

Selected Unpublished Presentations

Presentations to the National Academy of Sciences National Research Council Board on Radioactive Waste Management

Observations on Accuracy and Uncertainty in Performance Assessment, BRWM Fall Meeting, Washington, D.C., September 3, 2003 (invited speaker)

Recent Department of Energy Analysis of Yucca Mountain Barriers Using Total System Performance Assessment, BRWM Winter Meeting, Washington, D.C., December 12, 2002 (invited speaker)

Presentations to the Nuclear Waste Technical Review Board

Science Update, NWTRB Winter Meeting, Las Vegas, Nevada, January 28, 2009

Total System Performance Assessment: Modeling Approach and Overview of Results, NWTRB Spring Meeting, Las Vegas, Nevada, May 29, 2008

Barrier Capability and the Assessment of System Performance, NWTRB fall meeting, Amargosa, NV, September 27, 2006

Status of the Lead Laboratory Transition, presented to the NWTRB Fact-Finding Visit on the Status of the Total System Performance Assessment, Las Vegas, NV, August 3, 2006

Total System Performance Assessment for License Application Results and Summary of Total System Performance Assessment Documentation and Validation, presentations to NWTRB subgroup workshop on Total System Performance Assessment, Las Vegas, NV, August 23, 2005

U.S. DOE YMP TSPA Status and Plans (presented by P. Swift, coauthored by Robert Andrews and Jon Helton), presentation to NWTRB Subpanel on Performance Assessment, Las Vegas, NV, December 14, 2004

Overview of the U.S. Department of Energy Total System Performance Assessment Model and Overview of Nominal Scenario Class and Igneous Disruption Scenario Class Results in the Total System Performance Assessment, presentations to NWTRB Subpanel on Performance Assessment, Las Vegas, NV, March 8, 2004

Barrier Capability Analyses, NWTRB Winter Meeting, Las Vegas, NV, January 28, 2003

Status of the Department of Energy's Igneous Activity Analyses, NWTRB Fall Meeting, September 17, 2003

Department of Energy Performance Assessment and Barrier Analyses, NWTRB fall meeting, Las Vegas, NV, September 10, 2002

Project Plans for Fiscal Year 2002-2003: Performance Assessment, NWTRB Spring Meeting, Washington D.C., May 8, 2002

Performance Assessment Prioritization Overview (presented by P. Swift, coauthored with

Rob Howard and Tim Niemann), presentation to the Board panel on performance assessment, Las Vegas, NV, March 14, 2002

Implementing a Consistent Treatment of Uncertainty in the TSPA-LA, NWTRB Winter Meeting, Pahrump, NV, January 29-30, 2002

WIPP PA Consequence Modeling, NWTRB trip to the Waste Isolation Pilot Plant, Albuquerque, NM, August 12, 1991

Presentations to the National Academy of Sciences National Research Council Committee on the Waste Isolation Pilot Plant

Fluid Injection, The WIPP, and "The Hartman Scenario," presentation to members of the NAS WIPP Committee, Albuquerque, NM, August 18, 1998

Fluid Injection and the WIPP (presented by P. Swift, coauthored with Dan Stoelzel, Palmer Vaughn, Jim Bean, and Ross Kirkes), NAS WIPP Committee quarterly meeting, Washington, D.C., May 15-16, 1997

Overview of the Compliance Certification Application Performance Assessment (presented by P. Swift, coauthored with D. Rip Anderson, Hong-Nian Jow, Mel Marietta, Jon Helton, Palmer Vaughn, Jerry Berglund, Dan Stoelzel, and Kurt Larson), NAS WIPP Committee Quarterly Meeting, Albuquerque, NM, November 22, 1996

Regulator and Stakeholder Inputs to the Systems Prioritization to Date, coauthored with E. Boucheron, Washington, D.C., June 16, 1994

Update on Performance Assessment Progress, coauthored with D.R. Anderson and M.G. Marietta, Washington D.C., December 15, 1993

Presentations to the U.S. Nuclear Regulatory Commission Advisory Committee on Nuclear Waste

Overview of the U.S. Department of Energy Total System Performance Assessment Model, ACNW Spring Meeting, Rockville, MD, March 25, 2003

Component Performance and Key Contributors to Nominal Scenario Class Dose in the U.S. Department of Energy Total System Performance Assessment, ACNW Spring Meeting, March 26, 2003

Overview of the U.S. Department of Energy Total System Performance Assessment Model, ACNW meeting on the Biosphere, February 24, 2004

Performance Assessment Prioritization Overview, ACNW Spring Meeting, Rockville, MD, March 19, 2002

Implementing a Consistent Treatment of Uncertainty in the Total System Performance Assessment – License Application, ACNW Spring Meeting, Rockville, MD, March 19, 2002

Technical Updates Since the Preliminary Site Suitability Evaluation Report, ACNW Spring Meeting, Rockville, MD, March 19, 2002

Presentations to the U.S. Nuclear Regulatory Commission Staff

Presentation/Organization of Performance Assessment in Safety Analysis Report, U.S. Department of Energy Presentation on its License Application for a High-Level Waste Geologic Repository at Yucca Mountain, Nevada, Rockville, MD, June 20, 2008

Presentation/Organization of Performance Confirmation in Safety Analysis Report, U.S. Department of Energy Presentation on its License Application for a High-Level Waste Geologic Repository at Yucca Mountain, Nevada, Rockville, MD, June 20, 2008

Disruptive Scenarios: Igneous Eruptive Model Abstraction, presented by P. Swift, coauthored with William Statham, NRC-DOE Technical Exchange on Total System Performance Assessment for Yucca Mountain, Las Vegas, NV, April 4, 2008

Use of Infiltration Model Results in the Total System Performance Assessment, NRC-DOE Technical Exchange on Infiltration at Yucca Mountain, Las Vegas, NV, April 2, 2008

Introduction to the NRC-DOE Appendix 7 Meeting on Total System Performance Assessment, NRC-DOE Appendix 7 Meeting on Total System Performance Assessment for Yucca Mountain, Las Vegas, NV, March 31, 2008

Igneous Consequences in the Total System Performance Assessment, NRC-DOE Appendix 7 Meeting on Igneous Consequence Modeling, Las Vegas, NV, January 8, 2008

Performance Assessment Prioritization Overview, NRC-DOE Technical Exchange on Future Issue Resolution Meetings, Las Vegas, NV, February 5, 2002

Total System Performance Assessment Supplemental Sensitivity Analyses: Igneous Activity, DOE/NRC Technical Exchange on Key Technical Issues, Las Vegas, NV, June 21-22, 2001

Total System Performance Assessment and Integration Key Technical Issue Subissue 2 – Scenario Analysis (presented jointly with Geoff Freeze), DOE/NRC Technical Exchange on Features, Events, and Processes, Las Vegas, NV, May 15-17, 2001

Overview of Postclosure Features, Events, and Processes Relevant to Repository Design and Thermal-Mechanical Effects, DOE-NRC Technical Exchange on the Key Technical Issue and Subissues related to Repository Design and Thermal-Mechanical Effects, Las Vegas, NV, February 6-8, 2001

Total System Performance Assessment—Site Recommendation Rev. 00—Igneous Analyses, presented by P. Swift, coauthored with Michael Sauer, DOE/NRC Technical Exchange: Total System Performance Assessment—Site Recommendation Briefing, Las Vegas, NV, January 23, 2001

Container Life and Source Term, Subissue 5, Acceptance Criterion 7: Risk, DOE-NRC Technical Exchange on Key Technical Issues and Subissues Related to Criticality, Las Vegas, NV, October 23-24, 2000

Structural Deformation and Seismicity Subissues in the Total System Performance Assessment—Site Recommendation, DOE/NRC Technical Exchange, Las Vegas, NV,

October 11-12, 2000

TSPA-SR Features, Events, and Processes Approach: Process and Methodology, DOE/NRC Technical Exchange on Total System Performance Assessment (TSPA) for Yucca Mountain, San Antonio, TX, June 6, 2000

Igneous Activity in the Total System Performance Assessment – Site Recommendation: A Summary, NRC/DOE KTI Technical Exchange on Igneous Activity, Las Vegas, NV, August 29-31, 1999

