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September 16, 2003 (2:46PM)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

) Docket No. 72-22-ISFSI

PRIVATE FUEL STORAGE, LLC
(Independent Spent Fuel
Storage Installation)

) ASLBP No. 97-732-02-ISFSI

) September 5, 2003

STATE OF UTAH'S IDENTIFICATION OF EXPERTS FOR THE
CONTENTION UTAH K CONSEQUENCES PROCEEDING

At the present time, the State contemplates the following will be assisting it in the preparation of expert reports (filing date September 18, 2003), or preparation of testimony (filing date November 8, 2003) and appearance at the hearings scheduled for December 2 - 19, 2003. The information provided is consistent with General Interrogatories Nos. 3-5 that have been used during this proceeding since the beginning of discovery in 1999.

Name and Location:

Lt. Col. Hugh L. Horstman (U.S. Air Force, Ret.)
Layton, Utah

Subject matter of testimony:

Operational characteristics of F16s and review of crash reports as they relate to crash parameters.

Profession:

Pilot.

Employer:

Southwest Airlines.

Professional expertise:

See attached Resume.

Educational, Scientific
Experience, and

Professional Qualifications:

See attached Resume.

Publications

in the last ten years:

None available in the public domain.

Template = SECY-049

SECY-02

Testifying experience as expert in the last four years:

Private Fuel Storage, LLC licensing proceeding before the NRC 2002 evidentiary hearing.

Documents reviewed and/or relied upon:

All relevant expert reports filed by the State and PFS, and all documents referenced therein; relevant Utah K hearing documents; relevant Air Force documents.

Name and Location:

Lt. Col. Louis N. McDonald III (U.S. Air Force)
Layton, Utah

Subject matter of testimony:

Operational characteristics of F16s and related munitions and ordnance, including impact parameters.

Profession:

See attached Resume.

Employer:

See attached Resume.

Professional expertise:

See attached Resume.

Educational, Scientific Experience, and Professional Qualifications:

See attached Resume.

Publications in the last ten years:

See attached Resume.

Testifying experience as expert in the last four years:

None.

Documents reviewed and/or relied upon:

All relevant expert reports filed by the State and PFS, and all documents referenced therein; relevant Utah K hearing documents; relevant Air Force documents.

Name and Location:

Christoph M. Hoffmann, Ph.D.
Sami Kilic, Ph.D.
Metin Sozen, Ph.D.
West Lafayette, Indiana

Subject matter of testimony:

Modeling of F16 and ordnance impacts into SSCs and structural analysis relating to those impacts.

<u>Profession:</u>	See attached Resumes.
<u>Employer:</u>	See attached Resumes.
<u>Professional expertise:</u>	See attached Resumes.
<u>Educational, Scientific Experience, and Professional Qualifications:</u>	See attached Resumes.
<u>Publications in the last ten years:</u>	See attached Resumes.
<u>Testifying experience as expert in the last four years (Hoffman & Kilic):</u>	None.
<u>Testifying experience as expert in the last four years (Sozen):</u>	Guam: behavior of buildings in an earthquake in Guam. Orange County: seismic response of buildings in LA. London: earthquake damage in Peru.
<u>Documents reviewed and/or relied upon:</u>	All relevant expert reports filed by the State and PFS in this proceeding; relevant hearing documents; relevant Holtec license application documents and calculations; particular computer code information; site information; relevant Air Force and aircraft information; selected PFS and NRC Staff license application documents and other documents filed or generated in the PFS proceeding; relevant NRC or NRC contractor documents.
<u>Name and Location:</u>	Michael C. Thorne, Ph.D. Halifax, England Gordon R. Thompson, Ph.D. Cambridge, Massachusetts
<u>Subject matter of testimony:</u>	Consequences of radiation release and criticality relating to impacts into SSCs.
<u>Profession:</u>	See attached Resumes.

Employer (Thorne): Mike Thorne and Associates Limited.

Employer (Thompson): Institute for Resource & Security Studies; George Perkins Marsh Institute, Clark University.

Professional expertise: See attached Resumes

Educational, Scientific Experience, and Professional Qualifications: See attached Resumes

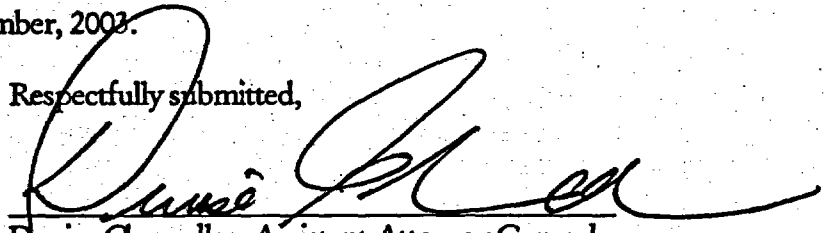
Publications in the last ten years: See attached Resumes

Testifying experience as expert in the last four years: See attached Resumes

Documents reviewed and/or relied upon: All relevant expert reports filed by the State and PFS in this proceeding; relevant hearing documents; relevant Holtec license application documents and calculations; particular computer code information; site information; relevant Air Force and aircraft information; selected PFS and NRC Staff license application documents and other documents filed or generated in the PFS proceeding; relevant NRC or NRC contractor documents.

DATED this 5th day of September, 2003.

Respectfully submitted,



Denise Chancellor, Assistant Attorney General
Fred G Nelson, Assistant Attorney General
Connie Nakahara, Special Assistant Attorney General
James R. Soper, Assistant Attorney General
Attorneys for State of Utah
Utah Attorney General's Office
160 East 300 South, 5th Floor, P.O. Box 140873
Salt Lake City, Utah 84114-0873
Telephone: (801) 366-0286, Fax: (801) 366-0292

CERTIFICATE OF SERVICE

I hereby certify that a copy of STATE OF UTAH'S IDENTIFICATION OF
EXPERTS FOR THE CONTENTION UTAH K CONSEQUENCES PROCEEDING
was served on the persons listed below by electronic mail (unless otherwise noted) with
conforming copies by United States mail first class, this 5th day of September, 2003:

Rulemaking & Adjudication Staff
Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington D.C. 20555
E-mail: hearingdocket@nrc.gov
(original and two copies)

Michael C. Farrar, Chairman
Administrative Judge
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-Mail: mcf@nrc.gov

Dr. Jerry R. Kline
Administrative Judge
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, DC 20555
E-Mail: jrk2@nrc.gov
E-Mail: kjerry@verizon.net

Dr. Peter S. Lam
Administrative Judge
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, DC 20555
E-Mail: psl@nrc.gov

Sherwin E. Turk, Esq.
Catherine L. Marco, Esq.
Office of the General Counsel
Mail Stop - 0-15 B18
U.S. Nuclear Regulatory Commission
Washington, DC 20555
E-Mail: set@nrc.gov
E-Mail: clm@nrc.gov
E-Mail: pfscase@nrc.gov

Jay E. Silberg, Esq.
Paul A. Gaukler, Esq.
Shaw Pittman, LLP
2300 N Street, N. W.
Washington, DC 20037-8007
E-Mail: Jay_Silberg@shawpittman.com
E-Mail: paul_gaukler@shawpittman.com

John Paul Kennedy, Sr., Esq.
David W. Tufts
Durham Jones & Pinegar
111 East Broadway, Suite 900
Salt Lake City, Utah 84111
E-Mail: dtufts@djplaw.com

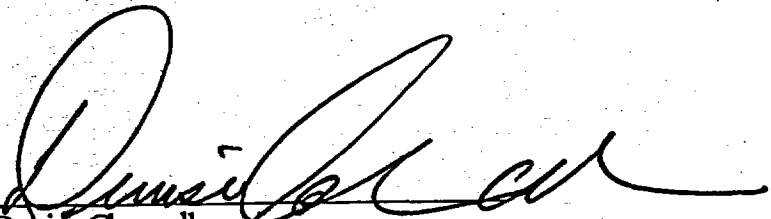
Joro Walker, Esq.
Land and Water Fund of the Rockies
1473 South 1100 East, Suite F
Salt Lake City, Utah 84105
E-Mail: utah@lawfund.org
(electronic copy only)

Larry EchoHawk
Paul C. EchoHawk
Mark A. EchoHawk
EchoHawk Law Offices
151 North 4th Street, Suite A
P.O. Box 6119
Pocatello, Idaho 83205-6119
E-mail: paul@echohawk.com
(*electronic copy only*)

Tim Vollmann
3301-R Coors Road N.W. # 302
Albuquerque, NM 87120
E-mail: tvollmann@hotmail.com

James M. Cutchin
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
E-Mail: jmc3@nrc.gov
(*electronic copy only*)

Office of the Commission Appellate
Adjudication
Mail Stop: O14-G-15
U. S. Nuclear Regulatory Commission
Washington, DC 20555



Denise Chancellor
Assistant Attorney General
State of Utah

Resume

**Lt. Col. Hugh L. Horstman
(U.S. Air Force, ret.)**

June 1999 – Present: Pilot, Southwest Airlines.

Pilots a Boeing 737 aircraft for Southwest Airlines. Responsible for the safe air travel of over 6,000 people per month throughout the United States.

1996 - : Adjunct Professor, Embry Riddle Aeronautical University.

Instructor of master's degree candidate students in aviation.

October 1997 – June 1999: Deputy Commander, 388th Operations Group, Hill AFB UT.
Commanded the F-16 Operations Group and 1,500 personnel. Responsible for all flying and maintenance of 60 F-16C aircraft and resources valued at \$4 billion, flying over 15,000 sorties per year. F-16 Instructor Pilot.

