Development of Computational Code for Internal Dosimetry

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From 1997-1999, the UK National Radiological Protection Board (NRPB), British Nuclear Fuels plc (BNFL) and Westlakes Research Institute (WRI) developed the suite of software modules known as "IMBA" – Integrated Modules for Bioassay Analysis. This enabled Approved Dosimetry Services (ADS) in the UK to transition from ICRP 26/30 dosimetry rules and models to ICRP 60/68, as mandated by new UK Ionizing Radiation Regulations (2000). In 2001, ACJ & Associates, Inc. and NRPB, sponsored by the U.S. Department of Energy and several individual DOE sites, began co-developing *IMBA Expert™ USDOE-Edition*. This development (completed in 2004) provided DOE with a customized, intuitive and "user-friendly" IMBA-interface, to implement throughout DOE the ICRP 68 biokinetic models and the ICRP 66 Human Respiratory Tract Model (HRTM) for bioassay analysis and internal dose assessment. It introduced advanced statistical methods, whilst preserving compliance with the mandatory U.S. 10CFR835 "dosimetry rules." In parallel with *USDOE-Edition*, other customized editions were co-developed: *IMBA Expert™ OCAS/ORAU-Edition* – to enable OCAS/ORAU dose-assessors to perform standardized dose calculations in support of the U.S. Energy Employees Occupational Injury Compensation Program Act (EEOICPA 2000), and; *IMBA Expert™ CANDU-Edition* (for the Canadian CANDU Owners Group, COG) – to meet special dose-assessment requirements in the operation of CANDU (heavy water moderated natural uranium) reactors. In 2005, NRPB (and later the UK Health Protection Agency's Radiation Protection Division, HPA-RPD) extended the *IMBA Expert™* "customized interface" concept to develop the "off-the-shelf" software "package" *IMBA Professional Plus* (IPP). This package serves the needs of various "international" users – and has gained worldwide application. This presentation looks forward to the further development of the "IPP" approach to implementing future recommendations of ICRP for internal dose assessment and applying recent developments in Bayesian uncertainty analysis. The anticipated ICRP recommendations will be based on Publication 103 and ICRP's current updating of the ICRP 66 and 68 models.

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