Comparison of DOE's Scenario Methodology to Criteria and Guidance in the NRC TSPA&I IRSR Rev.1, Section 4.4, DOE/NRC Appendix 7 Meeting on the TSPA FEP Database, Las Vegas, NV, September 8, 1999

Scenario Development for the Yucca Mountain TSPA, DOE/NRC Appendix 7 Meeting on Disruptive Events, Las Vegas, NV, October 6-8, 1998

Presentations to the U.S. Environmental Protection Agency

Introduction to Fluid Injection and Salt Water Disposal near the WIPP, DOE/EPA Technical Exchange Meeting, Carlsbad, NM, Oct. 10, 1996

History and Development of the Culebra Conceptual Model, DOE/EPA Technical Exchange, Carlsbad, NM, December 5-7, 1995

Scenario Development Refresher, presented with D.A. Galson, coauthored with D.A. Galson, R.D. Wilmot, and D.R. Anderson, DOE/EPA Technical Exchange Meeting, Washington, D.C., November 7-9, 1995

FEPs Screening Criteria, presented with D.A. Galson, coauthored with D.A. Galson, R.D. Wilmot, D.R. Anderson, and K. M. Economy, DOE/EPA Technical Exchange Meeting, Washington, D.C., November 7-9, 1995.

Detailed Discussion of FEPs Screened In: Natural Climate Change and 2-D Flow Modeling, coauthored with Tom Corbet, DOE/EPA Technical Exchange Meeting, Washington, D.C., November 7-9, 1995.

Detailed Discussion of FEPs: Fluid Injection, coauthored with Dan Stoelzel, DOE/EPA Technical Exchange Meeting, Washington, D.C., November 7-9, 1995.

Comparison of Modeling of E1, E2, and E1E2 Intrusion Events in 1992 PA and CCA, DOE/EPA Technical Exchange Meeting, Washington, D.C., November 8-9, 1995.

Climate Change and Long-Term Performance Assessment for the Waste Isolation Pilot Plant, EPA Technical Workshop on Waste Isolation Pilot Plant Compliance Issues, Washington D.C., February 14-16, 1995

Scenario Development for the WIPP (presented with D.A. Galson, coauthored with D.A. Galson, T.W. Hicks, and R.D. Wilmot), EPA/DOE Technical Exchange Meeting, Albuquerque, NM, September 22-23, 1994

Regulator and Stakeholder Inputs to the Systems Prioritization to Date, coauthored with E. Boucheron, DOE/EPA Technical Exchange Meeting, Washington, D.C., June 15, 1994

Treatment of Nonradioactive Waste Characteristics in Past PAs for 40 CFR 191, DOE/EPA Technical Exchange Meeting, Washington, D.C., June 14, 1994

Introduction to WIPP Performance Assessment, presented with D.R. Anderson and others, coauthored with the WIPP Performance Assessment Department, DOE/EPA Technical Exchange, Albuquerque, NM, February 22-25, 1994.

Presentations to the State of Nevada

State of Nevada / Department of Energy Meeting on Total System Performance Assessment for the Proposed Yucca Mountain Repository

Total System Performance Assessment: Introduction and Overview, Las Vegas, NV, July 7, 2008

Selected International Presentations

Radioactive Waste Management Funding and Research Center (RWMC), Tokyo, Japan, October 24, 2008

Yucca Mountain Total System Performance Assessment

Japan Nuclear Energy Safety Organization and Sandia National Laboratories Physical Protection Collaboration Meeting, Albuquerque, NM, September 25, 2007

Sandia National Laboratories' Role on the Yucca Mountain Project

Korea Atomic Energy Research Institute (KAERI) Delegation visit to Sandia National Laboratories, October 30, 2006

Overview and Current Status of the Yucca Mountain Project

Chinese National Nuclear Corporation (CNNC) Delegation visit to Sandia National Laboratories, October 27, 2006.

Overview and Current Status of the Yucca Mountain Project

Japan Nuclear Energy Information Center, Study Mission on Rad Waste Management in USA

Performance Assessment, Albuquerque NM, April 28, 2006

PUNT (Peaceful Uses of Nuclear Technology) Workshop on Radioactive Waste Regulations, Codes, and Standards, June 22-24, 2005, Beijing, China

Overview of the U.S. Radioactive Waste Management Program: Part II, Technical Summary of the Yucca Mountain Repository

The Commission Nationale d’Evaluation (France), visit to Sandia National Laboratories, October 18, 2001, Albuquerque, NM

Overview of Yucca Mountain Performance Assessment

FEP/Scenario Development Workshop, Institute of Nuclear Energy Research, Lungtan, Taiwan, August 15-17, 2000

The Role of Features, Events, and Processes in Performance Assessment for Radioactive Waste Repositories

Implementation of FEPs/Scenario Development: The WIPP Experience

Expectations from U.S. Regulators Regarding FEPs

Igneous Activity in the Yucca Mountain Performance Assessment: An Example of a FEP that is Included through Explicit Modeling

Seismic Activity in the WIPP and Yucca Mountain Performance Assessments: An Example of a FEP that is Excluded from the PA

Implementing FEP Screening and Scenario Development in Performance Assessment

DOE-CAO (Carlsbad Area Office)/ CIAE (China Institute of Atomic Energy) China/WIPP Nuclear Waste Management Workshop, Beijing, China, January 25-29, 1999

Introduction to the Waste Isolation Pilot Plant (WIPP)

Overview of Performance Assessment

Application of Performance Assessment Methodology

CRIEPI (Central Research Institute of Electric Power Industry, Japan)/WIPP Nuclear Waste Management Seminar, Tokyo, Japan, January 21-22, 1999

Introduction to the Waste Isolation Pilot Plant (WIPP)

Overview of Performance Assessment

Applications of Performance Assessment

NAGRA (Nationale Genossenschaft fur die lagerung radioaktiver Abfalle) Workshop on TRU disposal, Baden, Switzerland, December 11-13, 1996

Gas Generation and Transport in Repository Safety Assessments (presentation and workshop session lead)

EDWARD THOMAS

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USA Repository Services LLC
1160 N. Town Center Drive
Las Vegas, NV 89144

CURRICULUM VITAE

SUMMARY

Senior Engineering Specialist with over 30 years of progressive experience in all areas of underground hard rock mining. Experienced with various aspects of subsurface mining including project engineering, project management, subsurface ventilation, subsurface excavation, engineering design, planning and scheduling, and report writing. Proficient in mine design and subsurface ventilation network modeling.

PROFESSIONAL EXPERIENCE

Yucca Mountain Project

USA-RS, Bechtel SAIC LLC, and Washington Group International (Morrison Knudsen)
Las Vegas, Nevada, 1999 – Current

Senior Engineering Specialist, Discipline Engineering Manager. Manage the engineering activities in the Mining, Ventilation, and Geotech disciplines establishing and maintaining the technical standards, including development of retrieval operations and the EBS-postclosure interface. Responsible for ensuring technical work is performed with quality assurance procedures, schedules, and budget. Interact with external organizations, client, and regulators. Plan and schedule Mining work related to the subsurface repository design.

Mining/Ventilation Engineering Group Supervisor. Led the Mining and Ventilation Groups in the preparation of engineering analyses, calculations, drawings, and specifications for subsurface construction and procurement activities. Conducted VnetPC ventilation modeling of the subsurface repository.

Other positions included: Senior Engineering Specialist in the Licensing and Nuclear Safety Group. Engineering Specialist within the Subsurface Engineering, Mining Group. Prepared design documents for the subsurface repository in accordance with the NQA-1 quality assurance program. Integrated work within the Mining Team, other departments, organizations and the DOE. Title III Engineer at Area 25 coordinating and managing projects at the Exploratory Subsurface Facility.

