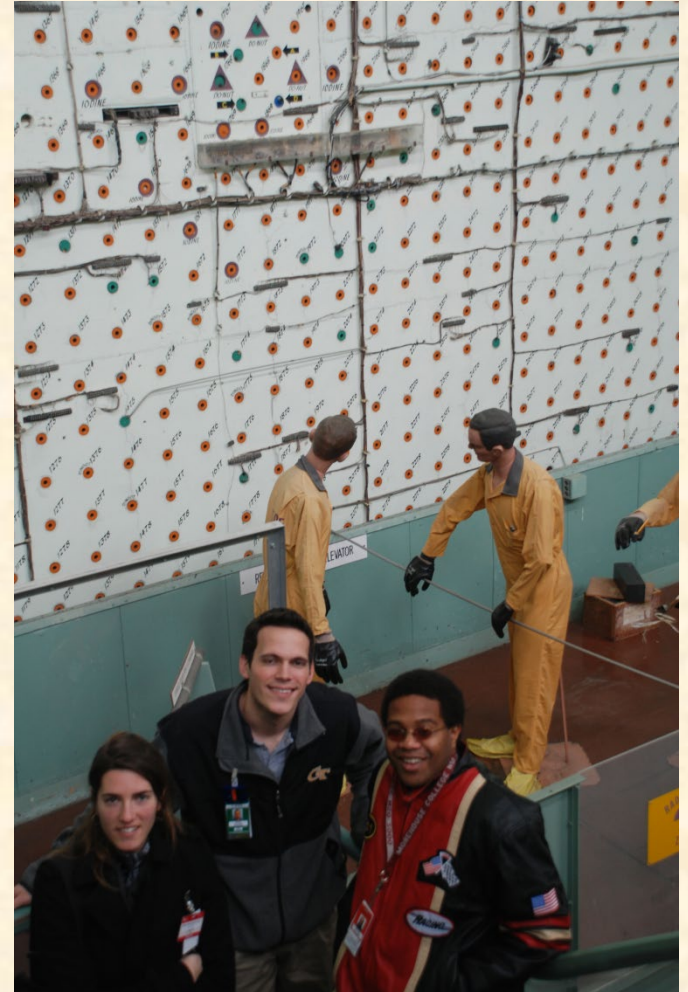
ISCORS Meeting  
Nov 9, 2010

# Outline

- **Center Staff**
- **Professional Activities**
- **Center Activities**
  - **Revision of Federal Guidance Technical Reports**
    - **FGR 12 – External dose coefficients**
    - **FGR 13 – Risk coefficients**
  - **Center software**
    - **DCFPAK – Dose/Risk electronic library**
    - **DCAL – Dose/Risk calculation engine**
    - **Rad Toolbox – HP electronic handbook**
- **Center Support**

# Center Staff

- **K F Eckerman**
  - **R W Leggett**
  - **R P Manger**
  - **M E Bellamy (Ph.D. candidate)**
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- **Offices in Oak Ridge**
  - **Computer cluster**
  - **Web site under development**







- **Beowulf computer cluster**
  - 7 Intel I7 920 CPUs
  - 8 logical cores per CPU, ~ 56 CPUs (77 GigaFlops)
  - 6 GB RAM per CPU
  - 8 TB hard drive storage
- **Cluster not on ORNL network**
- **Monte Carlo calculations**

# Professional Activities

- ICRP Committee 2, DOCAL & INDOS Task Groups
  - Revision of Publication 74 (external dosimetry)
    - Monte Carlo calculations for eye and skin
  - Revision of biokinetic models
    - Systemic kinetics
    - ICRP 66 HRTM
  - Revision of dosimetric codes
    - ICRP 107 decay data
    - ICRP 110 phantom data
    - Implementation of ICRP 100 HAT model
- NCRP Scientific Committees
  - NCRP Report No. 161 *Management of persons contaminated with radionuclides: Handbook*
- Technical support to HP community



# ICRP Committee 2 Meeting (Oct 2010)



**OAK RIDGE NATIONAL LABORATORY**  
**U. S. DEPARTMENT OF ENERGY**



# Center Activities – FGR 12 & 13

- **FGR 12 – External sources**
  - Age/gender specific MC calculations
    - Submersion, Ground surface & volume source
    - Photon, electron & neutron
  - Radiation field (instrument response)
- **FGR 13 – Internal sources**
  - Age/gender specific MC calculations
    - Photon, electron & neutron
  - Update of biokinetic models
    - Carbon, Iodine, etc.
  - Rewrite of DCAL software
    - Implement EPA’s BEIR VII risk models