Accomplishments: Rated the number one Lieutenant Colonel in the entire Fighter Wing. Achieved the highest aircraft readiness rates in Air Combat Command at 21% less cost than any other wing. Directed 12 major aircraft deployments to Bosnia, Kosovo, and Iraq.

June 1996 – September 1997: Deputy Commander, 52nd Support Group, Spangdahlem AB, Germany.

Commanded the Support Group and over 2,000 personnel. Responsible for maintaining the entire base infrastructure and environment, including facilities, security forces, communications capabilities, disaster response, housing, fire fighting and rescue, retail sales and personnel services.

Accomplishments: Rated more productive than any other Lieutenant Colonel in the wing. Controlled and directed allocation of a \$75 million operations and maintenance budget for the base and provided oversight for \$240 million worth of ongoing projects resulting in the base winning the USAF 1997 Installation of the year award. Commanded the United States Air Forces in Europe first Air Expeditionary Squadron with both F-16 and F-15 aircraft.

June 1995 – June 1996: Chief, 52nd Fighter Wing Readiness, Spangdahlem AB, Germany.

Designed and evaluated all base level exercises in preparation for real world contingencies, NATO Tactical Evaluations, Operational Readiness Inspections, Nuclear Surety Inspections. Conducted routine natural disaster and emergency response exercises. F-16 instructor pilot.

Accomplishments: Rated in the top 1% of the Air Force. Orchestrated an evaluation of 25 squadrons, 5,000 personnel, 72 aircraft for NATO, resulting in the first ever "Outstanding" grade given by NATO for mobilization, preparation and combat employment. Personally selected to lead an operational inspection of Operation Provide Comfort after the US friendly fire helicopter shootdown.

June 1993 - June 1995: Assistant operations Officer, 52 Fighter Wing, Spangdahlem Air base Germany

Description: Maintained readiness of a combat fighter squadron. Planned, organized and managed the squadrons utilization of 4800 sorties and 6,000 flying hours per year. F-16C instructor pilot and wing supervisor of flying (mission was both conventional and nuclear weapons employment).

May 1991 - May 1992: Executive Officer to the Chief of Staff of Plans, Headquarters Air Combat Command, Langley AFB, VA.

Managed the administrative process for headquarters directorate - responsible for all long range strategic planning for Air Combat Command.

August 1989 - May 1991: Aircraft program manager, Headquarters Tactical Air Command, Langley AFB, VA.

Developed relocation plans consistent with base closures and procured funding for all aircraft modifications.

September 1985 - August 1989: Flight Commander, 20th Fighter Wing, RAF Upper Heyford United Kingdom.

Responsible for leadership and training 14 of combat crews (pilots and navigators), F-111 instructor pilot (mission was both conventional and nuclear weapons employment).

Flying History

B-52: Over 1,000 hours (1979 - 1983) Navigator and Instructor Navigator

F-111: Over 1,000 hours (1985 - 1989) Instructor Pilot

F-16: Over 800 hours (1992 - 1999) Instructor Pilot

Miscellaneous aircraft: 700 hours as pilot in command

Education

August 1992 - June 1993, Air Command and Staff College, Montgomery, Alabama (diploma earned). Field of study: military history, leadership and management.

1982, Master of Arts, business, Central Michigan University.

1978, Bachelor of Science, business finance, University of Southern California.

Louis N. McDonald III

Flight Qualifications **Airline Transport Pilot: Airplane Multi-Engine Land, Instrument**
Commercial Pilot, Airplane Single Engine Land; Private Pilot, Glider
FAA First Class Medical; Restricted Radiotelephone Operator Permit
Flight Engineer (FEx) Written

Flight Experience **Total Flight Time: 4457**
Pilot-In-Command: 4260 **Night: 821** **USAF Instructor: 779**
Turbojet: 3373 **Instrument: 654** **USAF Evaluator: 84**
Multi-Engine: 1092 **Sim Inst: 323** **Combat: 124**

Employment

5/02 – Present **USAF Lieutenant Colonel** **388th Fighter Wing, Hill AFB UT**
Chief, Wing Exercises, Detachment Commander of Alert Operations, Special Assistant to Operations Group Commander, and Assistant Director of Operations, 34th FS. F-16 C/D Instructor Pilot. Supervise all mobility and combat readiness exercises, air defense alert operations, and squadron flying operations.

4/01 – 4/02 **USAF Lieutenant Colonel** **8th Fighter Wing, Kunsan AB, Republic of Korea**
35th Fighter Squadron Director of Operations, and wing Chief of Standardization and Evaluation. F-16 C/D Instructor Pilot and Flight Evaluator. In charge of every aspect of squadron flight operations for 36 assigned and attached F-16 pilots. As Chief of Standardization/Evaluation, I was the wing's chief pilot evaluator responsible for assessing the flying proficiency and combat readiness of more than 100 pilots.

7/00 – 4/01 **USAF Lieutenant Colonel** **388th Fighter Wing, Hill AFB, UT**
Chief, Current Operations and F-16 C/D Instructor Pilot. Responsible for wing flying hour program management and execution.

9/97 – 6/00 **USAF Major/Lieutenant Colonel** **Air Land Sea Application Center, Langley AFB, VA**
Joint Service action officer, researching, authoring, and publishing Multiservice Tactics, Techniques, and Procedures publications, used by all services to resolve interoperability problems and enhance operations.

7/96 – 9/97 **USAF Major** **Air Command and Staff College, Maxwell AFB, AL**
Student, Distinguished Graduate **Armed Forces Staff College, Norfolk, VA.**

3/94 – 7/96 **USAF Captain/Major** **51st Fighter Wing, Osan AB, Republic of Korea**
F-16 Instructor Pilot and Flight Evaluator. Assistant Director of Operations, 36th Fighter Squadron, Flight Commander, and Chief of Squadron Programming.

7/92 – 3/94 **USAF Captain** **Det. 1, 57th Fighter Weapons Wing, Holloman AFB NM**
F-117 Operational Test and Evaluation Pilot, F-117 Instructor Pilot. Responsible for flight test and program management for F-117 software updates, hardware modifications, weapons improvements, and low-observable characteristic assessments.

1/90 – 7/92 **USAF Captain** **37th Tactical Fighter Wing, Tonopah Test Range, NV**
F-117A Instructor Pilot and Mission Commander. Awarded Distinguished Flying Cross, 3 Air Medals, 3 Aerial Achievement Medals. 124 combat hours in Desert Storm, including 8 missions to "downtown" Baghdad. Chief of Scheduling, Weapons, and Life Support.

10/82 – 1/90 **USAF Lieutenant/Captain** **Hill AFB, UT, Shaw AFB, SC, MacDill AFB, FL**
F-16 A/B/C/D Pilot, Flight Lead, Mission Commander, and Instructor Pilot.

Education **Master of Aeronautical Science (Honors Graduate) Embry-Riddle Aeronautical University, 1998**
Bachelor of Science, Physics, Carnegie-Mellon University, 1982

Military Training **Armed Forces Staff College, 1997; Air Command and Staff College, 1997 (Distinguished Graduate)**
Squadron Officer's School, 1987; Lead-In Fighter Training, 1984 (Distinguished Graduate)
Undergraduate Pilot Training, 1984 (Distinguished Graduate)

Security Clearance **Top Secret/SCI**

CHRISTOPH M. HOFFMANN

November 2001

EDUCATION

- 1968 Vordiplom (Mathematics), Universität Hamburg, West Germany
- 1970 M.A. (Mathematics), Indiana University, Bloomington, Indiana
- 1972 M.S. (Computer Science), University of Wisconsin, Madison
- 1974 Ph.D. (Computer Science), University of Wisconsin, Madison

PROFESSIONAL EXPERIENCE

- 1974 -- 1976 Research Assistant Professor of Computer Science,
University of Waterloo, Waterloo, Canada.
- 1976 - 1982 Assistant Professor of Computer Science, Purdue University.
- 1980 Gastprofessor für Informatik, Christian-Albrechts Universität,
Kiel, West Germany
- 1982 -- 1989 Associate Professor of Computer Science, Purdue University.
- 1984 -- 1986 Visiting Professor of Computer Science, Cornell University.
- 1989 -- Professor of Computer Science, Purdue University.

RESEARCH INTERESTS

Hoffmann's research is in geometric and solid modeling with applications in manufacturing. He also maintains interests in simulation and in computational science. Specifically, Hoffmann is exploring high-level generative geometry representations. The goal of the work is to establish a compilation paradigm in computer-aided design as a means for creating interoperable CAD systems that capture design intent. Geometric constraint solving is an integral part of this work. Other recent activities include extracting geometric structures from confocal imagery and mesh generation for scientific simulations and visualization.

Prior to Hoffmann's interest in geometric and solid modeling, he has done research in compiler construction, nonprocedural programming languages, graph isomorphism, coding theory, analysis of algorithms, and computational group theory and algebra.

