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U.S. Nuclear Regulatory Commission
Dr. Keith Compton
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U.S. Nuclear Regulatory Commission
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SUBJECT: Transmittal of Final Version of Report on Activities Completed in
Biosphere Characteristics During Fiscal Year 2007 (Intermediate
Milestone 06002.01.372.720)

Dear Dr. Compton:

This letter transmits the final version of Intermediate Milestone 06002.01.372.720, Report on Activities Completed in Biosphere Characteristics During Fiscal Year 2007. This report was previously transmitted for review on September 26, 2007, under Contract No. NRC-02-02-012, and Account No. 06002.01.372. This milestone summarizes activities that were conducted in support of the U.S. Nuclear Regulatory Commission (NRC) integrated subissue, Biosphere Characteristics, during the 2007 fiscal year:

- *Support Review of KTI Agreements:* Biosphere Characteristics supported the Redistribution of Radionuclides in Soil Integrated Subissue review of the U.S. Department of Energy (DOE) Analysis and Model (AMR) Report, Inhalation Exposure Input Parameters for the Biosphere Model, Revision 4. Over a period of 6 weeks, the report was examined and comments were e-mailed to NRC staff to support the determination of whether the AMR satisfied Key Technical Issue Agreement IA 2.11. Specifically, the inhalation input parameters were reviewed. The Center for Nuclear Waste Regulatory Analyses (CNWRA) comments were incorporated into an NRC response letter to DOE. The agreement item still requires resolution of one minor deficiency, and is near closure.
- *Support Prelicensing Interactions:* A CNWRA staff member provided background information during preparations for an Advisory Committee on Nuclear Waste working group meeting on igneous activity held in February. The staff member briefed the NRC program manager and another CNWRA staff member on dosimetry aspects of igneous activity.



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- *Support Transition from Prelicensing to Licensing Application Review:* Informal input was provided to the Biosphere Characteristics draft review strategy. Staff also supported the review strategy by collecting electronic copies of correspondence between DOE and NRC concerning agreement items related to Biosphere Characteristics. The correspondence will be reviewed in preparation for the license application review to ensure that all agreement items are completed.
- *Support Development of Risk Insights Through Use and Development of the Total-system Performance Assessment (TPA) Code:* A number of TPA Version 5.1 parameter changes were supported by more current information. A review of GENII Version 2.05 and the associated user manual was initiated and is ongoing. A review of NUREG/CR-6910, a report on alternative food-chain pathway models, is also ongoing. A brief letter report will document these reviews and allow staff to be aware of new developments in biosphere characteristics.

Approximately 40 TPA Version 5.1 code input parameter values were updated to improve internal consistency and documentation of technical bases for biosphere model inputs. In response to NRC guidance regarding unnecessary sampling of non-risk-significant input parameters, 24 TPA Version 5.1 input parameter values that were previously sampled were set to constant values to improve the efficiency of code runs.

Staff completed and delivered the draft Biosphere Characteristics chapter for the TPA Version 5.1 User Guide. This chapter was one of three "pioneer" chapters that were written to define the content and style of the User Guide and, consequently, required numerous significant revisions as the User Guide format and content evolved. This entailed submission of three versions of the chapter, including two as milestones (initial draft, intermediate milestone number 06002.01.372.730, and final combined user guide, intermediate milestone number 06002.01.354.720), with resolution of NRC comments for each version. Complete input parameter and data file documentation was included in the User Guide effort. Timely incorporation of NRC comments and delivery of each version helped maintain the overall schedule for the user guide development effort. The final version was reviewed by the Office of General Counsel with only minimal corrections.

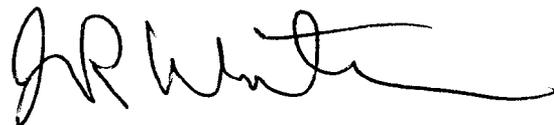
Staff were also involved in TPA Version 5.1 validation testing and writing and reviewing a Software Validation Test Report (SVTR) relevant to Biosphere Characteristics to support TPA Version 5.1 validation. Staff conducted testing and wrote the SVTR to validate changes associated with Software Change Request numbers 563 and 566 that allowed incorporation of groundwater protection information and ICRP-72 dose conversion factors into TPA Version 5.1.

- *Involvement in International Programs:* Participation by CNWRA staff in the 15th International Solid State Dosimetry Conference held in Delft, The Netherlands, was canceled due to scheduling conflicts with the TPA User Guide effort.

- *Staff Exchange:* CNWRA staff supported a staff exchange with the NRC project manager for Biosphere Characteristics at the CNWRA from April 9–20, 2007, to work on the review strategy. During the exchange, the review strategy was updated and needs for additional work were identified. Staff practiced using the NRC ADAMS search tool to locate agreement items correspondence, and work for fiscal year 2008 was discussed.
- *International Approaches to Biosphere Modeling:* At the request of CNWRA staff, because staff were working on other priorities and to complete an expanded scope, the intermediate milestone 06002.01.372.710 associated with this work was delayed until fiscal year 2008. The scope of the proposed milestone was expanded to address both domestic and international approaches to biosphere modeling, including pertinent modeling not necessarily focused on high-level waste but that may be generally applicable to the Yucca Mountain region. A plan for the review is currently being developed. The plan will guide joint NRC and CNWRA efforts that will be completed by April 30, 2008.
- *Meeting Attendance:* One staff member attended the 2007 midyear Health Physics Society Meeting in Knoxville, Tennessee, January 21–24, 2007. A trip report summarizing the meeting was prepared and submitted as AI 06002.01.372.701. One staff member attended the 19th Annual NRC Regulatory Information Conference in Washington, DC. A presentation by Bruce Napier at this conference indicated that Bechtel SAIC Company, LLC, is validating the GENII Version 2.05 code, possibly for use in the DOE biosphere model.

Work performed during this fiscal year occurred at a lower level of effort than originally planned due to commitments in other areas—in particular, support of TPA Version 5.1 validation and user guide efforts. If you have any questions on the materials prepared or assistance provided during fiscal year 2007 for the NRC Biosphere Characteristics Integrated Subissue, please contact me at (210) 522-5249 or Dr. Jim Durham at (210) 522-6936.

Sincerely,



James R. Winterle
Manager
Performance Assessment

JRW:bs

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