# FGR 13 - RBEs low energy electrons

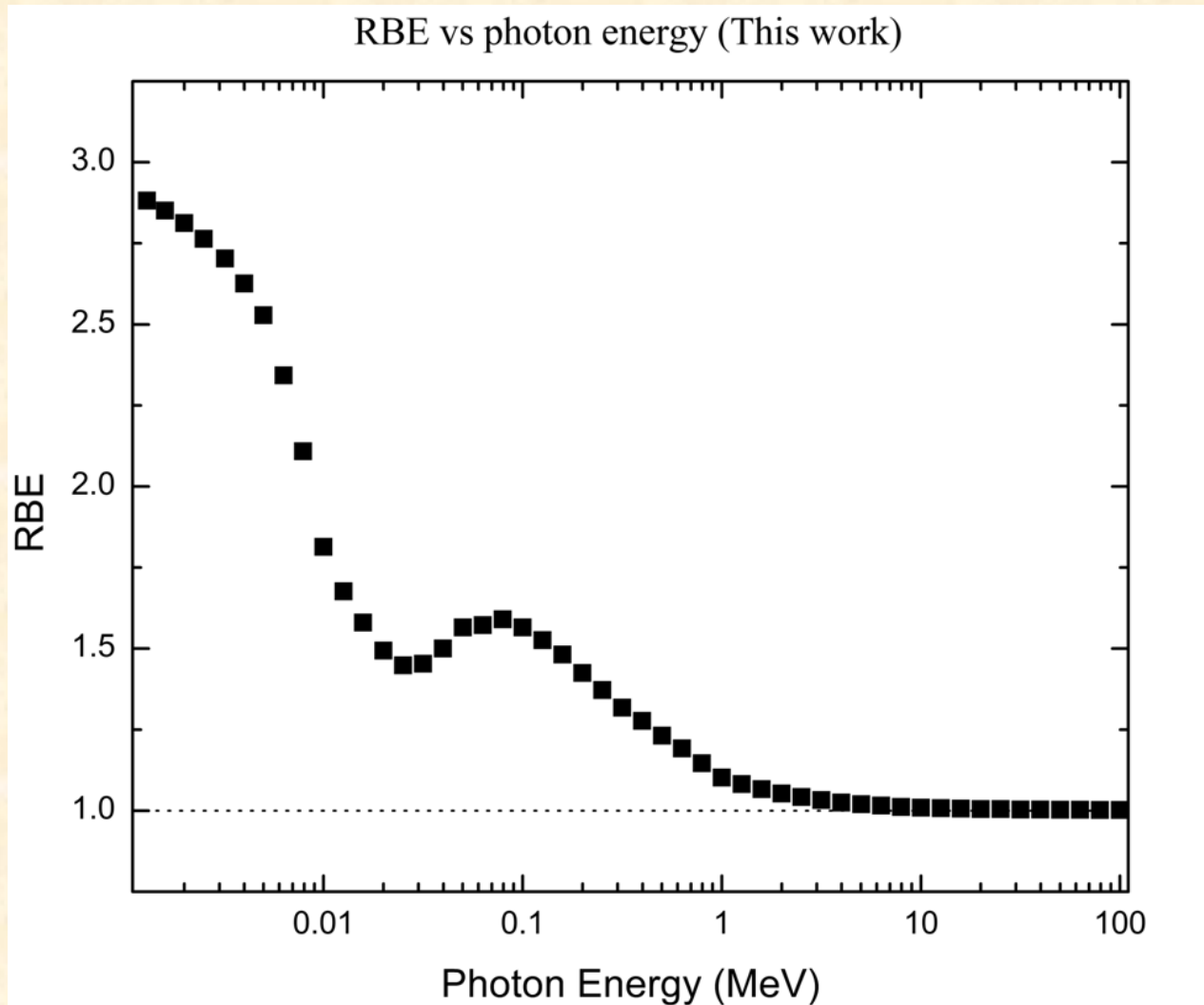
- RBE > 1 indicated for H-3
- Biophysical modeling of electron track
- Ongoing work

## RBE Dependence as Function of Energy Cutoff, $E_C$

Radiation	Energy Cutoff, $E_C$		
	3.0 keV	4.0 keV	5.0 keV
H-3 beta	1.9	2.0	2.1
C-14 beta	1.3	1.3	1.3
40 kVp x-ray	1.6	1.7	1.7
220 kVp x-ray	1.4	1.4	1.4



# RBE as Function Photon Energy



# Center Software/Libraries

- **Maintenance tasks**
  - Address Windows issues
  - Corrections/additions etc.
  - User identified needs
- **DCFPAK**
  - Dec/Jan update release
- **DCAL**
  - Jan update release
- **Rad Toolbox**
  - Dec/Jan 3<sup>rd</sup> release

# Center Support

- **Support critical to**
  - **Add new staff**
  - **Professional activities**
  - **Ensure program continuation**
- **Need to expand Center interaction**
  - **University programs**
  - **Other DOE facilities**
- **Your efforts are appreciated**