EDITORIAL DUTIES

- Editor, SIAM Monographs in Science and Engineering; 1994--
- Editorial Board, ACM Transactions on Graphics; 1995--
- Editorial Board, Journal for Symbolic Computation; 1989--2003
- Editorial Board, Journal for Applicable Algebra; 1989--2002
- Editorial Board, Computer-Aided Geometric Design; 1990--
- Editorial Board, Computer Aided Design; 1996--
- Editorial Board, Intl. J. of Comp. Geometry and Applications; 1991--
- Editorial Board, Advances in Computational Mathematics; 1992--1995
- Editorial Board, Computer Graphics Forum; 1992--
- Editorial Board, CVGIP: Graphical Models and Image Processing; 1994--2003

RECENT PROFESSIONAL DUTIES

1. Program Committee, CSG 96, Winchester, England, 1996.
2. Program Committee, 2nd Eurographics Workshop on Implicit Surfaces, Eindhoven, Netherlands, 1996.
3. Program Committee, IFIP WG5.2 Workshop on Geometric Modeling in Computer-Aided Design, Washington DC, 1996.
4. Program Committee, CGI '96, Korea Advanced Inst of Sci and Technology, Korea, 1996.
5. Program Committee, Pacific Graphics '96, Taiwan, 1996.
6. Program Committee, Blaubeuren Workshop, Theory and Practice of Geometric Modeling, Germany, 1996.
7. Advisory Board, ARO-MURI program in computational geometry, 1996-1998. Consortia are Hopkins, Brown, Duke, and Penn, Stanford.
8. Review board, Ford Foundation postdoctoral fellowships, 1996.
9. Conference Chair, 4th Symposium on Solid Modeling, 1997.
10. Conference Chair, 13th ACM Symp. of Computational Geometry, applied track, 1997.
11. Program Committee, 14th ACM Symp. of Computational Geometry, 1998.
12. Program Committee, 3rd Conference on Constructive Solid Geometry (CSG 98), Winchester, England, 1998.
13. Advisory Board, Army Research Office, 1998.
14. Program Committee, ASME Design for Manufacturing Conference, 1998.
15. Program Committee, Pacific Graphics 1998.
16. Program Committee, International Conference on Visual Computing (ICVC'99), 1999.
17. Program Committee, Pacific Graphics '99.
18. Program Committee, Computer Graphics International, CGI '99.
19. Advisory Board, Army Research Office, 1999.
20. Program Committee, CGI '2000, Geneva, Switzerland, 2000.
21. Program Committee, GEO-7, Parma, Italy, 2000.
22. Program Committee, Solid Modeling 2001, Ann Arbor, MI, 2001.
23. Program Committee CGI 2001, Hong Kong, China, 2001.
24. Program Committee, Solid Modeling 2002, Saarbrücken, Germany, 2002.
25. Program Committee CGI '2002, Bedford, England, 2002.
26. Program Committee, Solid Modeling 2003, Seattle, Washington, 2003.
27. Program Committee, CGI '2003, Tokyo, Japan, 2003.

TECHNOLOGY TRANSFER

An Electronic Primer on Geometric Constraint Solving. World-wide-web Mosaic interactive book on geometric constraint solving. Includes several tours for diverse reader interests: casual browsing, tutorial on how to use constraint solvers, theoretical foundations, implementation issues. URL is <http://www.cs.purdue.edu/homes/cmh/electrobook/intro.html>. The work is joint with Pam Vermeer.

Advised the ARPA ENGEN project, a consortium effort led by Ford and SCRA/PDES Inc to define neutral product data standards that capture constraint-based design.

Advised the NCMS/RRM OCAI project (Open CAD Architecture for Interoperability), a consortium effort to define an object architecture for integrating CAD and downstream product

information processing.

Advised the Aerospace Industry Group on future directions in CAD.

RECENT ACCEPTED INVITATIONS TO CONFERENCES

1. IFIP Workshop on Product Design, Airlie Foundation, Washington DC, May 1996.
2. ARO Workshop on Applications of Computational Geometry, Philadelphia, May 1996.
3. Workshop on Computational Fluid Dynamics, Princeton, July 1996.
4. Pacific Graphics '96, Taiwan, July 1996.
5. Theory and Practice of Geometric Modeling, Blaubeuren, Germany, October 1996.
6. Open CAD Architecture for Interoperability, Natl. Center for Manufacturing Sciences, November 1996.
7. Integrating CAX Into Manufacturing, Design Engineering Technical Conference, Atlanta, GA, Sept. 1998.
8. Erep Project Summary and Status, CAD tools and Methods for System Design, Dagstuhl, Germany, November 1998.
9. Towards Robust Geometric Computations, Panel Discussion, Siggraph 1998.
10. Variational Constraints in 3D, Intl Conf on Shape Modeling and Applications, Aizu, Japan, 1999.
11. Interoperability and Process, GM Proving Grounds, July 1999.
12. Geometric Constraint Solving, Tutorial, Solid Modeling 99, Ann Arbor, MI, 1999.
13. Geometric Constraint Solving, Laredo Summer School, Laredo, Spain, September 1999.
14. Spatial Constraints on Lines, Automated Deduction in Geometry, Zürich, Switzerland, September 2000.
15. Geometry for Game Developers. Game Technology Seminar, San Francisco, February 2001.
16. Geometric Design. IMA, University of Minnesota, April 2001.
17. Asian Symposium on Computer Mathematics, Beijing, China, 2003.
18. MIT Workshop on Product Lifecycle Management, Boston, 2003

BOOKS

1. *Group Theoretic Algorithms and Graph Isomorphism*, Springer Lecture Notes in Computer Science, Nr.136, 1982; 311 pages.
2. *Geometric and Solid Modeling, An Introduction*, Morgan Kaufmann, San Mateo, Cal., 1989; 340 pages.
3. *Issues in Robotics and Nonlinear Geometry*, JAI Press; 1992, 270 pages.

BOOK CHAPTERS

1. "Algebraic and Numerical Techniques for CAGD," in *Computations of Curves and Surfaces*, W. Dahmen, M. Gasca, C. Micchelli, eds., NATO ASI Series C, Vol. 307, Kluwer Academic, London 1990, 499-528.
2. "Fundamental Techniques Geometric and Solid Modeling," in *Advances in Control and Dynamics*, Vol. 48, C.T. Leondes, ed., Academic Press, 1992, 101-165; (with

G. Vaneczek).

3. "Computer Vision, Descriptive Geometry and Classical Mechanics," in *Computer Graphics and Mathematics*, B. Falcidieno, I. Hermann and C. Pienovi, eds, Springer Verlag, Eurographics Series, 1992, 229-244.
4. "Erep, An Editable High-Level Representation for Geometric Design," in *Geometric Modeling for Product Realization*, P. Wilson, M. Wozny, M. Pratt, eds., North Holland, 1993, 129-164.
5. "Constrained Surface Computations and Applications in Geometric Modeling," in *Computational Geometry*, A. Conte, V. Demichelis, F. Fontanella, I. Galligiani, eds., World Scientific, London, 1993; 176-201.
6. "On the Separability Problem of Real Functions and Its Significance in Solid Modeling," in *Computational Algebra*, K. Fischer, P. Loustaunau, J. Shapiro, E. Green, and D. Farkas, eds., Marcel Dekker, Lecture Notes in Pure and Applied Math. 151, 1993; 191-204.
7. "Geometric Constraint Solving in R^2 and R^3 ," in *Computing in Euclidean Geometry*, second edition, D. Z. Du and F. Hwang, eds., World Scientific Publishing, 1995, 266-298; (with P. Vermeer).
8. "Geometric Approaches to Mesh Generation," in *Modeling, Mesh Generation, and Adaptive Numerical Methods for Partial Differential Equations*, I. Babuska, J. Flaherty, W. Henshaw, J. Hopcroft, J. Olinger, T. Tezduyar, eds., IMA Volumes in Mathematics and its Applications, Vol 75, Springer Verlag, 1995; 31-52.
9. "Solid Modeling," in *CRC Handbook on Discrete and Computational Geometry*, J.E. Goodman and J. O'Rourke, ed., CRC Press, Boca Raton, FL, 863-880, July 1997.
10. "Geometric Constraint Decomposition." In *Geometric Constraint Solving and Applications*, B. Brüderlin and D. Roller, eds., Springer Verlag, 1998, 170-195; (with A. Lomonosov and M. Sitharam).

REFEREED JOURNAL AND CONFERENCE PUBLICATIONS

1. "A Completeness Theorem about Straight-Line Programs with Structured Variables," *JACM* 23, 1976, 203-220; (with L. Landweber)
2. "Design and Correctness of a Compiler for a Nonprocedural Language," *Acta Informatica* 9, 1978, 217-241.
3. "Semantic Properties of Lucid's Compute Clause and its Compilation," *Acta Informatica* 13, 1980, 9-20.
4. "An Interpreter Generator Using Tree Pattern Matching," *6th ACM Symp. Princ. of Progr. Lang.*, 1979, 169-179; (with M. O'Donnell)
5. "Pattern Matching in Trees," *J. ACM* 29, 1982, 68-95; (with M. O'Donnell)