BHP Copper (formerly Magma Copper Company) **San Manuel, Arizona, 1978 – 1999**

Senior Engineer - 12/91 through 3/99

Project Engineer for the Lower Kalamazoo orebody expansion project. A key member of the Lower Kalamazoo feasibility study and expansion project with responsibilities that included ventilation design work, feasibility report preparation, directing project teams, scheduling, coordinating external design work, project management and procurement. Involved with the

initial contract work for TBM construction, raise bore, and other projects. Project engineer coordinating the design, installation, and commissioning of subsurface structures. Supervised the mine engineering, planning, geology, survey and computer departments. Assignments included engineering staff management, project management, budgeting and report writing. Coordinated engineering projects, maintenance projects, contract management, and procurement with both internal and external resources. Generated life of mine schedules and the corresponding budget estimates.

Senior Ventilation Engineer - 11/85 through 12/91

Responsible for designing, installing, maintaining and operating the underground ventilation and 3,000 ton cooling system at the San Manuel Mine. Effectively designed and managed the ventilation transition phase to the use of LIID equipment in development and production areas. Established an energy conservation program that reduced power and supply costs. Position required extensive interaction with MSHA and State Mine Inspectors. Assisted other mining operations with ventilation related projects. Supervised four employees.

Production Foreman - 8/85 through 11/85

Development Foreman - 8/81 through 8/85

Ventilation Engineer - 10/79 through 9/81

Production Engineer - 3/79 through 10/79

Front Line Supervisor - 6/78 through 3/79

Staff engineering and front-line supervisory positions that included production, primary drift development, shaft development, and mechanical excavation working boss. Supervised up to 30 employees.

EDUCATION

University of Arizona

Tucson, Arizona

BS in Mining Engineering 1978

EIT Certificate 1978

PROFESSIONAL AFFILIATION

A.I.M.E. Student Chapter President, 1977

SME (Society for Mining, Metallurgy, and Exploration Inc.) – current member

MICHAEL ULSHAFFER

MICHAEL L. ULSHAFFER

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US Citizen • Highest Fed Grade: GS-15 • 5 Pt Vet Preference • "Q" Clearance

SUMMARY OF QUALIFICATIONS

- ◆ Proven project engineer/manager experienced in all aspects of nuclear regulated Quality Assurance (QA), nuclear weapon systems, construction, technical research, environmental management, personnel issues and leadership.
- ◆ Extensive expertise working liaison assignments with contractors, foreign nationals and the military.
- ◆ Able to deal effectively with individuals at all levels; Proven ability to motivate others to achieve goals.
- ◆ Excellent communication skills, both verbal and written.
- ◆ Hardworking, results oriented, and self-motivated.

EXPERIENCE

Supervisory General Engineer, US Dept of Energy (DOE), GS-15, Supervise up to thirty-five, 8/03 - Present
Office of Civilian Radioactive Waste Management, Yucca Mountain Geologic Repository (YMP), Las Vegas, NV.
Supervisor: Ward Sproat (202) 586-6842

Supervisory Division Lead and Acting Director (9/05 – 1/07), Office of Quality Assurance (OQA): Accountable for all aspects of conducting an effective and robust Quality Assurance Program for activities associated with the research, construction and eventual operation of the YMP. This entailed meeting the requirements and oversight of the Nuclear Regulatory Commission. *This was accomplished through aggressively benchmarking industry practices and behaviors; developing a self-critical and nuclear safety culture; mentoring and fostering line ownership of quality; developing a competent and accountable staff and regularly briefing the public, State and National stakeholders.* Also responsible for the development, maintenance and defense of Quality Program and Description documents, implementing QA procedures, annual Business Plan goals and objectives and associated change management plans. As the responsible manager, played a major role in the oversight of the YMP License Application, *which resulted in a high-quality, docketable document.* In addition, manage the following: OQA self-assessment program, development of effective Performance Indicators, evaluation of contract performance, the OQA Training Program, procurement document reviews, and the interface and coordination with waste custodians (Office of Environmental Management and the Nuclear Navy).

Supervisory General Engineer, US DOE, EN-IV, Supervise Ten, 3/98 – 8/03
PANTEX PLANT, Amarillo Area Office (AAO), TX. Supervisor: Darrell Schmidt (806) 477-4750

Chief, Weapons Quality Staff (WQS): Responsible for directing the Quality Assurance (QA) program and activities for the AAO, to include anticipation, innovation, and excellence in establishing Nuclear Weapon QA policy and expectations, to assure that nuclear weapons systems that constitute the nation's nuclear weapon stockpile, meet design definition and customer requirements, to evaluate the Management and Operating (M&O) contractor's performance in all functional aspects of QA activities. *Demonstrated personal leadership and innovation in the Nuclear Weapon QA Complex in the areas of verification and acceptance inspections, Nonconforming products, and execution of 1.0, 2.0, 3.0, and 4.0 QA Surveys of the contractor's manufacturing and quality control operations with regard to nuclear weapons components and nuclear weapons.*

General Engineer, US DOE, GS-13, "Q" Clearance, 4/95 - 2/98
PANTEX PLANT, AAO, TX. Supervisor: Dick Phillips (806) 477-3173

Production Operation Team: Oversee Mason & Hanger-Silas Mason contract for DOE's nuclear Weapon dismantlement and surveillance programs. Coordinate and recommend technical proposals between National Laboratories, NNSA HQ's, and internal organizations. Also graded the contractors' performance. Knowledgeable of program management skills and methods, techniques, and practices for the dismantlement and assembly of complex components and assemblies used in the manufacture of nuclear weapons. Determined and minimized impacts from nuclear facility maintenance, repairs, or construction. *Participated in several start-up readiness reviews for nuclear weapon systems and nuclear facility operations. Successful dismantlement and surveillance of B61, B83, and W84 programs. Core Project Team member of W56, B61-O/2/5, W70, W80, B83, and W84 nuclear weapon programs.*

Construction Manager, USAF Latin American Affairs, Captain, Supervised Four, 1/93 - 3/95
24th CIVIL ENGINEER SQUADRON, Howard AFB, Panama. Supervisor: Lt Col Schmidt

Chief, Joint Operations: Chief USAF engineering agent to Central and South America, programming, coordinating, managing resources, and executing Air Force engineering projects and deployments. *Directed \$4 M and more than 4,000 USAF Guard and Reserve personnel constructing twelve schools, 2 clinics, 7 facilities, 65 wells, and 18 foot bridges in 10 Latin American countries, improving the quality of life for thousands of residents.*

Principal Air Force engineer in the construction of four refugee camps for 10,000 Cuban and Haitian refugees during the 1994 US campaign "Operation Safe Haven".

Research Engineer/Program Manager, Captain, USAF, Supervised Eight, 5/89 - 12/92
PHILLIPS LABORATORY, Kirtland AFB, Albuquerque, NM. Supervisor: Dr Brendan Godfrey

Chief, Aircraft Shelter Office, Civil Engineering Research Division: USAF representative for international protective airfield structure research, developmental planning, and construction. Responsible for the construction, research and planning of full to 1/3-scale aircraft shelter models, including planning and execution of test plans, all levels of US and NATO coordination, managing \$54 M in research funds, construction management, and technical reports. *Completed research, construction of NATO/US shelters, and vulnerability tests against exotic weapons at the McCormick and Utah Test and Training Ranges - on time and under budget. Developed multi-agency, international five-year aircraft shelter research and development program. Conducted several Aircraft Shelter and Explosive Testing conferences.*

Managed the environmental restoration of 25 years of waste generated at McCormick test range.

Base Environmental Coordinator/Program Engineer, 1Lt, USAF, Supervised 1, 4/84 - 8/87
52nd CIVIL ENGINEER SQUADRON, Spangdahlem Air Base, Germany. Supervisor: Lt Col Robbins

Jump-started an ignored environmental and natural resource program into one of the finest in US Air Force Europe (USAFE) and Pacific Air Force, *evidenced by the Pentagon awarding the 1987 Thomas D. White Environmental Award to Spangdahlem Air Base as best overseas environmental program.*

Contributed to the "greatest programming effort in USAFE," (Brigadier General Hardy) by personally *programming over \$70 M in construction and base renovation projects.*

Managed, trained and motivated 60 person Rapid Runway Repair (RRR) team to perform Expedient crater and spill repairs. *Team won the prestigious USAFE RRR Olympics at Ramstein Air Base, Germany, placing first in five of seven categories. Crowned 1986 European champions.*

EDUCATION

M.S. Degree, Civil Engineering, Soils and Foundations - May 1989; GPA 3.9; wrote thesis, *Pile Selection using a Fuzzy Set Program, PSI*; Clemson University, Clemson SC, 29634.

