CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: MCNP5 Training Course
AI20.06002.01.011.005

DATE/PLACE: February 10–14, 2003
Los Alamos National Laboratory, Los Alamos, New Mexico

AUTHOR: Lane Howard

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PERSONS PRESENT:

Eighteen students from various organizations and six instructors from the LANL X–5 division (Forrest Brown, Elizabeth Selcow, Avneet Sood, Tom Booth, Tim Goorley, and Jeremy Sweezy) were present.

BACKGROUND AND PURPOSE OF TRIP:

The purpose of the trip was to obtain up-to-date training on the latest release of MCNP (Version 5) for professional development. MCNP is a general-purpose Monte Carlo N-Particle code that can be used for neutron, photon, electron, or coupled neutron/photon/electron transport, including the capability to calculate eigenvalues for critical systems. For neutrons, all reactions given in a particular cross-section evaluation (such as ENDF/B-VI) are accounted for. Thermal neutrons are described by both the free gas and S(alpha, beta) models. For photons, the code takes account of incoherent and coherent scattering, the possibility of fluorescent emission after photoelectric absorption, absorption in pair production with local emission of annihilation radiation, and bremsstrahlung. A continuous-slowing-down model is used for electron transport that includes positrons, k x-rays, and bremsstrahlung but does not include external or self-induced fields. Important standard features that make MCNP very versatile and easy to use include a powerful general source, criticality source, and surface source; both geometry and output tally plotters; a collection of variance reduction techniques; a flexible tally structure; and an extensive collection of cross-section data.

SUMMARY OF PERTINENT POINTS:

The course was taught by instructors from the Diagnostic Applications Applied Physics Division (X-5) of LANL who are the code developers of MCNP. Topics included basic and advanced geometries, source definitions, tallies, data, variance reduction, statistical analysis, criticality, plotting, and neutron/photon/electron physics.

SUMMARY OF ACTIVITIES:

The course consisted of four days of training from 8:30 to 4:30 each day. Many topic area example problems were used to demonstrate use of the code and each student had a PC to use for the problem sets.

CONCLUSIONS:

The course provided good training on the newest version of MCNP; particularly in the ability to use the code for example problems during the class and ask questions directly to the code developers.

PROBLEMS ENCOUNTERED:

None.

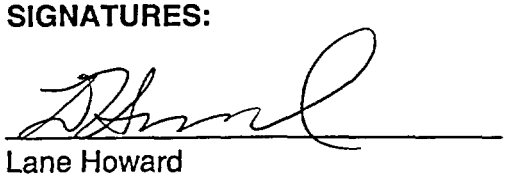
PENDING ACTIONS:

None.

RECOMMENDATIONS:

This course is recommended for staff seeking up-to-date training on application of the latest version of the MCNP code. Additional courses taught by the X-5 group at Los Alamos include an MCNP for Health Physicists and an Advanced MCNP course.

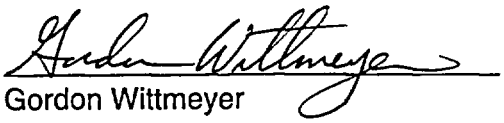
SIGNATURES:



Lane Howard
Senior Research Engineer

2/19/03
Date

CONCURRENCE:



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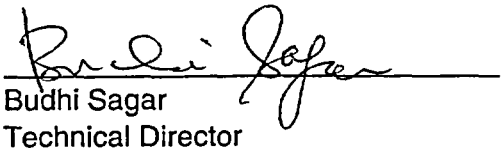

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