6. "Programming with Equations," *ACM Trans. on Progr. Lang. and Systems* 4, 1982, 96-112; (with M. O'Donnell)
7. "Testing Isomorphism of Cone Graphs," *ACM Symp. Thy. of Computing*, 1980, 244-251.
8. "Subcomplete Generalizations of Graph Isomorphism," *J. Comp. Sys. Sci.* 23, 1982, 332-359.
9. "An $O(n^3)$ Isomorphism Test for Trivalent Graphs, or, Solving n Subproblems for the Price of One," *J. ACM* 34, 1987, 513-531; (with Z. Galil, E. Luks, C. Schnorr and A. Weber)
10. "Implementation of an Interpreter for Abstract Equations," *Software Practice and Experience* 15, 1985, 1185-1204. (with M. O'Donnell)
11. "Automatic Surface Generation in Computer Aided Design," *The Visual Computer* 1, 1985, 92-100; (with J. Hopcroft)
12. "Quadratic Blending Surfaces," *Computer Aided Design* 18, 1986, 301-307. (with J. Hopcroft)
13. "The Potential Method for Blending Surfaces and Corners," in *Geometric Modeling*, G. Farin, ed., SIAM, 1987, 347-365; (with J. Hopcroft)
14. "Simulation of Physical Systems from Geometric Models," *IEEE Journal on Robotics and Automation* RA-3, 1987, 194-206; (with J. Hopcroft)
15. "Geometric Ambiguities in Boundary Representations," *Computer Aided Design* 19, 1987, 141-147; (with J. Hopcroft)
16. "Projective Blending Surfaces," *Artificial Intelligence* 37, 1988, 357-376; (with J. Hopcroft)
17. "Towards Implementing Robust Geometric Computations," *5th ACM Symp. Comp. Geometry*, Urbana, Ill., 1988, 106-117; (with J. Hopcroft and M. Karasick)
18. "Tracing Surface Intersections," *Computer-Aided Geometric Design* 5, 1988, 285-307; (with C. Bajaj, J. Hopcroft, and R. Lynch)
19. "The Problems of Accuracy and Robustness in Geometric Computation," *IEEE Computer* 22, 1989, 31-42.
20. "Local Implicit Approximations of Curves and Surfaces," *ACM Trans. on Graphics* 8, 1989, 298-325; (with J.-H. Chuang)
21. "Robust Boolean Operations on Polyhedral Solids," *IEEE Trans. Graphics* 9, 1989, 50-59; (with J. Hopcroft and M. Karasick)
22. "On the Geometry of Dupin Cyclides," *The Visual Computer* 5, 1989, 277-290; (with V. Chandru and D. Dutta)

23. "Variable Radius Blending Using Dupin Cyclides," *Geometric Modeling for Product Engineering*, K. Preiss, J. Turner, M. Wozny, eds., North Holland, 1990, 39-58; (with V. Chandru and D. Dutta)
24. "A Dimensionality Paradigm for Surface Interrogations," *Computer-Aided Geometric Design* 7, 1990, 517-532.
25. "Some Techniques for Visualizing Surfaces in Four-Dimensional Space," *Computer Aided Design* 23, 1991, 83-91; (with J. Zhou).
26. "Eliminating Extraneous Solutions in Curve and Surface Operations," *Intl. J. Comp. Geometry Applic.* 1, 1991, 47-66; (with P. Vermeer)
27. "Explicit Faber Polynomials on Circular Sectors," *Mathematics of Computation* 58, 1992, 241-253. (With Karin Gatermann and Gerhard Opfer).
28. "Curvature Computations on Surfaces in n Space," *Mathematical Modelling and Numerical Analysis* 26, 1992, 95-112; (w. Chuang).
29. "On the Skeleton of Simple CSG Objects," *Trans. ASME* 115, 1993, 87-94; (with D. Dutta).
30. "Validity Determination for MAT Surface Representation," *6th IMA Conference on Mathematics of Surfaces*, Edinburgh, Sep 1994; (with P. Vermeer)
31. "Design Compilation for Feature-Based, Constraint-Based CAD," *3rd ACM Symposium on Solid Modeling*, Salt Lake City, May 1995
32. "A Geometric Constraint Solver," *CAD* 27, 1995, 487-501; (with W. Bouma, I. Fudos, J Cai, W. Paige).
33. "A Spatial Constraint Problem," *Computational Kinematics '95*, J.-P. Merlet and B. Ravani, eds., Kluwer Academic Publ., 1995, 83-92; (with P. Vermeer).
34. "Geometric Constraints for CAGD," *Mathematical Methods for Curves and Surfaces*, M. Daehlen, T. Lyche, L. Schumaker, eds., Vanderbilt University Press, 1995, 237-254; (with J. Peters).
35. "Towards Feature Attachment," *CAD* 27, 1995, 695-702; (with X. Chen).
36. "On Editability of Feature Based Design," *CAD* 27, 1995, 905-914; (with X. Chen).
37. "Generic Naming in Generative, Constraint-Based Design," *CAD* 28, 1996, 17-26; (with V. Capoyleas and X. Chen)
38. "Constraint-Based Parametric Conics for CAD," *CAD* 28, 1996, 91-100; (with I. Fudos).
39. "Correctness Proof of a Geometric Constraint Solver," *Intl J Comp Geometry and Applic* 6, 1996, 405-420; (with I. Fudos).

40. "Symbolic Constraints in Geometric Constraint Solving," *J for Symbolic Computation* 23, 1997, 287-300; (with R. Joan-Arinyo)
41. "A graph-constructive approach to solving systems of geometric constraints," *ACM Trans on Graphics* 16, 1997, 179-216; (with I. Fudos).
42. "Finding Solvable Subsets of Constraint Graphs," Springer LNCS 1330, G. Smolka, ed., 1997, 463-477; (with A. Lomonosov and M. Sitharam).
43. "On user-defined features," *CAD* 30, 1998, 321-332; (with R. Joan-Arinyo).
44. "CAD and the Product Master Model," *CAD* 30, 1998, 905-919; (with R. Joan-Arinyo).
45. "Making complex, multidimensional battlefield information intuitive." *Proceedings of the 21st Army Science Conference*, Univ of Maryland, Baltimore, 1998; (with P. Emmerman, J. Walrath, and R. Winkler, Y. Kim).
46. "A Framework for Object Modeling," *CAD* 31, 1999, 541-556; (with V. Kumar, D. Burns, and D. Dutta).
47. "Distributed Maintenance of Multiple Product Views," *CAD* 32, 2000, 421-432; (with R. Joan-Arinyo).
48. "A Systematic Framework for Solving Geometric Constraints Analytically," *JSC* 30, 2000, 493-520; (with C. Durand).
49. C. Hoffmann, "Decomposition plans for geometric constraint problems, I. Performance Measures for CAD." *JSC* 31, 2001, 367-408; (with A. Lomonosov and M. Sitharam).
50. "Decomposition plans for geometric constraint problems, II. New Algorithms." *JSC* 31, 2001, 409-428; (with A. Lomonosov and M. Sitharam).
51. "Robustness in Geometric Computations," *JCISE* 1, 2001, 143-155.
52. "Towards valid parametric CAD models," *CAD* 33, 2001, 81-90; (with K.-J. Kim).
53. "Variable-Radius Circles in Cluster Merging, Part I: Translational Clusters," *CAD* 34, 2002, in press. (with C.-S. Chiang).
54. "Variable-Radius Circles in Cluster Merging, Part II: Rotational Clusters," *CAD* 34, 2002, in press. (with C.-S. Chiang).
55. "Solving Spatial Geometric Constraint Configurations with Locus Intersection," *Solid Modeling* 2002; (with X.-S. Gao and W. Yang).
56. "Producing High-Quality Visualizations of Large-Scale Simulations," *Visualization* 2003, Seattle; (with V. Popescu, S. Kilic, M. Sozen, and S. Meador).

INVITED CONTRIBUTIONS

1. "Algorithms for Factorizing Semigroups," in *Combinatorial Algorithms on Words*, A. Apostolico and Z. Galil, eds., Springer NATO ASI Series F-12, 1984, 59-83; (with R. Capocelli)
2. "A Note on Unique Decipherability," *11th Symp. Math. Found. Comp. Sci.*, Prague, 1984, Springer Lect. Notes in Comp. Sci. 176, 50-63.
3. "Algebraic Curves," in *Mathematical Aspects of Scientific Software*, J. Rice, ed., IMA Volumes in Math. Applic., Springer Verlag, 1988, 101-122
4. "Model Generation and Modification for Dynamic Systems from Geometric Data," in *CAD Based Programming for Sensory Robots*, B. Ravani, ed., Springer NATO ASI Series F-50, 481-492, 1988; (with J. Hopcroft)
5. "How to Construct the Skeleton of CSG Objects," *Proc. 4th IMA Conf. Math. of Surfaces*, Oxford University Press, 1991.
6. "How to Compute Offsets Without Self-Intersection," *Proc. SPIE Conf. Curves and Surfaces in Computer Vision and Graphics*, Intl. Soc. for Optical Engr., Vol 1610, 1991, 76-87, (with C.-S. Chiang and R. Lynch).
7. "Modeling the DARPA Diesel Engine in Pro/Engineer," *Manufacturing, Engineering, Design, Automation*, DARPA Stanford Workshop, June 1992, 631-639.
8. "On Projections in Geometric Design," *Proc 1992 Intl Workshop on Mathematics Mechanization*, Beijing, China, 168-180.
9. "Implicit Curves and Surfaces in CAGD," *IEEE Computer Graphics and Appl.* 13, Jan. 1993, 79-88.
10. "On the Semantics of Generative Geometry Representations," *Proc. 19th ASME Design Conference*, Vol. 2, 1993, 411-420.
11. "A Road Map to Solid Modeling," in *IEEE Trans. on Visualization and Computer Graphics* 2, 3-10; (with J. Rossignac).
12. "How Solid is Solid Modeling?" in *Applied Computational Geometry*, M. Lin and D. Manocha, eds., LNCS State-of-the-Art-Survey, Springer Verlag, 1996, 1-8.
13. C. Hoffmann, "EREP Project Overview," in *CAD Systems Development*, P. Brunet and D. Roller, eds., Springer Verlag 1997, 32-40.
14. "T. Várady, C.M. Hoffmann, "Vertex blending: problems and solutions," *Mathematical Methods for Curves and Surfaces*, Eds.: M. Daehlen, T. Lyche and L. L. Schumaker, Vanderbilt University Press, to appear 1998. with T. Várady.
15. C. Hoffmann, A. Lomonosov, M. Sitharam, "Geometric constraint decomposition," in *Geometric constraint solving and applications*, B. Brüderlin and D. Roller, eds., Springer Verlag 1998, 170-195.
16. "Variational Constraints in 3D," *Proc. Intl Conf on Shape Modeling and Applications*, 90-97, Aizu, Japan, 1999; (with C. Durand).
17. "On Spatial Constraint Solving Approaches," *Springer Lect. Notes in AI 2061, Automated Deduction in Geometry*, J. Richter-Gebert and D. Wang, eds., Springer Verlag, 2001, 1-15; (with B. Yuan).
18. "CADDAC: Multi-Client Collaborative Shape Design System with Server-Based Geometry Kernel," 2002 ASME Design Engr. Techn. Conf., DETC2002/CIE-34465, Montreal, Canada, pp.57; (with A. Agrawal and K. Ramani).
19. "CADDAC: Multi-Client Collaborative Shape Design System with Server-Based Geometry Kernel," *JCISE 3*, to appear; (with A. Agrawal, M. Babu and K. Ramani).
20. "Compliant Motion Constraints," *ASCM 2003*; (with W. Yang).

