

Donald (Donnie) Gene Harrison

Education:

Bachelor's of Science in Nuclear Engineering, University of Missouri – Rolla, May 1983

U.S. Nuclear Regulatory Commission, Rockville, Maryland (2007 - Present)

Branch Chief, PRA Licensing Branch

Recognizing his leadership capabilities, in 2007, Mr. Harrison was selected for the Nuclear Regulatory Commission (NRC) Leadership Potential Program. He was then selected to be the branch chief for the Balance of Plant Branch within the NRC Office of Nuclear Reactor Regulation (NRR). Due to his demonstrated leadership abilities, he was also requested to be the branch chief of the Safety Issue Branch (resolving the generic issue related to the potential for containment sump clogging) for 6 months while the current branch chief was on a detail. In April 2009, due to his extensive knowledge and expertise in probabilistic risk assessment (PRA), as well as his supervisory capabilities, he was selected as the branch chief for the PRA Licensing Branch (APLA) within NRR. This branch is responsible for all risk-informed regulatory and rulemaking activities and all risk-informed/risk-related licensing action reviews. In this position, he supervises technical staff; facilitates resolution of policy, technical, and administrative issues; plans and executes work activities; and communicates effectively with internal and external stakeholders. His more than 25 years of technical expertise in PRA and risk-related activities, combined with his proven leadership abilities, has ensured the development of high-quality risk-informed rules, regulatory activities, and staff reviews of licensing actions.

As the supervisor of a technical branch he ensures tasks are accomplished by the technical staff in a manner consistent with established technical guidance, regulations, and standard review plans, as well as ensuring consistency with the organizational mission, values, and strategic and operating plans. In performing this role, he communicates both orally and in writing on varied complex technical problems with division and senior management (including the EDO) and representatives of other NRR branches and divisions, other NRC offices, Commission TAs and the Commissioners, national laboratories, industry representatives, and members of the public. For two technical areas (fire protection and containment sumps), he has provided periodic briefings to the NRC Chairman.

In addition to his regular supervisory duties, Mr. Harrison has been called upon by senior management to address specific technical and personnel issues. As an example, Mr. Harrison was requested to chair a special task group to investigate specific concerns raised by a staff member to the NRC Chairman. The task group investigated the concerns, while maintaining the confidentiality of the staff member, and provided recommendations to senior management in addressing these concerns.

As a supervisor, he demonstrates an applied knowledge of management principles, trends, and generally accepted practices and techniques to achieve effective program planning, budgeting, and administration of a complex technical discipline.

U.S. Nuclear Regulatory Commission, Rockville, Maryland (2000 - 2007)

Senior Reliability and Risk Analyst, PRA Licensing Branch

Mr. Harrison was the Senior Reliability and Risk Analyst within the NRC Probabilistic Risk Assessment (PRA) Licensing Branch (APLA) within NRR. Though initially hired at the GG-13 level in July 2000, due to his extensive experience and knowledge in PRA (including internal and external events PRA at Levels I, II, and III), he was subsequently promoted through a competitive process to GG-15 (skipping

the GG-14 level) in July 2002. In this role, he was the technical lead for many risk-informed activities, including peer reviewing all risk-informed licensing actions and mentoring all junior staff in performing these reviews.

Due to his broad experience and knowledge, he was involved in nearly all of the NRC's highest priority activities that relied upon risk insights. Examples include: (a) development and implementation of the action plan for a phased approach to improving PRA quality; (b) developing the risk-informed categorization process for 10 CFR 50.69, "Risk-Informing Special Treatment Requirements," and associated Regulatory Guide (RG) 1.201; (c) development of the risk-informed aspects of the resolution of Generic Safety Issue (GSI) 191, "Potential Clogging of Pressurized Water Reactor Containment Sumps;" and (d) updating the plan for achieving regulatory "coherence" through risk-informing 10 CFR 50. All of these activities involved his active participation in closely coordinating with other staff, holding meetings and interactions with the industry and members of the public, and in briefings at all levels of the NRC, including: Commissioner Technical Assistants (TAs), Executive Director for Operations (EDO), Advisory Committee on Reactor Safeguards (ACRS), and other NRC senior management.