B.S. Degree, Civil Engineering/Math Minor - Dec 1983; GPA 3.0; Brigham Young University, Provo UT, 84602.

High School Diploma, Nathan Bedford Forrest High, Jacksonville, FL, Jun 1975

OTHER

Numerous leadership, quality, personnel management and engineering courses, honors and awards.

Details available upon request

Other Skills:

Good with computers: hardware and most software

Type 40+ words per minute

Love/participate in all sports, reading, writing, home improvement, gardening, and outdoor/family activities.

REFERENCES

Business/personal references available upon request

JOHN WAGNER

John C. Wagner, Ph.D.

Office Address

P.O. Box 2008
Oak Ridge, TN 37831-6170
Phone: 865 241-3570
Mobile: 865 274-1184

SUMMARY

Nuclear Engineer (Ph.D.) with experience in the development and use of computational methods for criticality safety, radiation shielding, and reactor analysis; particular expertise in Monte Carlo transport, variance reduction methods, and burnup credit criticality safety for spent fuel storage, transport, and disposal. Experience developing and implementing new methods in large production code; performing, documenting, and reviewing complex analyses; developing technical bases for safety analyses; licensing spent fuel systems; providing guidance to sponsors on a broad variety of technical issues; developing proposals; and providing technical leadership and managing R&D staff in the development and application of nuclear analysis software.

EDUCATION

Pennsylvania State University

Doctor of Philosophy in Nuclear Engineering, December 1997

Dissertation title: *Acceleration of Monte Carlo Shielding Calculations with an Automated Variance Reduction Technique and Parallel Processing*

Master of Science in Nuclear Engineering, December 1994

Thesis title: *Monte Carlo Transport Calculations and Analysis for Reactor Pressure Vessel Neutron Fluence*

Missouri University of Science & Technology (formerly University of Missouri-Rolla)

Bachelor of Science in Nuclear Engineering, May 1992

WORK EXPERIENCE

Oak Ridge National Laboratory,

6/9 –Present Positions of increasing responsibility in performance of applied nuclear analysis R&D, technical leadership, project management, and staff supervision, development and recruitment.

5/9–Present **Technical Integrator**

Nuclear Modeling, Design & Safety TI, Nuclear Science & Technology Division (NSTD)

Supervisor: Dr. Cecil V. Parks, NSTD Acting Division Director

Responsible for managing, coordinating and integrating research in eight R&D groups, as well as integration of work with other groups in and outside of the NSTD. Responsibilities include directing/managing R&D efforts for projects and staff, program development, staffing, managing TI and project budgets, and providing overall technical leadership and direction. Principal Investigator for technical projects involving criticality safety, burnup credit for transportation and storage, spent fuel characterization, radiation transport code application and development, and radiation protection and shielding analyses.

10/03–05/09 **Group Leader**

Radiation Transport & Criticality Group, Nuclear Science & Technology Division (NSTD)

Supervisor: Dr. James E. Rushton, NSTD Division Director

Responsible for 25 staff/Postdocs performing a variety of projects involving the development and application of software for analysis, safety, and design of nuclear systems. Responsibilities included directing/managing R&D efforts for projects and staff, program development, staffing, managing group and project budgets, and providing overall technical leadership and direction. Principal Investigator for technical projects involving criticality safety, burnup credit for transportation and storage, spent fuel characterization, radiation transport code application and development, and radiation protection and shielding analyses. Specific examples of projects (sponsors) include:

➤ YMP Postclosure Criticality (DOE/OCRWM Lead Laboratory for Repository Systems)

WORK EXPERIENCE (continued)

- SCALE Software Development & Technical Assistance for Transportation and Storage Licensing (NRC)
- PWR Facility Dose Modeling & Nuclear Vulnerability Analyses (DTRA)
- Development of New Hybrid Radiation Transport Method for Global Variance Reduction (DTRA)
- Develop Technical Basis to ISG-8 Guidance to Include Fission Product Burnup Credit (NRC/RES)
- Technical Review of Burnup Credit License Applications (NRC/SFST)
- Burnup Credit Data Assessment and Evaluation (DOE OCRWM Office of Logistics Management)
- DOE SNF Data Assessment and Analysis (DOE OCRWM Office of Logistics Management)
- Moderator Intrusion Consequence Analyses for Commercial Spent Fuel Transport (NRC/SFST)
- Advanced Variance Reduction for PWR Ex-vessel Detector Response Calculations (Duke)

1/07–11/07 **Project Manager (Lead, Postclosure Criticality Safety for YMP)**

Nuclear Systems Design, Analysis, and Safety (NSADS) Group, Nuclear Science & Technology Division
Supervisor: Dr. Cecil V. Parks, NSADS Manager

On assignment to the DOE Office of Civilian Radioactive Waste Management's (OCRWM) Lead Laboratory for Repository Systems as Lead for Postclosure Criticality Safety at the Yucca Mountain Project (YMP). In this capacity, responsible for developing, planning, and implementing a 5-year, multimillion-dollar experimental program to establish the technical data needed to justify full burnup credit in the Postclosure criticality safety evaluation, managing the YMP Postclosure criticality department staff and work activities, and interfacing with the customer (DOE OCRWM), regulator, and other relevant stakeholders. Re-established QA program at ORNL and achieved "qualified" status for performing QA work supporting OCRWM.

6/99–10/03 **Research & Development Staff**

Nuclear Analysis Methods & Applications (NAMA) Group, Nuclear Science & Technology Division
Supervisor: Dr. Cecil V. Parks, NAMA Group Leader

Performed a variety of projects involving criticality safety, radiation shielding, spent fuel characterization, and radiation therapy, with majority of time spent on burnup credit for spent fuel storage, transport, and disposal, and variance reduction for Monte Carlo simulations. Worked with a variety of codes in the SCALE package, as well as MCNP, DOORS, and HELIOS. Examples of completed major projects include:

- Automated variance reduction for Monte Carlo fixed-source and criticality calculations based on 3-D discrete ordinates adjoint functions. Developed a new code (ADVANTG – Automated Deterministic VAriaNce reducTion Generator) for automated generation of consistent, deterministic-based weight window and source biasing parameters for the MCNP/MCNPX code. Computational speed-ups between ~100 and 100,000 times, as compared to unbiased cases, have been achieved for several relevant fixed-source applications, including nuclear well-logging tools and PWR thermal ex-core detectors.
- Burnup credit for commercial spent fuel to support existing NRC regulatory guidance for storage and transportation, and to provide technical basis and recommendations for expansion of burnup credit (NRC ISG-8, Rev. 2). Notable activities included (1) development of a computational benchmark for the assessment of reactivity margins in a burnup credit cask; (2) studies of reactivity margins associated with fission products, depletion conditions, cooling time, spatial burnup distributions, isotopic validation approaches, burnable poison rods, integral burnable absorbers, control rods, and axial power shaping rods; and (3) support of NRC Phenomenon Identification & Ranking Table (PIRT) process for burnup credit.

Holtec International, **Principal Engineer**

Supervisors: Mr. Michael McNamara / Dr. K.P. Singh

7/97–6/99 Accomplishments and responsibilities included:

- Criticality safety analyses for dry spent fuel storage
 - Performed criticality safety analyses, using MCNP and KENO, for HI-STAR 100 spent fuel storage/transport system and HI-STORM 100 storage system, in accordance with 10CFR71 and 10CFR72.
 - Lead author of criticality chapters for the HI-STAR 100 TSAR and SAR and HI-STORM 100 TSAR.
 - Experience interacting with NRC reviewers, culminating in the resolution of all criticality-related questions and their issuance of draft Safety Evaluation Reports (SERs) and Certifications of Compliance (CoCs) for the HI-STAR 100 storage and transport system.
 - Assisted in the preparation of proposals, including development of new basket design(s).
- Criticality safety analyses for wet spent fuel storage
 - Performed criticality safety analyses, using MCNP, KENO, and CASMO, to support re-racking spent fuel pools for maximum capacity, in accordance with 10CFR50. Responsibilities included preparation of the criticality safety-related chapter (Chapter 4) of the License Amendment Reports, resolution of

WORK EXPERIENCE (continued)

- comments and questions by clients, and where necessary, resolution of questions by NRC reviewers.
- Performed criticality safety analyses for a number of specific purposes other than re-racking, including: expansion of storage capacity, qualification of new fuel types for storage in existing racks, and analysis/qualification of damaged fuel for storage.
- Assisted in the preparation of proposals, including development of proposed rack design(s).
- Shielding analyses for dry spent fuel storage
 - Consultant and technical reviewer for shielding analyses, using SAS2H, ORIGEN-S, and MCNP, for HI-STAR 100 spent fuel storage/transport system and HI-STORM 100 storage system.