WORK IN PROGRESS

1. "Making Constraint Solvers more Usable," (with B. Yuan and M. Sitharam).
2. "Solid Modeling," to appear in CRC Handbook on *Discrete and Computational Geometry*, J. E. Goodman and J. O'Rourke, ed., CRC Press, Boca Raton, FL, second edition.
3. "Modeling ECM Fiber Formation: Structure Information Extracted by Analysis of 2D and 3D Image Sets," (with J. Wu, S. Voytik-Harbin, D. Filmer, B. Yuan, C.-S. Chiang, J. Sturgus, P. Robinson).

DISTINGUISHED LECTURES

Johns Hopkins University, Baltimore, November 1991

University of Utah, Salt Lake City, November 1993

Texas A&M University; upcoming.

CURRICULUM VITAE

SAMI KILIC

Purdue University
Computing Research Institute
West Lafayette, Indiana

RESEARCH AREAS

Applied mechanics, structural engineering, seismic engineering, dynamic response of reinforced concrete structures, fluid-structure interaction.

EDUCATION

Stanford University, Department of Civil & Environmental Engineering 1990-1997
John A. Blume Earthquake Engineering Center
Ph.D. in Civil Engineering,

University of California, Berkeley, Department of Civil Engineering 1989-1990
Structural Engineering and Mechanics of Materials
M.S. in Civil Engineering

Bogazici University, Department of Civil Engineering 1985-1989
B.S. in Civil Engineering

ACADEMIC APPOINTMENTS

Senior Research Scientist, Purdue University 2003-present
Computing Research Institute
West Lafayette, Indiana.

Research Associate, Purdue University 2002
School of Civil Engineering

Assistant Professor, Bogazici University 1997-2001
Department of Civil Engineering.

RESEARCH EXPERIENCE

Purdue University, West Lafayette, Indiana 2002

Simulation of the September 11 aircraft crash into the Pentagon building based on physical rules that govern the behavior of the aircraft and the reinforced concrete load carrying structure. Scientific model design of the simulation as part of a multi-disciplinary team consisting of Computer Science and Civil Engineering researchers. Partial funding provided by the National Science Foundation and the Army Research Office.

Stanford University, Stanford, California.

1990-1993

United States National Science Foundation, Grant BCS-89-01665 entitled "P-Delta Effect and Frame Stability in Seismic Response and Code Design". Ph.D. advisor: Professor Helmut Krawinkler.

SELECTED PUBLICATIONS

"An evaluation of the effect of the 17 August 1999 Kocaeli earthquake on two tall reinforced concrete chimneys", Kilic, Sami A., and Sozen, Mete A., *Structural Journal*, American Concrete Institute (ACI), vol. 100, no.3, pp. 357-364, 2003.

"Integrating modeling, simulation, and visualization", Hoffmann, C.; Popescu, V.; Kilic, S.; and Sozen, M., submitted to *Computers in Science & Engineering*, IEEE, 2003.

"Producing high-quality visualizations of large-scale simulations", Popescu, V.; Hoffmann, C.; Kilic, S.; and Sozen, M., Purdue University Computer Science Dept. Tech. Rep. 03-011, West Lafayette, Indiana, 2003.

"Non-linear response of the 115m Tupras refinery reinforced concrete stack subjected to the 1999 Kocaeli earthquake", Akinci, Onder and Kilic, Sami A., *CICIND Report*, International Committee on Industrial Chimneys (CICIND), September 2002.

"A preliminary analysis on the Tupras refinery stack collapse during the 17 August 1999 Kocaeli earthquake", Kilic, Sami A.; Moncarz, Piotr D.; and Noakowski, Piotr, *CICIND Report*, International Committee on Industrial Chimneys, March 2001.

"P-Delta effects in portal frames", Kilic, Sami A., and Krawinkler, Helmut, 11th European Conference on Earthquake Engineering, Paris, France, September 1998.

PROFESSIONAL MEMBERSHIPS

- American Society of Civil Engineers (ASCE), Reston, Virginia.
- Earthquake Engineering Research Institute (EERI), Oakland, California.
- Structural Eng. Assoc. of Northern California (SEAONC), San Francisco, California.
- International Committee on Industrial Chimneys (CICIND), Herts, England, U.K.
- Institute of Electrical and Electronics Engineers (IEEE).

BIOGRAPHICAL DATA

METE A. SOZEN

Education: B.S. in Civil Engineering, Robert College, Istanbul
 M.S. in Civil Engineering, University of Illinois, Urbana, IL
 Ph.D. in Civil Engineering, University of Illinois, Urbana IL

Positions Held

1957-1959 Assistant Professor of Civil Engineering, University of Illinois, Urbana, IL
 1959-1963 Associate Professor of Civil Engineering, University of Illinois, Urbana, IL
 1963-1994 Professor of Civil Engineering, University of Illinois, Urbana, IL
 1994-Present Kettelhut Distinguished Professor of Structural Engineering, Purdue Univ.

Professional Registration

Structural Engineer, State of Illinois

Professional Societies

Honorary Member: American Society of Civil Engineers
 American Concrete Institute
 Association of Turkish Engineers and Scientists

Honorary Memberships

U.S. National Academy of Engineering	1977
Royal Swedish Academy of Engineering Sciences	1980

Honorary Degrees

Bogazici University, Turkey	1988
Johann Pannonius University, Hungary	1998

Awards Received

A. Epstein Prize, University of Illinois	1961
Research Prize, American Society of Civil Engineers	1963
R. C. Reese Award, American Society of Civil Engineers	1971
Moisseiff Award, American Society of Civil Engineers	1972
Kelly Award, American Concrete Institute	1975
Bloem Award, American Concrete Institute	1985
D. C. Drucker Award, University of Illinois	1986
Howard Award, American Society of Civil Engineers	1987

Boase Award, Reinforced Concrete Research Council	1988
Lindau Award, American Concrete Institute	1993
R. C. Reese Award, American Society of Civil Engineers	1994
Parlar Award for Science & Technology, Middle East Technical University	1995
ASCE General Electric Senior Research Award	1997
Honorary Chapter Member, Chi Epsilon	1997
Illinois Section Structural Group Lifetime Achievement Award	1998
Outstanding Paper Award, ASCE Council on Forensic Engineering	1998
Earthquake Engineering Research Institute, Distinguished Lecturer	2002
John Parmer Award, Structural Engineers Association of Illinois	2003

Special Lectures

Kavanaugh Memorial Lecture	Penn State University	1995
Sehlin Memorial Lecture	University of Minnesota	1995
Ferguson Memorial Lecture	American Concrete Institute	1995
Ryon Memorial Lecture	Rice University	1996
Degenkolb Memorial Lecture	SEAOC, San Francisco	1997
Moran Distinguished Lecture	Notre Dame University	1997
Noel Nathan Memorial Lecture	University of British Columbia	2002

Research Focus

Behavior of building structures, bridges, and dams subjected to static and dynamic loads.

Professional Experience

M. A. Sozen has served on a four-person committee of the Veterans Administration to develop the VA structural criteria for earthquake and fire resistant design (1971). He has served as Chair (1977-1983) of the American Concrete Institute subcommittee on seismic design to develop the first set of regulations for earthquake-resistant design. He was a member of the committee that produced ATC3 Model Code for Earthquake-Resistant Design (1978). He has been a consultant to code-writing bodies in Algeria, Colombia, Nicaragua, Romania, El Salvador, Turkey, and Venezuela. Through his research and professional committee activities, he has contributed to the development of current design procedures used in the ACI Building Code and the European Concrete Committee model code for flexural and shear strength of prestressed concrete, reinforced concrete floor slabs, and bond.

M. Sozen has served as the chair of the U. S. National Academy of Sciences on Natural Disasters and on Assessment of Blast-Effects research. He is currently chair of the Joint Technical Coordination Committee of the U. S. National Science Foundation and the Japanese Ministry of Education on the Urban Earthquake Hazard.

He has documented and analyzed damage caused by the earthquakes of Skopje (1963), Alaska (1964), Caracas (1967), San Fernando (1971), Managua (1972), Guatemala

(1974), Mexico City (1985), Sendai (1978), Chile (1985), San Salvador (1986), Loma Prieta (1989), Turkey-Erzincan, (1992), Northridge (1994), Turkey-Marmara (1999), and Turkey-Duzce (1999).

