


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of:	Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 and 3)
	ASLBP #: 07-858-03-LR-BD01
	Docket #: 05000247 05000286
	Exhibit #: ENT000005-00-BD01
	Admitted: 10/15/2012
	Rejected:
Other:	Identified: 10/15/2012
	Withdrawn:
	Stricken:

ENT000005
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KEY AREAS:

- Computer Model Verification and Validation
- Accident and Consequence Analysis for Design Basis Accident Support
- Regulatory Standard & Guidance Development
- New Reactor Design Accident Analysis and PRA Support
- Severe Accident and Quantitative Risk Analysis
- Level 2/3 Probabilistic Risk Assessment
- Tritium Dispersion and Consequence Analysis
- MACCS2 Code Applications
- Level 3 PRA Standard Development

PROFESSIONAL SUMMARY:

Dr. O’Kula has over 29 years of experience as a manager and technical professional in the areas of accident and consequence analysis, source term evaluation, commercial and production reactor probabilistic risk assessment (PRA) and severe accident analysis, safety software quality assurance (SQA), safety analysis standard and guidance development, computer code evaluation and verification, risk management, hydrogen safety, reactor materials dosimetry, shielding, and tritium safety applications. He is currently the lead for the PRA technical area in the Risk Assessment and Analysis Group. Dr. O’Kula is a member of the American Nuclear Society (ANS) Standard working group ANS 58.25 on Level 3 Probabilistic Safety Assessment, and recently concluded activities as a member of the Peer Review Committee for the Nuclear Regulatory Commission’s (NRC’s) State-of-the-Art Reactor Consequence Analysis (SOARCA) Program. Kevin was part of the Department of Energy (DOE) team writing DOE G 414.1-4, *Safety Software Guide*. He coordinated technical support for the DOE Office of Environment, Safety, and Health (EH) in addressing Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2002-1 on Software Quality Assurance (SQA), and was a consultant to DOE/EH-31 Office of Quality Assurance for disposition of SQA issues.

He is, or has supported, Atomic Safety Licensing Board (ASLB) relicensing issue resolution for several commercial plants including Indian Point, Prairie Island, and Pilgrim Nuclear Power Station, on severe accident mitigation alternatives (SAMA) analysis. He was also part of the accident analysis and PRA/severe accident teams supporting the Design Certification Document for the U.S. Advanced Pressure Water Reactor (US-APWR) a joint effort with URS Washington Division and Mitsubishi Heavy Industries (MHI). He has provided similar support for an alternative reactor technology, the Pebble Bed Modular Reactor (PBMR).

Dr. O’Kula was a member of the Partner, Assess, Innovate, and Sustain (PAIS) Safety Case team for the Sellafield Sites in the United Kingdom in the early 2009 period. The PAIS team identified and began implementation of improvement opportunities in nuclear safety and related areas for Sellafield. Recommendations were documented in comprehensive reports to the Site’s Nuclear Management Partners consortium in March 2009.

Kevin is coordinating URS SMS support to the Quantitative Risk Analysis (QRA) for evaluation of hydrogen events to risk-inform the Waste Immobilization and Treatment Plant (WTP) design at Hanford, including fault tree analysis and reliability data, and human factors areas. He is also a contributor to the DOE response on the use of risk assessment methodologies as part of the DNFSB Recommendation 2009-1 implementation action for Risk Assessment. He led work in reviewing EIS food pathway consequence analysis performed on assumed accident conditions from the Mixed Oxide Fuel Fabrication Facility (MFFF), sited at the Savannah River Site. This project compared and evaluated the impacts calculated from three computer models, including MACCS2, GENII, and UFOTRI.

He is past chair of the American Nuclear Society (ANS) Nuclear Installations Safety Division (NISD), and the Energy Facility Contractors Group (EFCOG) Accident Analysis Subgroup, and is the current NISD Program Committee Chair. He is a member of the Nuclear Hydrogen Production Technical Group under the ANS’s Environmental Sciences Division, and is chair for the EFCOG Hydrogen Safety Interest Group. He was the Technical Program Chair for two ANS embedded topical meetings on Operating Nuclear Facility Safety (Washington, D.C., 2004) and the Safety and Technology of Nuclear Hydrogen Production, Control and Management (Boston, MA, 2007). He is the Assistant Technical Program Committee Chair for the Probabilistic Safety Assessment (PSA) Meeting in Columbia, SC, scheduled for September 22-26, 2013.

