

## The Boice Report #12



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### NCRP Dosimetry Committee for the Million Worker Study Oak Ridge, Tennessee, April 2013

The National Council on Radiation Protection and Measurements (NCRP) and Vanderbilt University are coordinating the Study of One Million U.S. Radiation Workers and Veterans (Boice 2012). The dosimetric issues involved are complex and differ among the varied exposed populations: atomic veterans, U.S. Department of Energy workers exposed to both penetrating radiation and intakes of radionuclides, nuclear power plant workers, medical radiation workers, and industrial radiographers. The NCRP report will cover the specifics of practical dose reconstruction for the ongoing epidemiologic studies with uncertainty analysis evaluation. Strengths and limitations of the approaches taken will be covered, as will brief mention of other unique exposure circumstances such as among astronauts in space (Cucinotta 2011) and the military personnel in Japan after the Fukushima reactor accident (DTRA 2012). The first meeting of Scientific Committee 6-9 was held 2-3 April 2013 in Oak Ridge, Tennessee ([see photo on page 17](#)), and the report development began.

- **Title:** Deriving Organ Doses and Their Uncertainty for Epidemiologic Studies (Guidance for the One Million U.S. Radiation Workers and Veterans Study)
- **Approach:** The approach is to build upon, enhance, and expand previous NCRP reports (NCRP 2007, 2009a, 2009b, 2012).
- **Outline of Report:**
  - **Introduction:** Purpose and scope, Populations included, Radiation dose of interest, Consideration for comprehensive dosimetry database
  - **Common Aspects of Organ Dose Assessment:** Define exposure scenarios, Identify exposure pathways, Develop and implement methods of estimating organ dose, Evaluate limitations and uncertainties in estimates of organ dose, Document data, results, and quality management, Generic flow chart for organ dose and uncertainty assessment
  - **Organ Dose Assessments for Specific Populations in the Million Worker Study:** Nuclear weapons manufacturing workers, Nuclear weapons test participants, Nuclear power plant workers, Medical radiation workers, Industrial radiographers
  - **Commentary on Supplemental Populations:** Astronauts (Cucinotta 2011), Exposed military and dependent populations (Fukushima) (DTRA 2012), U.S. transuranium registry ([www.ustur.wsu.edu](http://www.ustur.wsu.edu)), REAC/TS registry (Christensen 2012)
  - **Conclusions and Recommendations**
  - **Appendices**
- **Uniqueness:** The report will be unique in the sense that it deals with practically all dosimetric circumstances in most occupational settings as reflected in the Million Worker Study, while also addressing environmental circumstances such as fallout during nuclear weapons testing. It will address the issues related to practical dose-reconstruction approaches for epidemiologic studies (Boice et al. 2006). Methods to estimate doses from internal intakes of radionuclides will be developed (Leggett et al. 2005) as will approaches to combine external and internal radiation

for risk assessment. The focus will be on providing the best estimate of organ absorbed dose received each year by workers or veterans and not high-sided estimates as used in compensation programs. Actual data developed from the Million Worker Study will be used throughout, including approaches for workers employed at more than one facility during their career. The goal of the study, which is 10 times larger than the study of Japanese atomic bomb survivors and has more highly exposed persons, will be to quantify the risk of exposures that are received gradually over time and not all at once. Another interesting and useful aim of the report is the assessment of uncertainties in dose estimates developed for epidemiologic purposes.

- **Committee Members:** Andre Bouville (chair), Dick Toohey (cochair), Harold Beck, Jim Cassata, Larry Dauer, Keith Eckerman, Derek Hagemeyer, Bruce Napier, Kathy Pryor, Dave Schauer, Steve Simon, Dan Stram, John Till, Craig Yoder, Cary Zeitlin, Rich Leggett (consultant), Sami Sherbini (consultant), and Marvin Rosenstein (NCRP technical consultant)

I hope you attended the 11–12 March 2013 NCRP Annual Meeting (or viewed the webinar), which was dedicated to the people of Fukushima. The presentations were recorded and the link is available on the NCRP website ([ncrponline.org](http://ncrponline.org)). The musical introduction of PBS Science Correspondent Miles O'Brien is also available on the NCRP website.

## References

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**April 2013 – Oak Ridge: NCRP SC 6-9 on Dosimetry for the Million Worker Study**  
Left to right: Dick Toohey (cochair), Jim Cassata, Marvin Rosenstein, Keith Eckerman, Derek Hagemeyer, Dan Stram, Sami Sherbini, Craig Yoder, Harold Beck, Kathy Pryor, Andre Bouville (chair), Larry Dauer, David Schauer, and John Boice