As a member of the six-person committee of the American Society of Civil Engineers, he is currently working on the analysis of the damage to the Pentagon building on 11 September 2001. He is also involved in an experimental research project related to impact of projectiles on reinforced concrete walls,

He has worked as an intermittent consultant on special projects concerned with structural safety and damage to the following organizations:

Advisory Committee on Reactor Safeguards, Nuclear Regulatory Commission
 (Washington, DC)
 Applied Technology Council (Menlo Park, CA)
 ARPE (San Juan, P.R.)
 Avesipe (Caracas)
 Bechtel (Ann Arbor, MI)
 Brookhaven National Laboratory (NY)
 Bureau of Reclamation, Denver, CO
 C. F. Murphy and Associates (Chicago, IL)
 CRSI (Chicago, IL)
 Consumers Power (Jackson, MI)
 Dominican Power Corp. (Santo Domingo)
 DuPont Co.
 EBASCO (New York, NY)
 Edelca (Caracas)
 Electric Power Research Institute (Palo Alto, CA)
 ERICO (Cleveland, OH)
 Gavlin and Reckers (Chicago, IL)
 General Cement (Tampa, FL)
 Gomez y Associates (Bogota, Colombia)
 Harza (Chicago, IL)
 I. Cantor (New York, NY)
 Iatasa (Buenos Aires)
 J. A. Parkin (Toronto, Canada)
 Los Alamos National Laboratory (Los Alamos, CA)
 Midtconsult Aps (Copenhagen, Denmark)
 MOP (Managua)
 Nuclear Regulatory Commission (Washington, DC)
 Pacific Gas and Electric Co. (San Francisco, CA)
 Phillips Petroleum (Paris)
 Portland Cement Association (Skokie, IL)
 Raymond Concrete Pile Co. (New York, NY)
 Skidmore, Owings and Merrill (Chicago, IL)
 SANDIA National Laboratories (Albuquerque, NM)

Southern California Edison
 Stanford Research Institute (Palo Alto, CA)
 TAMS (New York, NY)
 United Nations Development Corporation (Paris)
 U.S. Army Engineers Waterways Experiment Station (Vicksburg, MS)
 U.S. Department of State, Foreign Buildings Office (Washington, DC)
 C. E. Walker Associates (Kalamazoo, MI)
 Westinghouse, Savannah River Site (Aiken, SC)
 Wiss, Janney, and Elstner (Emeryville, CA)

Selected Publications

1. M. A. Sozen, E. M. Zwoyer and C. P. Siess, "Strength in Shear of Beams without Web Reinforcement," Engineering Exp. Station Bulletin No. 452, University of Illinois, Urbana, 1959.
2. J. Warwaruk, M.A. Sozen and C. P. Siess, "Strength and Behavior in Flexure of Prestressed Concrete Beams," Eng. Exp. Station Bulletin No. 464, University of Illinois, Urbana, 1962.
3. M. A. Sozen, "Multiple-Panel Reinforced Concrete Floor Slabs: Design Methods-Their Evolution an Comparison," Journal of the American Concrete Institute, No. 8, August 1963, pp. 99-1028.
4. H.E.H. Roy and M. A. Sozen, "Ductility of Concrete," American Society of Civil Engineers special publication Flexural Mechanics of Concrete, 1965, pp. 213-236.
5. M. D. Vanderbilt, M. A. Sozen, and C. P. Siess, "Deflections of Multiple-Panel Reinforced Concrete Floor Slabs," Journal of the Structural Division, Proceedings of the ASCE, V. 91, No. ST4, August 1965, pp. 77-101.
6. R. J. Lenschow and M. A. Sozen, "A Yield Criterion for Reinforced Concrete Slabs," Journal of the American Concrete Institute, V. 64, No. 5, May 1967, pp. 266-273.
7. W. G. Corley and M. A. Sozen, "Time-Dependent Deflections of Reinforced Concrete Beams," Journal of the American Concrete Institute, V. 63, No. 3, March 1966, pp. 373-386.
8. W. A. Welsh and M. A. Sozen, "Analysis and Control of Anchorage-Zone Cracking in Prestressed Concrete," University of Illinois, Engineering Experiment Station Bulletin No. 497, V. 66, Number 17, 1968, 77 p.
9. S. O. Olesen, M. A. Sozen, and C. P. Siess, "Strength in Shear of Prestressed Concrete Beams with Web Reinforcement," University of Illinois, Engineering Experiment Station Bulletin No. 493, V. 64, Number 134, 1967, 46 p.

10. M. F. Stocker and M. A. Sozen, "Bond Characteristics of Strand," Eng. Exp. Station, Bulletin No. 503, University of Illinois, Urbana, 1970.
11. B. I. Karlsson and M. A. Sozen, "Prestressed Concrete Deep Slabs with Openings," Nuclear Engineering and Design, 24, 1973, pp. 1-11.

12. S. Otani and M. A. Sozen, "Simulated Earthquake Tests of Reinforced Concrete Frames," Journal of the Structural Division, ASCE, ST3, March 1974, pp. 687-701.
13. M. A. Sozen, "Hysteresis in Structural Elements," Applied Mechanics in Earthquake Engineering, ASME, AMD, V. 8, November 1974, pp. 63-73.
14. J. K. Wight and M. A. Sozen, "Strength Decay of Reinforced Concrete Columns under Shear Reversals," Journal of the Structural Division, ASCE, ST5, May 1975, pp. 1053-1065.
15. P. Gulkan and M. A. Sozen, "Inelastic Response of Reinforced Concrete Structures to Earthquake Motions," Journal of the American Concrete Institute, V. 71, No. 12, December 1974, pp. 104-126.
16. A. Shibata and M. A. Sozen, "Substitute Structure Method for Seismic Design in Reinforced Concrete," Journal of the Structural Division, ST1, January 1976, pp. 1-18.
17. M. A. Sozen and H. Aoyama, "Impact of Laboratory and Field Observations on Earthquake-Resistant Design of Reinforced Concrete Structures," Structural and Geotechnical Mechanics, Prentice-Hall, 1977, pp. 305-333.
18. M. A. Sozen, "Earthquake Simulation in the Laboratory," Proceedings, Earthquake Resistant Constructions, Berkeley, 1978, pp. 1606-1630.
19. M. A. Sozen, "Earthquake Response of R/C Buildings with a View to Drift Control," Proceedings, 7th World Conference on Earthquake Engineering, Istanbul, September 1980.
20. M. Saiidi and M. A. Sozen, "Simple Nonlinear Seismic Analysis of Reinforced Concrete Structures," Journal of the Structural Division, Proceedings of the American Society of Civil Engineers, V. 107, N. ST5, May 1981, pp. 937-962.
21. M. A. Sozen, "Lateral Drift of Reinforced Concrete Structures Subjected to Strong Ground Motion," Bulletin of the New Zealand National Society for Earthquake Engineering, V. 16, No. 2, June 1983, pp. 107-122.
22. D. G. Morrison and M. A. Sozen, "Lateral-Load Tests of R/C Slab-Column Connections," Journal of Structural Engineering, American Society of Civil Engineers, V. 109, No. 11, November 1983, pp. 2698-2714.

23. K. Shimazaki and M. A. Sozen, "Seismic Drift of Reinforced Concrete Structures," Technical Research Report of Hazama-Gumi, Tokyo, 1984, pp. 145-166.
24. D. Wolfgram, D. Rothe, P. Wilson and M. Sozen, "Earthquake Simulation Tests of Three One-Tenth Scale Models," Earthquake Effects on Reinforced Concrete Structures, U.S.-Japan Research, American Concrete Institute, SP-84, 1985.
25. M. A. Sozen, "Toward A Behavior Based Design of Reinforced Concrete Frames to Resist Earthquakes," Proceedings, Ninth Congress of Turkish Society of Structural Engineers, November 1987, V. 1, pp. 1-45.
26. M. A. Sozen and J. Bariola, "Notional Behavior of Reinforced Concrete Frames in Earthquakes," Proceedings, Earthquake Engineering Research Institute, Mesa, Arizona, February 1988.
27. M. A. Sozen, "Earthquake Response of Buildings with Robust Walls," Proceedings, Fifth Chilean Conference on Earthquake Engineering, Santiago, Chile, August 1989.
28. M. A. Sozen, "A Frame of Reference," The Art and Science of Geotechnical Engineering: A volume honoring Ralph B. Peck, Prentice-Hall, 1989, pp. 240-247.
29. M. E. Kreger and M. A. Sozen, "Seismic Response of Imperial County Services Building in 1979," Journal of Structural Engineering, American Society of Civil Engineers, V. 115, No. 12, December 1989, pp. 3095-3111.
30. M. A. Sozen, "The Chilean Formula for Earthquake-Resistant Design of Medium-Rise Reinforced Concrete Structures," Proceedings, Turkish Association of Structural Engineers, Conference on Design Technology, V. 1, September 1989, pp. 283-314.
31. M. A. Sozen, "Deferring Payments: Management of the Earthquake Risk in Central United States," Proceedings, Workshop on Evaluation, Repair and Retrofit of Structures, UJNR, Washington, DC, May 1990.
32. L. E. Garcia, A. Sarria, and M. A. Sozen, "Observed Behavior Under Lateral Load of A Five Story Large Panel Precast Building and Its Mathematical Modeling," Proceedings, International Conference on Building with Load Bearing Concrete Walls in Seismic Zones, Association Francaise du Genie Parasismique, Paris, June 1991.
33. M. A. Sozen and J. J. Dragovich, "Experiments to Study Dynamic Torsional/Translational Response of Reinforced Concrete," Proceedings, National Science Foundation Meeting on Earthquake Engineering, Phoenix, Arizona, August 1991.
34. M. A. Sozen, P. Monteiro, J. P. Moehle, and H. T. Tang, "Effects of Cracking and Age on Stiffness of Reinforced Concrete Walls Resisting In-Plane Shear," Proceedings of

the Fourth Symposium on Nuclear Power Plant Structures, Equipment, and Piping, North Carolina State University, Raleigh, NC, December 1992, pp. 3.1-3.13.