Pennsylvania State University, **Graduate Research Assistant**

Advisor: Prof. Alireza Haghighat, Nuclear Engineering Department

8/92–7/97

Completed projects include:

- Code development for automated variance reduction of Monte Carlo (MCNP) calculations using 3-D discrete ordinate adjoint functions, resulting in a new code, A³MCNP, which is capable of (1) automatic generation of input files for 3-D S_N TORT calculations, including mesh generation and cross-section processing and (2) automatic and effective calculation and utilization of variance reduction parameters (coupled source biasing parameters and cell-independent weight windows) from S_N adjoint functions to accelerate Monte Carlo calculations;
- Adaptation of MCNP for parallel processing with the Message Passing Interface (MPI);
- Monte Carlo calculations and analyses of reactor pressure vessel neutron fluence for Three Mile Island Unit 1 (TMI-1), including detailed comparisons to measured data and deterministic (DORT) results;
- Co-organizer and co-instructor of the International Workshop/Training Course on Transport Methodologies and Uncertainty Estimation for PWR Pressure Vessel Fluence and BWR Shield/Shroud Dose Calculations (June 19–23, 1995), the Second International Training Course/Workshop on Methodologies for Particle Transport Simulation and Their Application to Reactor Dosimetry/Shielding (June 2–7, 1996), and the Third International Training Course/Workshop on Methodologies for Particle Transport Simulation and Their Application to Reactor Dosimetry/Shielding (May 19–23, 1997);
- Monte Carlo design/optimization studies for the Penn State Breazeale Reactor's (PSBR) D₂O tank and collimator to improve the imaging capabilities at the PSBR; and
- Characterization of the neutron and gamma radiation environments at the Army Pulse Radiation Facility (APRF) with the Monte Carlo method, including comparisons to measured data.

Holtec International, **Consultant**

Contacts: Dr. Stanley E. Turner and Everett L. Redmond II

9/96–3/97

Performed technical review of criticality (MCNP & KENO) and shielding (SAS2H, ORIGEN-S & MCNP) calculations associated with the NRC license submittal for the HI-STAR 100 and HI-STORM 100 spent fuel storage/transport systems and shielding analysis for the Private Fuel Storage Facility.

Los Alamos National Laboratory, **Graduate Research Assistant**

Radiation Transport Group (X-6/XTM), Applied Theoretical Physics Division

Supervisor: Dr. John S. Hendricks

5/94–7/94

Improved and enhanced the CRSRD computer code, which translates multigroup cross sections into a format suitable to MCNP. Assumed the major portion of the responsibility for coordinating and teaching the MCNP Multigroup/Adjoint Course (LANL, June 6–7, 1994).

Supervisor: Dr. John S. Hendricks

5/93–8/93

Investigated the usage and validity of the general purpose Monte Carlo transport code MCNP for multigroup/adjoint calculations. Published as LA-12704, *MCNP: Multigroup/Adjoint Capabilities*.

Supervisor: Dr. Gregg W. McKinney

6/92–8/92

Investigated the suitability of the general purpose Monte Carlo transport code MCNP for criticality safety calculations. Compared MCNP and KENO results for benchmarking purposes. Published as LA-12415, *MCNP: Criticality Safety Benchmark Problems*.

WORK EXPERIENCE (continued)

Oak Ridge National Laboratory, **Summer Research Participant**

Research Reactors Division

Supervisors: Dr. David H. Cook and B. Lamar Lepard

6/91–8/91 Two major projects included (1) safety evaluation of the proposed High Flux Isotope Reactor (HFIR) fire protection system and (2) determination of hydrogen accumulation in pony motor battery rooms.

CITIZENSHIP / SECURITY CLEARANCE

US Citizen

2/99–12/02 Department of Energy (DOE) L-level security clearance

12/02–Present DOE Q-level security clearance; SCI

HONORS & ACTIVITIES

- UT-Battelle Awards Night, Nominated for **Outstanding Accomplishment in Science & Technology Award for Distinguished Engineer** (2008)
- Certificate of Accomplishment for contributions to the completion of the YMP License Application (2008)
- Participation in inaugural ORNL Developing Leadership Potential program (completed 12/2007)
- Nuclear Science & Technology Division Scientific and Technical Award (December 2006) [for accelerated completion of the event response for the Nuclear Vulnerability Project]
- Nuclear Science & Technology Division Scientific and Technical Award (April 2006) [for support of the DOE Integrated Transportation Operation Project Work Group]
- UT-Battelle Awards Night, **Outstanding Accomplishment in Science & Technology Award for Early Career Engineering Accomplishment** (2002) [for excellence in engineering research]
- Best Paper Award from the Radiation Protection & Shielding Division (“one of the best papers at the ICRS-11 / RPSD 2008 Topical Meeting”)
- Best Paper Award from Nuclear Criticality Safety Division (ANS Winter Meeting, November 2000)
- Best Benchmarking Paper Award from Mathematics & Computations Division of the ANS (May 1995)
- Best Paper Award in Reactor Physics at 1993 ANS Student Conference (Rensselaer Polytechnic Institute)
- INPO Fellowship (1992–1993); Power Engineering Scholarship (1991)
- Reviewer for *Nuclear Technology*; *Nuclear Science & Engineering*; *Annals of Nuclear Energy*
- Member of the American Nuclear Society (ANS)
- Elected to Executive Committee, Mathematics & Computation Division, ANS (2001–2004)
- Elected Chair, Radiation Protection & Shielding Division, ANS (2007); Vice Chair (2006), Treasurer (2003–2005)
- Elected to Board, ANS Oak Ridge/Knoxville Local Section (2001–2004); Program Chair (2001–2003)
- Member of Alpha Nu Sigma – Nuclear Engineering Honor Society
- Contributing member to ANSI/ANS-19.10-2009, “Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals”
- Member of ANSI N14.35 Writing Group, “Verification of Burnup Levels For Spent Nuclear Fuel Casks”
- Member of OECD/NEA Working Party on Nuclear Criticality Safety (WPNCs) Expert Groups on Burnup Credit Criticality Safety and Source Convergence for Criticality Analyses
- Member of Pennsylvania State University Nuclear Power Advisory Board (2009 – present)
- Member of Missouri University of Science & Technology Nuclear Engineering Development Board (2008 – present)

PATENTS

- Ventilated Overpack Apparatus and Method for Storing Spent Nuclear Fuel, Patent No. US 6,519,307 B1, February 11, 2003.

PUBLICATIONS

Ph.D. Dissertation

J.C. WAGNER, “Acceleration of Monte Carlo Shielding Calculations with an Automated Variance Reduction Technique and Parallel Processing,” *Ph.D. Dissertation*, The Pennsylvania State University, Nuclear Engineering (December 1997).

M.S. Thesis

J.C. WAGNER, “Monte Carlo Transport Calculations and Analysis for Reactor Pressure Vessel Neutron Fluence,” *M.S. Thesis*, The Pennsylvania State University, Nuclear Engineering (December 1994).

Journal Articles

J.C. WAGNER, A. HAGHIGHAT, and B.G. PETROVIC, “Monte Carlo Transport Calculations and Analysis for Reactor Pressure Vessel Neutron Fluence,” *Nucl. Technol.* **114**, 373–398 (1996).

J.C. WAGNER and A. HAGHIGHAT, “Automatic Variance Reduction of Monte Carlo Shielding Calculations Using the Discrete Ordinates Adjoint Function,” *Nucl. Sci. Eng.* **128**, 186–208 (1998).

