

Experience Summary:

- ✓ 25 years of experience in:
 - Safety/risk analysis, including human reliability analysis
 - Supported the preparation and review of well 100 SB/AB documents
 - Safety program development, implementation, and assessments
 - Software engineering
 - Design safety evaluations,
 - Fire and explosion modeling
 - Nuclear explosive safety,
 - Radiation protection and criticality safety, and
 - Training
- ✓ Contributor author of a significant number of DOE Standards, Guides, and Handbooks on safety and design
- ✓ Performed numerous design safety evaluations and documentation for major design projects and facilities
- ✓ DOE Certified Readiness Reviewer
- ✓ Criticality Safety Engineer (CSE)
- ✓ Fire Protection Engineer (FPE)
- ✓ Extensive experience in phenomenological modeling (e.g., fire, explosion, criticality, dispersion, consequences, reliability analysis)

Education

- Ph.D., Nuclear Engineering, University of New Mexico
- M.S., Health Physics, Georgia Institute of Technology
- Numerical Analysis Master Program, John Hopkins University
- M.Eng. Nuclear Engineering, Cornell University
- BS. Mathematics/Physics, Montclair State University
- Business Executive Program, Dartmouth (Tuck School)

EXPERIENCE OVERVIEW

Dr. Restrepo has almost 25 years of experience in the areas of safety/risk analysis, safety basis (SB) documentation; reactor, nuclear explosive safety, criticality safety, non-reactor nuclear/non-nuclear operations and design, safety and operational program implementation and assessments; computer code phenomenological modeling; fire protection, emergency response, and training.

Dr. Restrepo has supported the preparation of over 100 safety basis and authorization basis (SB/AB) documents (e.g., DSAs, SARs, BIOs, EIS, TSRs), including their implementation for many DOE facilities. He has provided support to DOE/NNSA in preparing Orders, Stds., and Guides in the areas of safety/risk analysis and design, and reviewing SB documents throughout the DOE complex.

Dr. Restrepo has supported multiple design projects with SB documentation, integration of safety into the design, design documentation reviews/preparation, phenomenological modeling in support of design, etc.

Dr. Restrepo has provided technical advisory support to the DOE/NNSA and DOE contractors on safety and operational programs development, implementation and assessments. He has also supported operational readiness reviews (ORRs), and accident investigations throughout the DOE complex. Dr. Restrepo has supported the assessment of programs at several sites on behalf of DOE/NNSA, including USQ, Criticality Safety Program, ISM, Safety Basis, emergency response, etc. at LANL, Y-12, Pantex, Former Rocky Flats, SNL, NTS.

Dr. Restrepo is a qualified criticality engineer; he also has supported the evaluation/development of criticality safety programs and criticality safety evaluations (CSEs). He also supported the evaluation and implementation of fire protection programs and preparation and reviews of fire hazard analyses (FHAs).

Dr. Restrepo has supported nuclear explosive operations with safety assessments and SB/AB documentation e.g., DSA, HARs, ABCDs, SIIDs, Master Studies, weapons' response evaluations, etc. He led evaluations of computer codes and models on fires, explosions, spills, in-facility transport, and consequence analysis for DOE/HQ.

Dr. Restrepo also developed over two-dozen courses and taught numerous courses on SB, hazard analysis, risk analysis, consequence modeling, fire modeling, criticality safety, reliability analysis, integration of safety into design, implementation of SB documentation, etc. He also taught undergraduate (Eng. Physics) and graduate courses (risk analysis).

Work History

- OMICRON Safety and Risk Tech., Inc., 1997 – present (President)
- Sandia National Labs, 1990 – 1997 (SMTS)
- Colorado School of Mines, 1989 (Adj. Professor, Graduate Course in Risk Analysis)
- University of Colorado (Denver), 1988 – 1989 (Adj. Professor, Engineering Physics)
- Rockwell International (Rocky Flats), 1984 – 1990 (Pr. Tech. Lead Nuclear Safety Eng.)
- General Physics Corporation, 1983 – 1984 (Engineer)
- Paul VI High School, 1980 – 1981 (Physics Teacher)

Examples of Design Projects:

- NTS: Rad/NucCTEC, DAF TA-18 Relocation, Verb Area 5
- LANL: CMRR, RLWTF, RLWF, TRU Waste Facility, Radiography Facility, Pit production – CMIP, CMR upgrades, TA-55 Reinvestment Project.
- WIPP/LANL: Waste Characterization modular/mobile units
- SNL: GIF, Mo-99. ACRR, HCF, CNSAC, MESA
- Rocky Flats: PRMP, 707 and 776/77 seismic upgrades, furnace operations, and PREP
- ETTP (Oak Ridge): FWEC Waste Storage Facility.