Mr. Harrison was also the technical lead for planning, coordinating, and performing pilot application reviews using RG 1.200/Standard Review Plan (SRP) 19.1, "PRA Technical Adequacy Guidance." These pilot reviews were performed: (a) to provide assistance in clarifying aspects of the guidance, (b) to assess the licensee's self-assessment approaches, findings, and resolutions to ensure that the base PRA is properly evaluated, and (c) to develop industry and NRC lessons learned to improve RG 1.200, SRP 19.1, and the associated ASME Standard and industry guidance. As the NRC lead for this effort, he developed the plan and conducted the pilot reviews.

As a recognized expert in PRA techniques and risk-informed applications/approaches, he is frequently consulted by other organizations. As an example, Mr. Harrison assisted the Office of Commission Appellate Adjudication as an adjudicatory employee, providing technical advice in the Catawba and McGuire license renewal proceedings. He worked very quickly to review the Atomic Safety and Licensing Board decision and the parties' briefs, answered an extensive list of questions from the legal staff, and reviewed several draft legal decisions for technical accuracy in providing a technical/legal opinion.

Independent Consultant, Gaithersburg, Maryland (1999 - 2000)

Mr. Harrison supported Ricky Summitt Consulting, Inc. (RSC) in upgrading the Probabilistic Safety Assessment (PSA) for the Prairie Island Nuclear Generating Plant (PINGP) and supported RSC in upgrading the Carolina Power and Light (CP&L) Brunswick Nuclear Station PSA. His responsibilities included the development and review of improved system fault tree logic models and the associated development and review of system notebooks to document these models. In addition, Mr. Harrison improved the interfacing systems loss of coolant accident analysis (ISLOCA) in support of the upgrade effort for the CP&L Brunswick Nuclear Station.

Ricky Summitt Consulting, Inc., Knoxville, Tennessee (1998 - 1999) Project Manager

Mr. Harrison supported the upgrading of the PSA for the Brunswick Nuclear Station, which required the development and review of improved system fault tree models and the associated development and review of system notebooks to document these models. In addition, Mr. Harrison has performed a

systems fault tree analysis in preparation for expanding the usage of the station's fuel storage pools and has performed a number of other PSA-related analyses in support of the PSA upgrade.

Mr. Harrison converted the Mühleberg Nuclear Station Probabilistic Risk Assessment (PRA) for shutdown operations from the Risk Spectrum computer program to the CAFTA computer program. This effort also involved re-solving/quantifying the converted event tree and fault tree models to verify the accuracy of the conversion process. In performing the conversion, Mr. Harrison identified modeling, data, and documentation inaccuracies and omissions that will be considered in future updates of this PRA, as well as the PRA for power operations, which was the basis for many of the shutdown PRA system models.

Mr. Harrison provided support to Advanced Technologies & Laboratories International, Inc. (ATL) as the general site services contractor to the Department of Energy (DOE) at Richland, WA. Mr. Harrison supported the efforts to establish a DOE Office of River Protection (DOE-ORP) at Richland, WA that is managed separately from the DOE Richland Operations Office (DOE-RL), but operates within the DOE-RL site. This effort involved reviewing DOE and DOE-RL regulations, requirements, and responsibilities and recommending the proper integration or separation of the site programs between the two DOE Offices. Mr. Harrison also provided support to DOE-Richland Quality, Safety, and Health staff in revising their safety-related procedures and guidance manuals.

Link Technologies, Inc, Germantown, Maryland (1995 - 1998) Project Manager

Mr. Harrison provided technical support in revising the PSA documentation and reviewing engineering changes at the CP&L nuclear stations, including the Brunswick, Harris, and Robinson Nuclear Stations.

Mr. Harrison was involved in the development of an integrated safety and health (S&H) program for the DOE. This program strived to develop a framework in which the various analyses associated with worker and public S&H are integrated and thus, are more cost-effective and consistent. Key elements of this program include: a graded approach to hazards analysis; involvement of S&H personnel in project planning, engineering, and execution; and use of multi-disciplinary project teams with worker participation.

Mr. Harrison was involved in the DOE technical assistance program providing technical support to various DOE operations and field offices. The support was focused on ensuring that worker and public S&H are adequately considered for deactivation and decommissioning (D&D) projects. This included the integration of S&H considerations into the required environmental decision and development documentation.

In support of DOE's interest in adopting more cost-effective methods for accomplishing its mission while maintaining its commitment to S&H, Mr. Harrison led an effort to benchmark the proven safety management practices within the private sector. The insights from literature reviews, company surveys, and facility visits encompass organization and management, analyses, operations, monitoring and feedback, and incident/accident response and investigation.