35. M. O. Eberhard and M. A. Sozen, "Behavior-Based Method to Determine Design Shear in Earthquake-Resistant Walls," Journal of Structural Engineering, V. 119, No. 2, February 1993, pp. 619-640.

36. C. Konwinski, J. A. Ramirez, and M. A. Sozen, "Shear Strength of Reinforced Concrete Columns Subject to Seismic Loading," in Proceedings, National Seismic Conference on Bridges and Highways, San Diego, CA, Section 6C, 1995, pp. 1-11.

37. A. F. Hassan and M. A. Sozen, "Seismic Vulnerability Assessment of Low-Rise Buildings in Regions with Infrequent Earthquakes," ACI Structural Journal, V. 94, No. 1, January-February 1997, pp. 31-39.

38. M. A. Sozen, "Drift-Driven Design for Earthquake Resistance of Reinforced Concrete," Proceedings, The EERC-CUREe Symposium in Honor of Vitelmo V. Bertero, Berkeley, CA, Jan.-Feb., 1997

39. Mete A. Sozen, Charles H. Thornton, W. Gene Corley, and Paul F. Mlakar Sr., "The Oklahoma City Bombing: Structure and Failure Mechanisms of the Murrah Building," Journal of Performance of Constructed Facilities, V. 12, No. 3, August 1998, pp. 120-136.

40. P. Gulkan and M. Sozen, "Procedure for Determining Seismic Vulnerability of Building Structures," ACI Structural Journal, V. 96, No. 3, May-June 1999, pp. 336-342.

41. M. A. Sozen, "The Simplicity of Complexity," Proceedings, U. Ersoy Symposium on Structural Engineering, Ankara, July 1999.

42. M. A. Sozen, "Earthquake Resistance of Reinforced Concrete Building Structures," Proceedings, Mesa Symposium, Ankara, October 1999.

43. M. A. Sozen, "The Third Alternative for Proportioning of Earthquake-Resistant Buildings," Proceedings, International Workshop on the Taiwan 921 Earthquake, Taichung, December, 1999, 14 p.

44. S. Pujol, M. Sozen, and J. Ramirez, "Transverse Reinforcement for Columns of RC Frames to Resist Earthquakes," ASCE Journal of Structural Engineering, April 2000, V. 126, No. 4, pp. 461-466.

45. R. J. Frosch and M. A. Sozen, "Challenge for Civil Engineering-Autoadaptive Media," Structural Engineering & Mechanics, Vol. 10, No. 6, December 2000, pp. 651-655.

46. M. A. Sozen, "From Duzce to the City: A Prognostication of Probable Damage," Graeco-Turkish Symposium on Earthquake Engineering, Athens and Istanbul, January 2001.
47. M. A. Sozen, "As Simple As It Gets: The Anatolian Formula for Earthquake-Resistant Design," Proceedings, Turkish Structural Engineering Association Meeting, November 2001.
48. M. A. Sozen, "Measured ground shaking and observed damage: Do recent events confirm a direct connection?," Proceedings, U.S.-China Symposium, Beijing, 2001.
49. A. B. Matamoros and M. A. Sozen, "Drifts Limits of High-Strength Concrete Columns Subjected to Load Reversals," approved for publication, American Society of Civil Engineers, Structural Journal, April 2002.
50. S. A. Kilic and M. A. Sozen, "An Evaluation of the Effect of the 17 August 1999 Marmara Earthquake on Two Tall Reinforced Concrete Chimneys," submitted to American Concrete Institute, Structural Journal, to be published April 2002.
51. A. M. Johnson, K. M. Johnson, J. Durdella, M. A. Sozen, and T. Gur, "An Emendation of Elastic Rebound Theory: Main rupture and adjacent belt of right-lateral distortion detected by viaduct at Kaynaşlı, Turkey 12 November 1999 Düzce Earthquake," Journal of Seismology, Kluwer Academic Publishers, 6:329-346, 2002.
52. C. Donmez and M. A. Sozen, "Numerical Model for Biaxial Earthquake Response of Reinforced Concrete," submitted to American Society of Civil Engineers Structural Journal, for publication, April 2002.

Mike Thorne and Associates Limited

Michael Thorne

Qualifications PhD FSRP

KEY SKILLS

- Radiological protection
- Assessing the radiological safety of disposal of radioactive wastes
- Distribution and transport of radionuclides in the environment
- Expert elicitation procedures
- Probabilistic safety studies
- Development of safety criteria
- Pharmacodynamics

EDUCATION

1971: University of Sheffield, Yorkshire, UK, degree in physics, first class honours

1975: University of Sheffield, Yorkshire, UK, PhD in experimental studies in high energy physics

CAREER HISTORY

2001- Mike Thorne and Associates Limited

Development of Models for Radionuclide Transfers to Sewage Sludge and for Evaluating the Radiological Impact of Sludge applied to Agricultural Land

Client – Food Standards Agency

Includes a review of literature and the development and implementation of probabilistic models for such transfers.

Development of Biokinetic Models for Radionuclides in Animals

Client – Serco Assurance

Development of updated biokinetic models for use by the Food Standards Agency in their SPADE and PRISM modelling systems

Review Studies for the Proposed Australian National Radioactive Waste Repository
Client – RWE NUKEM

Reviews of reports on animal transfer factors and of the potential effects of climate change on the repository plus development of a model for the biokinetics of the ^{226}Ra decay chain in grazing animals.

Development and Application of a Model for Assessing the Radiological Impacts of ^3H and ^{14}C in Sewage Sludge
Client – NNC Ltd

Development of a model based on physical, chemical and biochemical principles for the uptake of ^3H and ^{14}C into sewage sludge and their subsequent distribution and transport after application of the sludge to agricultural land.

Support for development of the Drigg Post-closure Radiological Safety Assessment
Client - BNFL

Support in the areas of FEP analysis, biosphere characterisation, human intrusion assessment and the effects of natural disruptive events. In addition, provision of advice of future research initiatives that should be pursued by BNFL.

Co-ordination of biosphere research and participation in BIOCLIM
Client – UK Nirex Ltd

Co-ordination of research on climate change, ice-sheet development, near-surface hydrology and radionuclide transport, as well as participation in an international programme on the implications of climate change for radioactive waste disposal.

Review of Parameter Values
Client – AEA Technology/Serco Assurance

Review of biosphere parameter values for use in the ANDRA assessment model AQUABIOS.

Effects of Radiation on Organisms Other Than Man
Client – AEA Technology/Serco Assurance

Study for ANDRA to identify appropriate indicator organisms and develop appropriate dosimetry and effects models for those organisms.

**Development of a Database related to Emergency Planning
Client – AEA Technology (Rall)**

Identification of relevant international, overseas and national legislation, regulations and guidance, and production of brief summaries of the documents.

**Dose Reconstruction for Workers on a Uranium Plant
Client - McMurry and Talbot**

Dose reconstruction for the plaintiffs in a case relating to the Paducah Gaseous Diffusion Plant.

**Dose Reconstruction for a Worker Exposed to Pu and Am
Client – Pattinson and Brewer**

Dose reconstruction for a worker exposed by a puncture wound in the finger while working at a glove box.

1998-2001 AEA Technology

**Assessment of Remediation Options for Uranium Liabilities In Eastern Europe
Client - European Commission**

Studies of remediation requirements relating to mines, waste heaps and hydrometallurgical plant in Bulgaria, Slovakia and Albania.

**Evaluation of Unusual Pathways for Radionuclide Transport from Nuclear Installations
Client – Environment Agency**

Review of literature and conduct of formal elicitation meetings to determine potential pathways and evaluate their radiological significance.

**Revision of Exemption Orders Made Under the Radioactive Substances Act
Client – DETR**

Review of requirements for revision and preparation of a draft text for the purposes of consultation.

**Support Studies on the Drigg Post-closure Performance Assessment
Client - BNFL**

Support in the areas of FEP analysis, biosphere characterisation, human intrusion assessment and the effects of natural disruptive events. In addition, provision of advice of future research initiatives that should be pursued by BNFL.

Development of Models for the Biokinetics of H-3, C-14 and S-35 in Farm Animals

Client - FSA

Review of relevant literature, development of appropriate biokinetic models and implementation in stand-alone software.

Integration of Aerial and Ground-based Monitoring in the Event of a Nuclear Accident

Client - FSA

Desk-based review and simulation study designed to determine optimum monitoring strategies for different types of accidents.

Elicitation of Parameter Values for use in Radiological Impact Assessment Models

Client - FSA

Expert elicitation study to provide distributions of parameter values for use in the suite of assessment models currently used by the FSA for routine and accidental releases.

Biosphere Research Co-ordination and Assessment Studies

Client - United Kingdom Nirex Ltd

Continuation of a programme of work originally undertaken at Electrowatt Engineering (UK) Ltd

Site Investigation and Risk Assessment - Hilsea Lines

Client - Portsmouth City Council

Radiological assessment of a radium-contaminated site.

1987-1998 Electrowatt Engineering (UK) Ltd

Evaluation of Inhalation Doses from Uranium

Client - Baron & Budd

Provision of expert witness support in a class action relating to environmental exposure from a uranium plant.

Biosphere Studies Relating to Drigg

Client - BNFL

Provision of advice on time-dependent biosphere modelling for the Drigg low-level radioactive waste disposal facility.