EXPERIENCE SUMMARY (organized by OMICRON capabilities)

Safety Basis Documentation

- Supported the development of many DOE Stds, Guides, and Handbooks on nuclear safety, e.g., DOE-STD-3009, 1104, 5506, 1189, DOE-HDBK-3010.
- Supported the preparation/development of over 100 approved SB/AB documents for new, operational, ER, and D&D nuclear and non-nuclear facilities and activities throughout the DOE complex, including onsite and offsite transportation activities.
- Supported the review of SB documents for facilities throughout the DOE complex, including the performance of numerous confirmatory evaluations on behalf of DOE or NNSA
- Supported the preparation and review of environmental impact statements (EIS) and environmental assessments (EA).
- Supported assessment and implementation of dozens of SB docs.

Operational Safety Support

- Supported development of implementation plans and integration of safety into operations, also development/review of procedures and system design descriptions (SDDs).
- Supported transition plans and their implementation.
- Supported start up of operations, including readiness self-assessments, operational readiness reviews (ORRs).
- Participated in implementation or assessments of safety and operational programs (e.g., criticality, USQs, SB, ISM).
- Supported accident investigations and safety appraisal reviews at SNL, Y-12, LANL, and Rocky Flats
- Member of the Rocky Flats Resumption of Operations Review and Audit Team (1990-1991).

Nuclear Explosive Safety

- Supported DAF Master Study and its integration with SB documentation, and provided input/interface support with NESG.
- Supported NNSA Pantex Site Operations (PxSO) with assessment and review of SB documentation.
- Supported nuclear explosive operations at Pantex and the DAF with SB documentation preparation/reviews, Master Studies, and other documentation for programs such as W56, W62, W69, W76, W79, W88.
- Supported hazard and accident analysis of NEs with special analyses, e.g., off gassing of salts, documentation of intrinsic weapons hazards (B53 to W88).
- Supported the hazard analysis and documentation for the offsite transportation (OST), manufacturing and certification of NEs and/or NE components (physics packages, CSAs)
- Supported most major DP facilities and operations supporting the stockpile stewardship, either as an employee or consultant, including Rocky Flats, SNL, LANL, Y-12, and LLNL.

Computer Code**Experience/Training:**

- Accident Frequencies: FTAP, IMPORTANCE, SETS, ARRAMIS, TEMAC, IRRAS, SEATREE, SANET, SAPHIRE.
- Fire Modeling: FDS, FPETOOL, CFAST
- Explosion Modeling: BLASTX, CHEETAH
- Criticality, Reactivity, and Fission Products: MCNP, KENO Va/VI, FISSP, ORIGEN2, PK1D
- Heat Transfer and Fluid Flow: HEATING, MELCOR, FLOW3D
- Dispersion/Consequence Analysis: MACCS, Hot Spot, SMART, AIRDOS, RSAC, CAP88, EPICODE, ALOHA
- Shielding and Criticality: MORSE, MICROSIELD, QADMOD, MCNP, KENO VI.
- Toxic Releases: HAZCON, EPICode, ALOHA
- Uncertainty/Sensitivity: LHS, @RISK®, CRYSTAL BALL®

Design Safety Evaluations

- Led and supported the development of the integration of safety into the design, and preparation of safety basis and design documentation for several major design projects, e.g., CMRR, TRU Waste Facility, DVRS, RLWTF, Rad/NucCTEC.
- Develop the NNSA LASO Project Management Procedure/Guidance on Integration of Safety into Design.
- Supported the development of DOE-STD-1189 “*Integration of Safety into Design Process*”.
- Supported the development of the implementation guide for DOE O 420.1 (General Design Criteria, i.e., DOE G 420.1-1).
- Supported design safety evaluations, along with integrating safety into the design for multiple nuclear and non-nuclear facilities and operations throughout the DOE complex (see list provided). This includes the development and review of design and SB documentation (e.g., CDRs, F&ORs, PHA, PDSA).
- Author of the General Guidance for the Design of High-Hazard Nuclear (Non-Reactor) Facilities at Rocky Flats Plant (1989).