J.C. WAGNER and C.V. PARKS, “Critical Review of the Practice of Equating the Reactivity of Spent Fuel to Fresh Fuel in Burnup Credit Criticality Safety Analyses for PWR Spent Fuel Pool Storage,” *Nucl. Technol.* **136(1)**, 130–140, October 2001.

J.C. WAGNER and C.E. SANDERS, “Investigation of the Effect of Fixed Absorbers on the Reactivity of PWR Spent Nuclear Fuel for Burnup Credit,” *Nucl. Technol.* **139(2)**, 91–126, August 2002.

A. HAGHIGHAT and J.C. WAGNER, “Monte Carlo Variance Reduction with Deterministic Importance Functions,” *Progress in Nuclear Energy* **42(1)**, 25–53, January 2003 [invited paper, 5th most downloaded PNE paper in 2003].

H.P. SMITH and J.C. WAGNER, “A Case Study in Manual and Automated Monte Carlo Variance Reduction with a Deep Penetration Reactor Shielding Problem,” *Nucl. Sci. Eng.* **149**, 23–37, 2005 [invited paper].

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G. RADULESCU, D.E. MUELLER, and J.C. WAGNER, *Sensitivity and Uncertainty Analysis of Commercial Reactor Criticals for Burnup Credit*, *Nucl. Technol.* **167** (2009).

J.C. WAGNER, D.E. PELOW and T.M. EVANS, “Automated Variance Reduction Applied to Nuclear Well-Logging Problems,” *Nucl. Technol.* **168** (2009).

D.E. PELOW, T.M. EVANS and J.C. WAGNER, “Simultaneous Optimization of Tallies in Difficult Shielding Problems,” *Nucl. Technol.* **168** (2009).

J.C. WAGNER, D.E. PELOW, and E.D. BLAKEMAN, “A New Method for Global and Semi-Global Variance Reduction in Monte Carlo,” to be submitted to *Nucl. Sci. Eng.*

Technical Reports

J.C. WAGNER, J.E. SISOLAK, and G.W. MCKINNEY, *MCNP: Criticality Safety Benchmark Problems*, LA-12415, Los Alamos National Laboratory, 1992.

J.C. WAGNER, E.L. REDMOND II, S.P. PALMTAG, and J.S. HENDRICKS, *MCNP: Multigroup/Adjoint Capabilities*, LA-12704, Los Alamos National Laboratory, 1994.

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C.V. PARKS, M.D. DEHART and J.C. WAGNER, *Review and Prioritization of Technical Issues Related to Burnup Credit for LWR Fuel*, NUREG/CR-6665 (ORNL/TM-1999/303), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, February 2000.

J.C. WAGNER and M.D. DEHART, *Review of Axial Burnup Distribution Considerations for Burnup Credit Calculations*, ORNL/TM-1999/246, Lockheed Martin Energy Research Corp., Oak Ridge National Laboratory, March 2000.

J.C. WAGNER and C.V. PARKS, *Critical Review of the Practice of Equating the Reactivity of Spent Fuel to Fresh Fuel in Burnup Credit Criticality Safety Analyses for PWR Spent Fuel Pool Storage*, NUREG/CR-6683 (ORNL/TM-1999/230), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, September 2000.

J.C. WAGNER, M.D. DEHART and B.L. BROADHEAD, *Investigation of Burnup Credit Modeling Issues Associated with BWR Fuel*, ORNL/TM-1999/193, Lockheed Martin Energy Research Corp., Oak Ridge National Laboratory, October 2000.

S.M. BOWMAN, I.C. GAULD, and J.C. WAGNER, *Recommendations on Standardized Technical Specifications for Spent Fuel Storage Casks*, NUREG/CR-6716 (ORNL/TM-2000/385), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, March 2001.

J.C. WAGNER, *Computational Benchmark for Estimation of Reactivity Margin from Fission Products and Minor Actinides in PWR Burnup Credit*, NUREG/CR-6747 (ORNL/TM-2000/306), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, October 2001.

C.E. SANDERS and J.C. WAGNER, *Parametric Study of the Effect of Control Rods for PWR Burnup Credit*, NUREG/CR-6759 (ORNL/TM-2001/69), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, February 2002.

C.E. SANDERS and J.C. WAGNER, *Study of the Effect of Integral Burnable Absorbers for PWR Burnup Credit*, NUREG/CR-6760 (ORNL/TM-2000/321), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, March 2002.

J.C. WAGNER and C.V. PARKS, *Parametric Study of the Effect of Burnable Poison Rods for PWR Burnup Credit*, NUREG/CR-6761 (ORNL/TM-2000/373), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, March 2002.

J.C. WAGNER and C.V. PARKS, *Recommendations on the Credit for Cooling Time in PWR Burnup Credit Analyses*, NUREG/CR-6781 (ORNL/TM-2001/272), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, January 2003.

J.C. WAGNER and C.E. SANDERS, *Assessment of Reactivity Margins and Loading Curves for PWR Burnup Credit Cask Designs*, NUREG/CR-6800 (ORNL/TM-2002/006), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, March 2003.

J.C. WAGNER, M.D. DEHART, and C.V. PARKS, *Recommendations for Addressing Axial Burnup in PWR Burnup Credit Analyses*, NUREG/CR-6801 (ORNL/TM-2001/273), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, March 2003.

K.R. ELAM, J.C. WAGNER, and C.V. PARKS, *Scoping Studies for the Effects of Fuel Failure on Criticality Safety and Radiation Dose of Spent Fuel Casks*, NUREG/CR-6835 (ORNL/TM-2002/255), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, September 2003.

E.D. BLAKEMAN, D.E. PELOW, J.C. WAGNER, B.D. MURPHY, and D.E. MUELLER, *PWR Facility Dose Modeling Using MCNP5 and the CADIS/ADVANTG Variance-Reduction Methodology*, ORNL/TM-2007/133, Oak Ridge National Laboratory, Oak Ridge, Tenn., September 2007.

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J.C. WAGNER, *Criticality Analysis of Assembly Misload in a PWR Burnup Credit Cask*, NUREG/CR-6955 (ORNL/TM-2004/52), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, January 2008.

G. RADULESCU, D.E. MUELLER, and J.C. WAGNER, *Sensitivity and Uncertainty Analysis of Commercial Reactor Criticals for Burnup Credit*, NUREG/CR-6951 (ORNL/TM-2006/87), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, January 2008.

B. BEVARD, J.C. WAGNER, M. AISSA and C.V. PARKS, *Review of Information for Spent Nuclear Fuel Burnup Confirmation*, NUREG/CR-XXXX (ORNL/TM-2007/229), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, submitted for publication, August 2008.

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J.C. WAGNER, A. HAGHIGHAT, B.G. PETROVIC, and H.L. HANSHAW, "Benchmarking of Synthesized 3-D Sn Transport Methods for Pressure Vessel Fluence Calculations with Monte Carlo," *Proceedings of the Int. Conf. on Mathematics and Computations, Reactor Physics, and Environmental Analyses*, Portland, OR, pp. 1214–1222, May 1995 [Best Benchmark Paper Award].

A. HAGHIGHAT, H.L. HANSHAW, and J.C. WAGNER, "Multigroup Cross Section Generation with Adjoint Weighting and its Application to PV Dosimetry," *1996 Radiation Protection & Shielding Topical Meeting*, No. Falmouth, MA, pp. 173–180, April 1996.

J.C. WAGNER and A. HAGHIGHAT, "Application of the Discrete Ordinates Adjoint Function to Accelerating Monte Carlo Reactor Cavity Dosimetry Calculations," *1996 Radiation Protection & Shielding Topical Meeting*, No. Falmouth, MA, pp. 345–352, April 1996.

J.C. WAGNER, A.J. BARATTA, and J.W. GERDES, "Characterization of the Radiation Environment at the Army Pulse Radiation Facility with Monte Carlo," *Ninth Intl. Symposium on Reactor Dosimetry*, Prague, Czech Republic, pp. 762–769, September 2–6, 1996.