Dr. O’Kula was PRA group manager for K Reactor at the time of restart in the early 1990s. He led a successful effort demonstrating Savannah River Site (SRS) K-Reactor siting compliance to 10 CFR 100, and tritium facility compliance with SEN-35-91.

He was the project leader for independent Verification and Validation (V&V) of urban dispersion software for the Defense Threat Reduction Agency (DTRA) and is the current V&V project manager for the evaluation of several chemical/biological software tools for the U.S. Army Test and Evaluation Command (ATEC) and Chemical-Biological Program (Dugway Proving Ground (Utah) and Edgewood Chemical/Biological Center in Maryland.

EDUCATION:

Ph.D., Nuclear Engineering, University of Wisconsin, 1984
M.S., Nuclear Engineering, University of Wisconsin, 1977
B.S., Applied and Engineering Physics, Cornell University, 1975

TRAINING:

Conduct of Operations (CONOPS), 1994
Harvard School of Public Health, Atmospheric Science and Radioactivity Releases, 1995
Consequence Assessment, (Savannah River Site, 1995)
U.S. DOE Risk Assessment Workshop (Augusta, GA, 1996)
MELCOR Accident Computer Code System (MACCS) 2 Computer Code, 1997, 2005, 2011
MCNPX Training Class (ANS Meeting, 1999)

CLEARANCE:

Active DOE “L”

PROFESSIONAL EXPERIENCE:**URS Safety Management Solutions LLC
Advisory Engineer and Senior Fellow Advisor****1997 to Present**

Dr. O’Kula recently concluded activities as a member of the NRC-Sandia National Laboratories State-of-the-Art Reactor Consequence Analysis (SOARCA) Project Peer Review Committee. The SOARCA team provided recommendations on applying MACCS2 for modeling accident phenomena and subsequent off-site consequences from postulated severe reactor accidents. This activity supports the efforts of Sandia National Laboratories (SNL) and the Nuclear Regulatory Commission (NRC) to provide more realistic assessment of severe accidents.

Dr. O’Kula is also part of the Level 3 PRA Standard working group charged with developing an ANSI/ANS standard for Level 3 PRA analysis. He participated in a team that conducted an SQA gap analysis on the bioassay code [Integrated Modules for Bioassay Analysis (IMBA)] based on DOE G 414.1-4 requirements. He identified safety analysis codes that were designated as DOE “toolbox” codes, and oversaw production of the first documents (QA criteria and application plan, code guidance reports, and gap analysis) for six accident analysis codes designated for the DOE Safety Software Toolbox. He provided support to DOE/EH-31 (now DOE/HSS) for addressing SQA issues for safety analysis software. He was a contributor to DOE G 414.1-4, *Safety Software Guide* on SQA practices, procedures, and programs.

Kevin has provided technical input for work packages on several recent commercial projects. In the first, he teamed with Entergy on MACCS2 code applications issues in the Severe Accident Mitigation Alternatives (SAMA) analysis area for the Pilgrim Nuclear Power Station. In the second, he was part of tritium environmental release analysis team that supported evaluation of tritium control and management areas for the Braidwood plant. A third effort developed an initial SAMDA document for the Mitsubishi Heavy Industries (MHI) US-APWR (1610 MW_e evolutionary PWR), as well as complete a control room habitability study for postulated toxic chemical gas releases.

Kevin was part of a Washington Group team that developed a Design Control Document (DCD) for the MHI US-APWR using input information from MHI. He was Chapter lead on Chapter 15 (Transient and Accident Analysis), and later transitioned to severe accident evaluation and documentation support to Chapter 19 (PRA and Severe Accidents). He was the Chapter 19 lead for PRA and Severe Accident for COLA development for the Pebble Bed Modular Reactor (PBMR).

Dr. O’Kula developed the outline, coordinated contributors, and assembled the first draft of the DOE *Accident Analysis Guidebook*, a reference guide for hazard, accident, and risk analysis of nuclear and chemical facilities operated in the DOE Complex. He is also the primary author and coordinator for the *Accident Analysis Application Guide* for the Oak Ridge contractor. Dr. O’Kula also developed a one-day course and exam for the guide, which he later presented to the Oak Ridge, Paducah, and Portsmouth staff.