Training

- Supported the development and/or taught courses on quantitative risk analysis, consequence modeling, fire modeling, SB documentation preparation/review (DOE-STD-3009, 10CFR830), criticality safety, technical safety requirements, human reliability in the SAR and TSR process, technical specifications for BWRs, conduct of operations, design of DOE nuclear facilities, and nuclear explosive facilities/operations overview at Pantex (NSTE-276) for DOE, DOE contractors, and the nuclear power industry
- Taught high-school, undergraduate/graduate school courses on risk analysis and engineering physics
- Supported the assessment of training courses, programs and qualifications to DOE Standards

Software Development and Modeling

- Has experience using over two-dozen computer codes and applying models in the areas of reliability analysis, fault/event tree analysis, dispersion and consequence analysis, human reliability, fire/explosion modeling, criticality/shielding, and uncertainty/sensitivity analysis (see list provided).
- Led evaluations of computer codes/models on fires, explosions, spills, in-facility transport, and consequence analysis for DOE.
- Experienced modeler (numerical analysis) and programmer (Fortran 77, C++) with formal training in software engineering.
- Supported hundreds of phenomenological modeling and risk analysis activities throughout the DOE complex and nuclear power plant industry

Waste and Environmental Services

P.O. Box 93065, Albuquerque, NM 87110
Phone (505) 883-0553, fax (505) 883-0588
Website: OMICRON.net or OMICRONSafetyRisk.com

**Major Course Training
(non-degree):**

- Computer programming:
Object Oriented Programming with C++, Mathematica for Engineers and Scientists
- Human Reliability Analyses:
THERP and ASAP
- Software Engineering:
Software requirements specification, QA/testing, modular design, object design development, computer programming, and languages (Fortran, C++, Visual C++[®]/Basic[®])
- Nuclear Explosive Safety (NES): (Courses) WR-708, NST-211, NST-204, NST-203, NST-210, NESSG, weapons effects, explosive safety manual, (programs) W56, W69, W62, W76, W79, W88, and Master Studies, and other NES courses.
- Phenomenological Modeling:
Blast Analysis and Design, Consequence Modeling and Dose Reconstruction, Fire Modeling
- Reliability and PRA Courses:
FTA/ETA, Bayesian Models, Fuzzy Logic (basic/advanced), QRA/PRA courses, reliability analysis, Digraph and Markov models, human reliability courses
- Others:
Readiness Reviews, Plutonium metallurgy, Configuration Management/Change Control applications, ISM

- Supported DOE and waste facilities and operations at LANL, LLNL, NTS, WIPP, and Hanford FHI with SB documentation, operational implementation, assessments, and design.
- Supported the development and implementation of safety basis documentation for several ER and D&D projects at NTS, BNL.
- Supported development of DOE-STD-5506 and DOE/EM Limited Standard on hazard categorization.
- Performed environmental risk evaluations for environmental remediation sites, D&D facilities and operations

Homeland Security/Risk Assessment

- Supported the development of models to detect nuclear weapons proliferation (Bayesian Expert Systems/Network)
- Participated in several classified insider threat and sabotage evaluations for DOE and nuclear power plant facilities
- Supported all probabilistic or quantitative risk analysis (PRA/QRA) levels with analysis, and reviews.
- Prepared several risk/cost-benefit evaluations for nuclear facility upgrades and activities in the DOE complex
- Taught graduate course on risk and reliability analysis (Colorado School of Mines)
- Developed and taught numerous courses on quantitative risk analysis (QRA) including fault/event tree and human reliability analysis, dispersion/consequence modeling, fire modeling, and source terms to DOE and contractors

Other Areas of Technical Expertise

- Contributor to the DOE Defense Programs Safety Survey Report (developer of methods used)
- Submarine mission response - heat transfer and fluid flow modeling and maintenance optimization of heat exchangers.
- Safety classification/design evaluation of systems and equipment for BWRs
- System safety and reliability analysis of safety class mechanical systems for BWRs
- Supported probabilistic risk analysis (PRAs) for nuclear power industry.
- Co-author of the original and revised Rocky Flats Risk Assessment Guide (now the SARAH reports at various DOE sites)
- Supported the development of many of the current state-of-the-art methods used to support SB analysis in the DOE complex, including contributions on source terms (five factor formula), integration of phenomenological modeling into LPF calculations, dispersion/consequence modeling, contributor and independent reviewer of safety and risk analysis methodologies at Rocky Flats, Hanford, NTS, etc.