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J.C. WAGNER and A. HAGHIGHAT, "Monte Carlo PWR Cavity Dosimetry Calculations using an Automatic Variance Reduction Technique," *Joint Int. Conf. on Mathematical Methods and Supercomputing for Nuclear Applications*, Saratoga Springs, pp. 1031–1039, October 6–10, 1997 [invited paper].

J.C. WAGNER and A. HAGHIGHAT, "Automatic Variance Reduction for Monte Carlo Shielding Calculations with the Discrete Ordinates Adjoint Function," *Joint Int. Conf. on Mathematical Methods and Supercomputing for Nuclear Applications*, Saratoga Springs, pp. 671–680, October 6–10, 1997.

B.G. PETROVIC, A. HAGHIGHAT and J.C. WAGNER, "Definition of a Computational 3-D Benchmark Problem for PWR Pressure Vessel Neutron Transport Calculations," *Joint Int. Conf. on Mathematical Methods and Supercomputing for Nuclear Applications*, Saratoga Springs, pp. 292–301, October 6–10, 1997.

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B.G. PETROVIC, J.C. WAGNER and A. HAGHIGHAT, "Verification of Improved Synthesized 3-D Sn and Monte Carlo Methods for Pressure Vessel Fast Neutron Fluence Calculations," *Joint Int. Conf. on Mathematical Methods and Supercomputing for Nuclear Applications*, Saratoga Springs, pp. 1586–1595, October 6–10, 1997.

J.C. WAGNER, J.W. GERDES, and A.J. BARATTA, "Comparison of Calculated and Measured Neutron and Gamma Radiation Environments at the Army Pulse Radiation Facility," *1998 ANS Radiation Protection and Shielding Division Topical Conference*, Nashville, TN, April 19–23, 1998 [invited paper].

J.C. WAGNER and A. HAGHIGHAT, "Automatic Variance Reduction for Monte Carlo Shielding Calculations," *1998 ANS Radiation Protection and Shielding Division Topical Conference*, Nashville, TN, April 19–23, 1998.

A. HAGHIGHAT, H. HIRUTA, B. PETROVIC and J.C. WAGNER, "Performance of the Automated Adjoint Accelerated MCNP (A³MCNP) for Simulation of a BWR Core Shroud Problem," *Proceedings of the International Conference on Mathematics and Computation, Reactor Physics, and Environmental Analysis in Nuclear Applications*, Madrid, Spain, September 27–30, 1999.

C.V. PARKS, I.C. GAULD, J.C. WAGNER, B.L. BROADHEAD, M.D. DEHART, and D.D. EBERT, "Research Supporting Implementation of Burnup Credit in the Criticality Safety Assessment of Transport and Storage Casks," *Proceedings of the Twenty-Eighth Water Reactor Safety Information Meeting*, Bethesda, MD, October 23–25, 2000.

A. HAGHIGHAT and J.C. WAGNER, "Application of A³MCNP to Radiation Shielding Problems," *Proceedings of the International Conference on Monte Carlo for Radiation Physics, Particle Transport Simulation and Applications*, Lisbon, Portugal, October 23–26, 2000.

C.V. PARKS, M.D. DEHART, and J.C. WAGNER, "Phenomena and Parameters Important to Burnup Credit," *Proceedings of the Technical Committee Meeting on the Evaluation and Review of the Implementation of Burnup Credit in Spent Fuel Management Systems*, pp. 233–247, July 10–14, 2000, Vienna, Austria, August 2001.

C.V. PARKS and J.C. WAGNER, "Issues for Effective Implementation of Burnup Credit," *Proceedings of the Technical Committee Meeting on the Evaluation and Review of the Implementation of Burnup Credit in Spent Fuel Management Systems*, pp. 298–308, July 10–14, 2000, Vienna, Austria, August 2001.

C.E. SANDERS and J.C. WAGNER, "Impact of Integral Burnable Absorbers on PWR Burnup Credit Criticality Safety Analysis," *Proceedings of the 2001 ANS Embedded Topical Meeting on Practical Implementation of Nuclear Criticality Safety*, Reno, NV, November 11–15, 2001.

C.E. SANDERS and J.C. WAGNER, "Parametric Study of Control Rod Exposure for PWR Burnup Credit Criticality Safety Analyses," *Proceedings of the 2001 ANS Embedded Topical Meeting on Practical Implementation of Nuclear Criticality Safety*, Reno, NV, November 11–15, 2001.

J.C. WAGNER, "Addressing the Axial Burnup Distribution in PWR Burnup Credit Criticality Safety," *Proceedings of the 2001 ANS Embedded Topical Meeting on Practical Implementation of Nuclear Criticality Safety*, Reno, NV, November 11–15, 2001.

C.V. PARKS, J.C. WAGNER, I.C. GAULD, B.L. BROADHEAD, and C.E. SANDERS, "U.S. Regulatory Research Program for Implementation of Burnup Credit in Transport Casks," *Proceedings of the 13th International Symposium on the Packaging and Transportation of Radioactive Material (PATRAM2001)*, Chicago, IL, September 3–7, 2001.

J.C. WAGNER, "An Automated Deterministic Variance Reduction Generator for Monte Carlo Shielding Applications," *Proceedings of the American Nuclear Society 12th Biennial RPSD Topical Meeting*, Santa Fe, NM, April 12–14, 2002.

H.P. SMITH and J.C. WAGNER, "A Case Study in Manual and Automated Monte Carlo Variance Reduction with a Deep Penetration Reactor Shielding Problem," *Proceedings of the Nuclear Mathematical and Computational Sciences: A Century in Review, A Century Anew*, April 6–11, 2003, LaGrange Park, IL (2003), ISBN 0-89448-674-8, American Nuclear Society Order No. 700300.

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C.V. PARKS and J.C. WAGNER, "Current Status and Potential Benefits of Burnup Credit for Spent Fuel Transportation," *Proceedings of the 14th Pacific Basin Nuclear Conference*, Honolulu, Hawaii, March 21–25, ANS Order #: 700305, ISBN: 0-89448-679-9 (2004).

B.L. BROADHEAD and J.C. WAGNER, "Effective Biasing Schemes for Duct Streaming Problems," *International Conference on Radiation Shielding (ICRS-10)*, May 9–14, Funchal, Portugal (2004).

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J.C. WAGNER and D.E. MUELLER, "Updated Evaluation of Burnup Credit for Accommodating PWR Spent Nuclear Fuel in High-Capacity Cask Designs," *Proceedings of the 2005 Nuclear Criticality Safety Division Topical Meeting*, Knoxville, TN, September 19–22, 2005.

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D.E. MUELLER and J.C. WAGNER, "Application of Sensitivity/Uncertainty Methods to Burnup Credit Criticality Validation," *Proceedings of the IAEA Technical Meeting on Advances in Applications of Burnup Credit to Enhance Spent Fuel Transportation, Storage, Reprocessing and Disposition*, London, U.K., August 29–September 2, 2005.

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K.R. ELAM, **J.C. WAGNER**, and C.V. PARKS, [Scoping Studies for the Effects of Fuel Failure on Criticality Safety and Radiation Dose of Spent Fuel Casks](#), NUREG/CR-6835 (ORNL/TM-2002/255), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, September 2003.

J.C. WAGNER, *Technical Work Plan for: Development of Technical Data Needed to Justify Full Burnup Credit in Criticality Safety Licensing Analyses Involving Commercial Spent Nuclear Fuel*, TWP-EBS-MD-000019 REV 01. Las Vegas, Nevada: Sandia National Laboratories, February 2007.

J.C. WAGNER, *Criticality Analysis of Assembly Misload in a PWR Burnup Credit Cask*, NUREG/CR-6955 (ORNL/TM-2004/52), U.S. Nuclear Regulatory Commission, Oak Ridge National Laboratory, January 2008.

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C.V. PARKS and **J.C. WAGNER**, "A Coordinated U.S. Program to Address Full Burnup Credit in Transport and Storage Casks," *Proceedings of the IAEA Technical Meeting on Advances in Applications of Burnup Credit to Enhance Spent Fuel Transportation, Storage, Reprocessing and Disposition*, London, U.K., August 29–September 2, 2005.

