EMMANUEL K. GNANAPRAGASAM Ph.D., P.E.

Radiological Health Risk Section
Environmental Science Division
Argonne National Laboratory

Education:

Ph.D.	Northwestern University, Civil Engineering, 1991
M.S.	Northwestern University, Civil Engineering, 1987
B.S.	University of Moratuwa, Engineering, 1982

Professional Experience:

2002-Present   Environmental Systems Engineer
Radiological Health Risk Section
Environmental Science Division, Argonne National Laboratory

Upgraded RESRAD-OFFSITE to 32-bit and enhanced it by the addition of offsite dwelling, updated sensitivity analysis, ability to accept release and media concentrations, a faster water transport algorithm. Incorporated additional modules – map interface, air transport – developed by RESRAD team members. Authored user's guide and other documents to describing the capabilities of RESRAD-OFFSITE.

Summary of Previous Experience:

1999-2002   Assistant Environmental Systems Engineer (Regular)
Radiological Health Risk Section
Environmental Assessment Division, Argonne National Laboratory

Developed surface water contaminant transport and accumulation model for RESRAD-OFFSITE. Also developing improved air exchange and air quality model for RESRAD-BUILD. Developed step-by-step interactive input-output interface to perform probabilistic analysis in RESRAD-OFFSITE and to view intermediate results after each step. Modeled the deterministic and probabilistic Olen radium extraction site environmental release scenarios of Biosphere Modeling and Assessment Methods, BIOMASS (a multi-national model comparison study) using RESRAD-OFFSITE. Developed enhanced Visual Basic interface for Uncertainty/probabilistic inputs, including graphical help on distributions. Debugged the new LHS FORTRAN code, adapted it to work with RESRAD and verified it. Modified RESRAD (FORTRAN) to work with the new LHS program and to produce the desired probabilistic outputs. Changed the RESRAD code to perform time integration of dose and updated the time integrated risk routines. Improved the ground water transport model in RESRAD-OFFSITE to model both longitudinal dispersion and nuclide specific retardation of progeny produced in transit.

1994-1999   Assistant Environmental Systems Engineer (Term)
Environmental Assessment Division, Argonne National Laboratory

Developed conceptual models and wrote the FORTRAN code for RESRAD-OFFSITE to estimate radiological effects at offsite locations. The conceptual models developed include ground water transport algorithms and accumulation algorithms for parent and progeny. Developed the Visual Basic user interface for RESRAD-OFFSITE. Wrote the users guide for RESRAD-OFFSITE and the appendices to RESRAD documenting the formulations used in RESRAD-OFFSITE . Led the model prediction comparison study between four models (MEPAS, MMSOILS, PRESTO, and RESRAD) for a plume migration scenario in the saturated zone. Modeled the deterministic and probabilistic uranium mill tailings standardized test

scenarios versions 2.2 and 2.3, of the Biosphere Model Validation Study, BIOMOVS II (a multi-national model comparison study) using RESRAD. Compared the RESRAD predictions with the predictions of the other six models that participated in the study. Used the comparisons to suggest features and processes to enhance RESRAD. Modeled the "Validation of Environmental Model Predictions - Multiple Pathway Assessment Study" Scenario-S (an international exercise comparing model predictions with field observations, and field estimates of the radiological consequences of Chernobyl fallout in Southern Finland) using the Monte-Carlo version of RESRAD and compared it with the results of the multiple runs of deterministic RESRAD performed previously.

1993-1994	Engineer Special Term, Radiological Health Risk Section, Environmental Assessment Division, Argonne National Laboratory

Addressed concerns raised during the external verification of RESRAD. Benchmarked RESRAD for DOE programmatic environmental impact statement effort. Provided a report of dose attributed to progeny at point of exposure in RESRAD.

1992-1993	Post Doctoral Appointee, Environmental Assessment Division, Argonne National Laboratory

Provided model predictions using RESRAD for the "Validation of Environmental Model Predictions - Multiple Pathway Assessment Study" Scenario-S. Compared blind predictions with measured and estimated values, searched for possible reasons for differences between predictions and measured values. Modeled the deterministic uranium mill tailings standardized test scenario version 1.07 of the Biosphere Model Validation Study, BIOMOVS II using RESRAD. Selected statistical distributions and distribution statistics for parameters affecting dose calculations. Reviewed PEIS Human Health Risk Evaluation methodology for Environmental Restoration and Waste Management activities in DOE sites. Improved the groundwater transport pathway, and provided media concentration report in RESRAD.

1991-1991	Post Doctoral Research Fellow, Department of Civil Engineering, Northwestern University

Modeled the leaching of uranium and thorium from contaminated soils using GEOCHEM.

1985-1991	Research/Teaching Assistant, Department of Civil Engineering, Northwestern University

Quantified the incorporation of trace amounts of radium in gypsum, calcite, and brushite. Researched ways of predicting such incorporation using semi-empirical correlations. Formulated a nutrient supplement to enhance the anaerobic degradation of a landfill leachate. Conducted Laboratory class in Chemistry of the Aquatic Environment and in Fluid Mechanics.

Professional Registrations and Affiliations:

Professional Engineer: Civil, State of Washington
Professional Engineer: Environmental, State of Washington
Member, American Society of Civil Engineering
Plenary Member, Health Physics Society

Publications:

Author or co-author of 10 journal articles, 0 books, 9 reports, 1 conference publications and 2 presentations.