Dr. O’Kula also led an independent V&V review for the DTRA of the U.K.-developed Urban Dispersion Model (UDM) software for predicting chemical and biological plume dispersion in city environments, and is leading projects to verify and validate chemical/biological simulation suite software applications for the Dugway Proving Ground (Utah), and the Edgewood Chemical Biological Center (ECBC) in Maryland.

Managing Member, Consequence Analysis

Dr. O’Kula was responsible for the consequence analysis associated with accident analysis sections of Documented Safety Analysis (DSA) reports and other safety basis documents for SRS, Oak Ridge, and other DOE nuclear facilities. He also developed the methodology and identified appropriate computer models for this purpose. Additionally, Dr. O’Kula developed training to enhance consistency and

standardize analyses in the consequence analysis area. He was project manager for environmental assessment support to SRS on a transportation safety analysis using the RADTRAN code.

Dr. O’Kula coordinated development of a DOE Accident Analysis Guidebook involving over 10 sites and organizations. He also led the effort to produce Computer Model Recommendations for source term (fire, spill, and explosion), in-facility transport, and dispersion/consequence (radiological and chemical) areas.

**Westinghouse Savannah River Company
Group Manager**

1989 to 1997

Dr. O’Kula managed consequence analyses associated with accident analysis sections of DSA reports and other safety basis documents. He also developed the associated methodologies and identified appropriate computer models. He was a member of the management team supporting Criticality Safety Evaluation preparation assisting Safe Sites of Colorado and the dispositioning of final criticality safety issues for the decommissioning and decontamination of nuclear facilities at the Rocky Flats Environmental Technology Site.

In a teaming arrangement with Science Applications International Corporation, Kevin initiated discussions that led to development of an emergency management enhancement tool to risk inform likely source terms. Applied this approach to a Savannah River nuclear facility (K Reactor), and was part of the team to provide this methodology for use on the British Advanced Gas-Cooled Reactors (AGRs) (for the United Kingdom’s Nuclear Installation Inspectorate). Model was knowledge-based, and required development of an Accident Progression Event Tree (APET) for the facility in question.

Dr. O’Kula managed the completion of the SRS K Reactor PRA program. He was the lead for development of the K Reactor Source Term Predictor Model and assisted with the core technology lay-up program to preserve competencies in reactor safety. He coordinated a 25-person group responsible for K Reactor probabilistic and deterministic dose analyses, and led the examination of reduced power cases at project termination. He developed risk and dose management applications to cost-effectively prioritize facility modifications.

Kevin interfaced with DOE Independent and Senior Review teams to finalize study acceptance, and transitioned the risk assessment team to risk management functions for nuclear and waste processing facilities. In addition, he successfully prepared a 10 CFR 100 Siting white paper to resolve issues raised by the DNFSB, and teamed with DOE/HQ legal support to document resolutions. He led the development of a position paper demonstrating SRS Replacement Tritium Facility compliance with DOE Safety Policy (SEN-35-91).

Staff Engineer

Dr. O’Kula led an analytical team quantifying the tritium source term during a Loss of River Water design basis accident. He evaluated airborne tritium levels with multi-cell CONTAIN model, interfaced with a multidisciplinary team to resolve Operational Readiness Review concerns, developed an SRS-specific methodology for applying MACCS as a tool for Level 3 PRA Applications, and applied CONTAIN code for K Reactor source term analysis.

**E.I. du Pont de Nemours & Company
Principal Engineer, Research Engineer**

1982 to 1989

Dr. O’Kula performed risk analysis duties for the Savannah River Laboratory (SRL) Risk Analysis Group, after earlier conducting research activities for the Reactor Materials and Reactor Physics Groups. He performed initial planning for offsite irradiation of test specimens to evaluate remaining reactor lifetime for Savannah River reactor components.