J.C. WAGNER and D.E. MUELLER, "Assessment of Benefits for Extending Burnup Credit in Transporting PWR Spent Nuclear Fuel in the USA," *Proceedings of the IAEA Technical Meeting on Advances in Applications of Burnup Credit to Enhance Spent Fuel Transportation, Storage, Reprocessing and Disposition*, London, U.K., August 29–September 2, 2005.

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J.M. SCAGLIONE and **J.C. WAGNER**, "Burnup Credit Approach for the Proposed United States Repository at Yucca Mountain," *Proceedings of the IAEA/CSN International Workshop on Advances in Applications of Burnup Credit for Spent Fuel Storage, Transport, Reprocessing, and Disposition*, Cordoba, Spain, October 27–30, 2009.

G. RADULSCU and **J.C. WAGNER**, "Review of Results for the OECD/NEA Phase VII Benchmark: Study of Spent Fuel Compositions for Long-Term Disposal," *Proceedings of the IAEA/CSN International Workshop on Advances in Applications of Burnup Credit for Spent Fuel Storage, Transport, Reprocessing, and Disposition*, Cordoba, Spain, October 27–30, 2009.

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MARYLA WASIOLEK

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CURRENT JOB TITLE Risk Analyst (Principal Member of Technical Staff)

EDUCATION

Ph.D., Physics (Physical Sciences) 1990, AGH University of Science and Technology, Krakow, Poland

M.Sc., Applied Nuclear Physics 1983, AGH University of Science and Technology, Krakow, Poland

Undergraduate training 1977-1983; Major: Applied Nuclear Physics, AGH University of Science and Technology, Krakow, Poland

JOB-SPECIFIC TRAINING

Certified Health Physicist (American Board of Health Physics certification)
Certification current through 2012

PROFESSIONAL MEMBERSHIPS

Health Physics Society, 1987 – present
American Academy of Health Physics, 1986 – present
International Union of Radioecology, 2002 – present

CAREER SUMMARY

Sandia National Laboratories (Las Vegas, Nevada)

Yucca Mountain Project

October 2009 – present, Risk Analyst (Principal Member of Technical Staff)

Primary responsibilities include:

- Continuation of RAI (NRC request for additional information) response process support.
- Development of RAI responses related to biosphere modeling.
- Support of the Legal Team with respect to ASLB hearings and related litigation in the area of biosphere modeling.

Maryla A. Wasiolek

Sandia National Laboratories (Rockville, Maryland)

Yucca Mountain Project

August 2008 – October 2009, Principal Risk Analyst (Principal Member of Technical Staff)

Primary responsibilities included:

- Coordination and support to the RAI response process including process guidance, initial triage, and setup of the RAI response systems.
- Support, coordination, and participation in public meetings with the NRC regarding RAIs.
- Assistance in coordinating, monitoring, and reporting progress on development of RAI responses.
- Consistency reviews of RAI responses with other RAI responses that have been approved previously and the responses to contentions.
- Transmittal of RAI responses to the NRC, including drafting of the associated correspondence.
- Development of responses to RAIs related to biosphere modeling.
- Development of responses to contentions related to biosphere modeling.

Sandia National Laboratories (Las Vegas, Nevada)

Yucca Mountain Project

October 2006 – August 2008, Risk Analyst (Principal Member of Technical Staff)

Primary responsibilities included:

- Continuation of work on biosphere model for the Yucca Mountain repository
- Support of the License Application in the area of biosphere modeling, including development of Safety Analysis Report section on biosphere modeling.
- Development and implementation of the process of responding the NRC's requests for additional information (RAIs).

Bechtel SAIC Company, LLC, Las Vegas Nevada

Yucca Mountain Project

February 2006 – September 2006, Senior Science Specialist

October 2001 – February 2006 Science Specialist

February 2001 – October 2001, Senior Scientist

Primary responsibilities included:

- Development and maintenance of biosphere model and analysis reports (these reports document the methods of used in calculation of radiation dose to the human receptor for the Yucca Mountain repository)
- Management of work related to biosphere modeling
- QA support activities
- Providing expertise in the area of biosphere modeling, radiological risk assessment, and related regulatory basis
- Providing support to integrate biosphere modeling capabilities into the total system performance assessment model for the Yucca Mountain repository
- Interacting with senior staff and customers on significant matters, often requiring coordination between various Project organizations
- Communicating with the customer regarding both current and future work, and presenting technical approaches and findings to the customer
- Representing biosphere modeling effort through formal presentations and individual contacts
- Addressing issues raised by review groups and stakeholders.

Maryla A. Wasiolek

Science Applications International Corporation (SAIC), Las Vegas, Nevada

Yucca Mountain Project

April 2000 – February 2001, Senior Scientist

August 1997 – March 2000, Health Physicist

Primary responsibilities included:

- Biosphere modeling for the Yucca Mountain Project, including development of biosphere dose conversion factors, associated technical reports and other documentation.
- Support in the areas of radiological assessment, radiation safety, environmental protection, radiological engineering and design, and regulatory and licensing.

Department of Physics, New Mexico Tech, Socorro, New Mexico

1991 – 1997, Lab Associate and Lecturer

Primary responsibilities included:

- Management of the Atmospheric Radioactivity Laboratory
- Participation in the research projects (assessment of global radon fluxes from soils, radiological impact of naturally occurring radioactive materials in the petroleum industry in New Mexico, atmospheric transport of airborne contaminants)
- Teaching health physics- and radiation measurement-related courses at the senior and graduate level.
- Supervision of the use of radioactive sources
- Radiation safety training for undergraduate and graduate students.

Department of Physics, Clarkson University, Potsdam, New York

1990 – 1991, Research Associate (part-time position) and Assistant Radiation Safety Officer (part-time position)

Primary responsibilities included:

- Research on application of proton beams for cancer treatment
- Studies of the damaging effects of charged particles, such as protons and heavy ions, on astronauts in space.
- Operational health physics – assistance in establishing an up-to-date radiation safety program for the University, radiation monitoring of research and student laboratories, and radiation producing devices, assisting in radiation safety training for staff and students, disposal off radioactive waste, radioactive materials inventory.

Health Physics Laboratory, Institute of Nuclear Physics, Krakow, Poland

1983 – 1990, Staff Scientist

Primary responsibilities included:

- Participation in large-scale research projects concerning environmental radioactivity, (radiological impact of power plants, radiological impact of production and utilization of phosphate fertilizers, radiological occupational hazard in ceramic industry)
- Development, testing and application of thermoluminescent materials, TLD readers, and devices using TLDs
- Operational health physics and dosimetry program at the Institute of Nuclear Physics.

Maryla A. Wasiolek

COMPUTER PROFFICIENCY

General Applications: Microsoft Word, Excel, Power Point, Access, Project, Mathcad, Visio, SigmaPlot

Applications Used in Radiological Assessments/Modeling: GoldSim, GENII, RESRAD, Crystal Ball

SELECTED PUBLICATIONS

Wasiolek M. Modeling the Inhalation Enhancement Factor in Prospective Radiological Risk Assessment. Radioprotection 44 (5): 221-225, 2008.

Schery S.D., Wasiolek M., Modeling Radon Flux from the Earth's Surface. In "Radon and Thoron in the Human Environment", A. Katase and M. Shimo, Eds., World Scientific Publishing Co., Singapore, 1998.

Olszewska-Wasiolek M., Estimates of the Occupational Radiological Hazard in the Phosphate Fertilizers Industry in Poland. Radiation Protection Dosimetry 58: 269-276, 1995.

Yucca Mountain Project reports related to biosphere modeling:

Biosphere Model Report (co-author), MDL-MGR-MD-000001

Environmental Transport Input Parameters for the biospehre Model, ANL-MGR-MD-000007

Characteristics of the Receptor for the Biosphere Model, ANL-MGR-MD-000005

Inhalation Exposure Input Parameters for the Biosphere Model (co-author), ANL-MGR-MD-000001

Soil-Related Input Parameters for the Biospehre Model, ANL-NBS-MD-000009

QUALIFIED ON THE FOLLOWING SUBJECT MATTERS

Radiological Assessments
Environmental Transport of Radionuclides
Dosimetry