Mr. Harrison supported the development of the DOE Environment, Safety, and Health (ES&H) budget and execution plans for DOE. This support involved working with the DOE Headquarters staff on developing the ES&H budget planning guidance and working with the DOE-RL staff in implementing this guidance to: develop fiscal year (FY) 1998, FY 1999, and FY 2000 budget plans; identify vulnerabilities or areas requiring additional funding (i.e., unfunded/under-funded activities); and revise the FY 1997 and FY 1998 plans in preparation for execution. These plans utilize a risk-based ranking

scheme to prioritize the proposed activities at the site against a number of criteria, including: public, worker, and environmental protection; regulatory compliance; mission impacts; and risk reduction.

Jason Associates Corporation, Idaho Falls, Idaho (1991 - 1995)
Senior Staff

Mr. Harrison provided technical support to the Idaho National Engineering Laboratory (INEL) common cause failure (CCF) research program, which was conducted in support of the NRC. Mr. Harrison reviewed licensee event reports (LERs) and nuclear plant reliability data sheets (NPRDSs) to identify the potential existence of CCFs and completed associated CCF determination forms.

Mr. Harrison provided support to the Westinghouse Savannah River Company in the development of an accident management program, including risk-based arguments, to support the restart of the tritium production reactor at the Savannah River Site. This program sought to identify appropriate responses and plant upgrades that could result in reduced public risk given an emergency condition at the plant.

Mr. Harrison was a program manager for all aspects of safety/risk analysis support at the DOE Hanford site. In addition to performing the program management duties, Mr. Harrison was the technical lead for many of the support tasks. The tasks included developing updates to chapters of the Plutonium Finishing Plant (PFP) final safety analysis report (SAR) and performing and documenting the accident analyses related to the high-level radioactive waste tank ventilation systems. Mr. Harrison also provided the primary support to the safety analysis group at the Hanford site in developing safety analyses and operational/technical safety requirements (OSRs/TSRs) for their single-shell high-level radioactive waste tanks. This support was expanded to include the development of safety analyses and calculations for activities associated with these tanks.

Mr. Harrison provided the initial technical lead for development of a SAR for the Nevada Test Site (NTS) Area 3 and Area 5 Radioactive Waste Management Sites and Area 5 Hazardous Waste Accumulation Site. These SARs were conducted in accordance with the applicable DOE orders and standards.

Mr. Harrison performed work in support of upgrading the SAR for CPP-603, Underwater Fuel Storage Facility, and lead the development of a SAR for the EG&G Idaho Radioactive Waste Management Complex (RWMC) and Specific Manufacturing Capability (SMC) facilities.

Mr. Harrison provided the initial technical lead on the 30% design preliminary SAR for the INEL Pit 9 remediation project. This SAR was developed in accordance with DOE Order 5480.23 and DOE-STD-3009-94.

Mr. Harrison led the support effort provided to the DOE Idaho Operations Office in reviewing the preliminary SAR for the proposed Waste Characterization Facility. The review support was focused on the credibility of the technical analysis as required by the specifications in DOE Order 5480.23. In addition, an overall check was performed to ensure that the preliminary SAR addressed the scope and content requirements of the order.

Mr. Harrison provided support to the development of the SAR for the INEL Security Helicopter Operations, for both onsite and offsite missions.

Battelle - Pacific Northwest Laboratory, Richland, Washington (1989 - 1991)
Research Engineer

Mr. Harrison was involved in developing a simplified hazard audit guide for DOE, which considered both radiological and non-radiological hazardous materials. The methodology enabled each facility to rank its hazards and determine an overall hazard classification. The information obtained during the hazard audit could be used in numerous ways, including determining the adequacy of the facility's safety design and safety analysis report, prioritization of hazardous materials, and justification for minimizing and/or substituting hazardous materials. This guide, which was published in 1990, advocated many of the attributes eventually incorporated into DOE standard, DOE-STD-1027-92.

Mr. Harrison developed a risk-based inspection guide for NRC on the Three Mile Island Nuclear Station Unit 1 (TMI-1). This inspection guide provides a prioritization of systems and components that were found in the TMI-1 PRA to be of importance in minimizing the risk to the public from core damage events. This was the first risk-based inspection guide developed using a PRA that was based on support-state methodology.