Westinghouse Electric Corporation 1975
 Summer Student, Reactor Licensing
 Monroeville, PA

American Electric Power Corporation 1973 to 1974
 Co-op Student, Reactor Physics and Reactor Licensing
 New York, NY

Long Island Lighting Company 1972
 Summer Intern
 Riverhead, NY

PARTIAL LIST OF PUBLICATIONS (2000-2011):

- M. G. Wentink, K. R. O’Kula (Primary and Presenting Author), H. A. Ford, C.R. Lux, and H. C. Benhardt, *Operational Frequency Analysis Model Supporting the QRA for Risk-Informing the Design of a Waste Processing Facility*, American Nuclear Society Winter Meeting, October 30 - November 3, 2011 (Washington, D.C.).
- K. R. O’Kula, D. C. Thoman, J. Lowrie, and A. Keller, *Perspectives on DOE Consequence Inputs for Accident Analysis Applications*, American Nuclear Society 2008 Winter Meeting and Nuclear Technology Expo, November 9-13, 2008 (Reno, NV).
- K. R. O’Kula, F. J. Mogolesko, K-J Hong, and P. A. Gaukler, *Severe Accident Mitigation Alternative Analysis Insights Using the MACCS2 Code*, American Nuclear Society 2008 Probabilistic Safety Assessment (PSA) Topical Meeting, September 7-11, 2008 (Knoxville, TN).
- K. R. O’Kula and D. C. Thoman, *Modeling Atmospheric Releases of Tritium from Nuclear Installations*, American Nuclear Society Embedded Topical Meeting on the Safety and Technology of Nuclear Hydrogen Production, Control and Management, June 24-28, 2007 (Boston, MA).
- K. R. O’Kula and D. C. Thoman, *Analytical Evaluation of Surface Roughness Length at a Large DOE Site (U)*, American Nuclear Society Winter Meeting, November 12-16, 2006 (Albuquerque, NM).
- K. R. O’Kula and D. Sparkman, *Safety Software Guide Perspectives for the Design of New Nuclear Facilities (U)*, Winter Meeting of the American Nuclear Society, November 13 – 17, 2005 (Washington, D.C.).
- K. R. O’Kula and R. Lagdon, *Progress in Addressing DNFSB Recommendation 2002-1 Issues: Improving Accident Analysis Software Applications*, Fifteenth Annual Energy Facility Contractors Group Safety Analysis Workshop, April 30 – May 5, 2005, Los Alamos, NM (2005).
- K. R. O’Kula and Tony Eng, *A “Toolbox” Equivalent Process for Safety Analysis Software*, Fourteenth Annual Energy Facility Contractors Group Safety Analysis Workshop, May 1-6, 2004, Pleasanton, CA (2004).
- K. R. O’Kula, D. C. Thoman, J. A. Spear, R. L. Geddes, *Assessing Consequences Due to Hypothetical Accident Releases from New Plutonium Facilities (U)*, American Nuclear Society Embedded Topical Meeting on Operating Nuclear Facility Safety, November 14 – 18, 2004 (Washington, D.C.).
- K. O’Kula and J. Hansen, *Implementation of Methodology for Final Hazard Categorization of a DOE Nuclear Facility (U)*, Annual Meeting of the American Nuclear Society, June 13-17, 2004,

(Pittsburgh, PA).

K. R. O’Kula and Tony Eng, *A “Toolbox” Equivalent Process for Safety Analysis Software*, Fourteenth Annual Energy Facility Contractors Group Safety Analysis Workshop, May 1-6, 2004, Pleasanton, CA (2004).

K. R. O’Kula, et al., *Evaluation of Current Computer Models Applied in the DOE Complex for SAR Analysis of Radiological Dispersion & Consequences*, WSRC-TR-96-0126, Westinghouse Savannah River Company (2003).

K. R. O’Kula, et al., *Evaluation of Current Computer Models Applied in the DOE Complex for SAR Analysis of Radiological Dispersion & Consequences*, WSRC-TR-96-0126, Rev. 3, Westinghouse Savannah River Company (2002).

K. R. O’Kula, *A DOE Computer Code Toolbox: Issues and Opportunities*, Eleventh Annual EFCOG Workshop, also 2001 Annual Meeting of the American Nuclear Society, Milwaukee, WI (2001).

PUBLICATIONS (1988-1999):

Dr. O’Kula authored or co-authored more than 20 publications between 1988 and 1999. Details are available upon request.

PROFESSIONAL SOCIETIES AND STANDARDS COMMITTEES

- American Nuclear Society
- Health Physics Society
- ANS Level 3 PRA Standard Committee 58.25