Mr. Harrison led an evaluation of the Westinghouse advanced light water reactor (AP600) and the General Electric small boiling water reactor (SBWR) design features to assist the NRC in identifying potential regulatory/licensing issues associated with these advanced reactor designs and to determine the validity of the vendor's safety claims. This project involved reviewing the reactor designs, identifying technologies being used, and evaluating the compatibility of these designs with current regulations and related guidance.

Mr. Harrison was involved in the evaluation of in-vessel severe accident management strategies for the NRC. In support of this program, Mr. Harrison investigated the potential for, and effect of, the occurrence of a recriticality event in a BWR during the recovery from a severe accident. The feasibility of various strategies to mitigate such an event were also evaluated.

Mr. Harrison was involved in the containment response event tree analysis (i.e., Level II PRA) and led an approximate seismic analysis of the Washington Public Power Supply System Nuclear Project No. 1 (WNP-1), which was a candidate for use as one of the DOE new production reactors.

Mr. Harrison was involved in the consequence analysis (i.e., Level III PRA) of the EBASCO Heavy Water Reactor (EHWR) conceptual design, which was a design being pursued by DOE to replace the Savannah River reactors.

Mr. Harrison participated in the prioritization of generic safety issues and was involved in a weld inspection/prioritization program for the NRC.

Mr. Harrison was a member of a task force that evaluated the DOE Rocky Flats Plant safety analysis; primarily in assessing the completeness (i.e., consequence bounding) of the accident scenarios addressed in the safety analysis. As a result, additional accident scenarios were identified for further evaluation.

International Technologies Corporation/Tenera, L.P., Knoxville, Tennessee (1988 - 1989)
Risk Analyst

Mr. Harrison was involved in analyzing chemical treatment facilities using probabilistic techniques. He led the analysis effort on a treatment facility in California and led the fault tree systems analysis for a chemical processing plant PRA in New York.

Mr. Harrison was a technical contributor to the DOE ARSAP in the area of PRA uses and applications for evolutionary advanced light water reactor (ALWR) designs. Tasks included: performance of PRAs for ALWR designs; review of severe accident issues for relevance to ALWR designs; and development

of severe accident issue papers on PRA methods dealing with external events, success criteria and mission time, accident sequence selection, and human factors. Mr. Harrison also led the external events analyses, including the identification and screening of potential external events, and led the quantitative analysis of seismic events, using the EPRI ALWR Requirements Document and seismic capacities he developed for generic types of components.

**Rockwell Hanford Operations / Westinghouse Hanford, Richland, Washington (1985 - 1988)
Engineer**

Mr. Harrison developed and implemented a PRA approach for considering the radiological safety of the public during high-level radioactive waste repository operations. This approach was developed for the design and licensing of a high-level nuclear waste repository for the DOE Basalt Waste Isolation Project. He developed the methodology used to determine the geologic repository subsurface structures, systems, and components important to public safety and developed the event trees and fault trees used in this determination. Mr. Harrison was also responsible for the development of an accident/incident statistics database and an entity-relationship database, which were used in support of the importance determination.

Mr. Harrison was involved in the DOE risk characterization program that provided consistent estimates of the risks from the disposal of high-level radioactive wastes in the geologic repositories under consideration.

**Duke Power Company, Charlotte, North Carolina (1983 - 1985)
Associate Engineer**

Mr. Harrison was a member of the group responsible for conducting PRAs for the Duke Power Company McGuire and Catawba Nuclear Stations. For the Catawba PRA, Mr. Harrison was the lead engineer for the steam generator tube rupture event tree analysis, seismic analysis, and fault tree analysis of the auxiliary feedwater, chemical and volume control, standby shutdown, and hydrogen mitigation systems. He also conducted the uncertainty analysis for both the Catawba and McGuire PRAs and performed risk reduction studies for some of the dominant risk contributors for the McGuire Nuclear Station. In these roles, Mr. Harrison executed a number of PRA computer codes (e.g., SETS, WAMCUT, COMCAN III); developed an uncertainty code based on the WASH-1400 uncertainty analysis; and debugged, adapted, and documented a computer code used in the seismic analysis.

Mr. Harrison developed a seismic success tree model to determine the minimum combination of components required to survive an earthquake at Duke's Oconee Nuclear Station to avoid core damage.