Development of a Siting Policy for Nuclear Installations: Harbinger Project and Follow-up Study
Client - HSE/NSD

Review of existing policy and development of alternatives as a precursor to application to a wide range of installations, not restricted to commercial reactors.

Support to the Rock Characterisation Facility Public Enquiry
Client - UK Nirex Ltd

Preparation of position papers and rebuttals of evidence.

Radiation Doses to an Individual as a Consequence of Working on the San Onofre Nuclear Power Plant
Client - Howarth & Smith

Interpretation of personal and area monitoring data for legal purposes.

Interpretation of Uranium in Urine Data for the Fernald, Ohio Feed Materials Processing Center
Client - Institute for Energy and Environmental Research

Interpretation of urinalysis and lung counting data, and appearance as an expert witness in the associated trial.

Determination of Failure Probabilities for use in PRA
Client - Nuclear Installations Inspectorate

Development of new approaches to the use of Bayes Theorem in defining component failure probabilities for use in PRA when statistics on actual failures are limited.

Review of Inventory Information
Client - UK Nirex Ltd

Review of uncertainties in inventories of individual radionuclides.

ALARP Study of Options for the Treatment, Packaging, Transport and Disposal of Plutonium Contaminated Material
Client - UK Nirex Ltd

Use of multi-attribute utility analysis to establish which option is preferred.

Expert Judgement Estimation of Intrusion Model Parameters
Client - British Nuclear Fuels plc

Project Manager of a study assessing the risks of human intrusion into Drigg radioactive disposal site using expert judgement techniques.

Brainstorming Study of Risks Associated with Building Structures
Client - Building Research Establishment

Participation in a classification study of the health risks associated with buildings including both injuries and disease.

Rongelap Resettlement Project
Client - Marshall Islands Government

Participation in an oversight committee evaluating the radiological safety of Rongelap in the context of resettlement by its evacuated community.

Radiological Consequences of Deferred Decommissioning of Hunterston A
Client - Scottish Nuclear Ltd

Project Manager of a study of the radiological impacts of groundwater transport of radionuclides, releases to atmosphere and intrusion.

Reviews of Safety Documentation
Client - UK Nirex Ltd

Review of safety related documentation for Packaging and Transport Branch.

The Sheltering Effectiveness of Buildings In Hong Kong
Client - Ove Arup & Partners

Project Manager of a study evaluating the shielding effectiveness of all types of building in Hong Kong for volume sources of photons in air and surface deposition sources.

Assessment of the Radiological Impact of Releases of Radionuclides from Premises other than Licensed Nuclear Sites
Client - Ministry of Agriculture, Fisheries and Food

Project Manager of a study to identify representative premises, obtain data on their releases of radionuclides and assess radiological impacts using a new methodology developed for the project.

Assessment of the Radiological Implications of Uranium and its Radioactive Daughters In Foodstuffs
Client - Ministry of Agriculture, Fisheries and Food

Project Manager of a review study of concentrations of uranium and its daughters in foodstuffs, taking local and regional variations in uranium

concentrations in soils, sediments and waters into account.

Radionuclides In Sewage

Client - Her Majesty's Inspectorate of Pollution

Project Manager of a study including a desk review on alternative methods of disposal of sewage sludges, interpretation of monitoring data relating to radionuclide discharges from Amersham International to the public sewer system, development of a model for radionuclide transport in sewers, and collection and analysis of effluent, foul water, sediment, sludge and other samples suitable for use in model validation studies.

Accident Consequence Calculations

Client - Nuclear Installations Inspectorate

Project Manager of a study to assess the radiological consequences of various atmospheric releases using the MARC code.

Definition of Threshold Recording Levels for Drums of ILW

Client - UK Nirex Ltd

Project Manager of a study of the implications of post-closure radiological impacts of radioactive waste disposal in defining Threshold Recording Levels for radionuclides in individual waste drums.

Definition of Expert Judgment Exercises Relating to Nuclear Safety

Client - Commission of the European Communities

Project Manager for a study defining expert judgment exercises relating to conceptualisation, representation and input data specification. Included a comprehensive review of available formal expert judgment procedures, and mathematical and behavioural aggregation techniques.

Definition of Research Requirements Relating to the Use of Expert Judgment In Parameter Value Elicitation for Reactor Safety Studies In a UK Context

Client - Nuclear Safety Research Management Unit, HSE

Development of proposals for using combined behavioural and mathematical aggregation procedures in formal elicitation of expert judgment.

Development Priorities for the Drigg Technical Development Programme

Client - British Nuclear Fuels plc

Provision of detailed advice to BNFL on future design options, and research and development priorities, in relation to radioactive waste disposal at Drigg.

Channel Tunnel Safety Studies
Client - Channel Tunnel Safety Authority

Provision of advice and guidance on safety criteria appropriate to the Fixed Link, on the classes of Dangerous Goods that may properly be carried and on the overall characteristics of the proposed Safety Case.

Development of Societal Risk Criteria
Client - Marathon Oil

Interpretation of F-N curves in the context of the offshore oil/gas industry, taking risk aversion into account.

Impacts of Salt Dispersal on Plant Communities
Client - Sir William Halcrow

Evaluation of salt dispersal from a major road in winter in relation to adjacent Sites of Special Scientific Interest.

Offsite Consequence Assessments
Client - Nuclear Electric

Studies of the offsite radiological impacts of atmospheric and liquid releases of radioactive materials from Magnox stations.

Dry Run 3
Client - Her Majesty's Inspectorate of Pollution

Uncertainty and bias studies involving formal expert judgment procedures to develop a conceptual model of those factors and interrelationships which are of significance in determining the post-closure radiological impact of a deep geological repository for radioactive wastes. This project also included advice on data and models to be used for post-closure radiological assessments.

Radiological Assessments of Drigg
Client - British Nuclear Fuels plc

Project Manager for post-closure radiological impact assessments of the Drigg LLW disposal site. Also included specification and development of computer codes relating to the radiological impact of fires, releases of radioactive gases produced by microbial action and metal corrosion, and human intrusion.

Biosphere Co-ordination
Client - UK Nirex Ltd

Co-ordination of the UK Nirex Ltd Biosphere Research Programme from its inception, including requirements definition, technical management of all projects and QA surveillance as the Client's Representative.

Biosphere Support for the Nirex Disposal Safety Assessment Team
Client - AEA Technology

Development of approaches for assessing the radiological impact of releases of radionuclides to the biosphere, plus advice on radiological protection criteria, definition of individual risk, implications of conventionally toxic chemicals in wastes and a variety of other matters.

Evaluation and Radiological Assessment of Liquid Effluent Releases from Various Premises
Client - Her Majesty's Inspectorate of Pollution

Reviews of monitoring data and evaluations of radiological impact, primarily related to Harwell, Aldermaston, Capenhurst and Amersham International.

Evaluation of the Radiological Impact of Overseas Nuclear Accidents
Client - Her Majesty's Inspectorate of Pollution

Studies of the impact of potential overseas nuclear accidents on the UK, with emphasis on survey and monitoring requirements, and the selection of appropriate radiation detection equipment for monitoring.

Bilthorpe Power Station
Client - British Coal/East Midlands Electricity

Preparation of an Environmental Statement with emphasis on atmospheric dispersion of SO₂ and NO_x.

Gas Generation in Radioactive Waste Disposal Facilities
Client - AEA Technology

Development of a coupled microbial degradation and corrosion model for gas generation in repositories for LLW and ILW.

Effects of Chernobyl on Drinking Water Supplies
Client - Her Majesty's Inspectorate of Pollution

Evaluation of the radiological implications of enhanced concentrations of radionuclides in water supplies in England and Wales subsequent to the Chernobyl accident.

Sea Disposal of Radioactive Wastes
Client - UK Nirex Ltd

Participation in an Environmental Impact Assessment of the proposed resumption of sea-dumping of radioactive wastes.

UK Research Related to Radioactive Waste Management
Client - Her Majesty's Inspectorate of Pollution

Identification of gaps in the UK national research effort related to radioactive waste management.

Research Requirements for Repository Design and Site Investigations
Client - UK Nirex Ltd

Review of research requirements for repository design and site investigations in relation to LLW and ILW disposal in near-surface and deep repositories.

1985 - 1986 International Commission on Radiological Protection, Sutton, Surrey, England

Scientific Secretary responsible for arranging and minuting meetings, administrative arrangements, technical review of reports, editing of the Commission's journal, liaison with other international organisations and public relations.

1979 - 1985 ANS Consultants Ltd, Epsom, Surrey, England

Reviews of data on the distribution and transport of radionuclides in terrestrial and aquatic ecosystems (see publications list).

Development of a dynamic model for radionuclide transport in agricultural ecosystems and implementation of the model on various microcomputer systems.

Photon and neutron shielding studies of radiochemical plant, together with area classification and ALARA studies.

A review of UK use of the criticality code MONK and other approaches to criticality safety assessment.

Radiological and conventional safety aspects of Magnox reactor decommissioning.

Development of metabolic models for inclusion in ICRP Publication 30.

Development of pharmacodynamic models for toxic chemicals.

Review of neutron activation analysis in studies of radionuclide transport in soils and plants.

Experimental studies on radionuclide transport in soils and plants using various photon-emitting radionuclides.

Support for DoE work on probabilistic risk assessment of LLW and ILW disposal.

Review of UK research requirements for HLW disposal.

Post-closure radiological impact assessment of the proposed LLW and ILW facility at Elstow, Bedfordshire.

Development of a generalised biosphere model for use in probabilistic risk assessments of solid radioactive waste disposal.

Initial development of a mathematical model for use in assessing the radiological impact of contaminated groundwater.

Development, computer implementation and comprehensive documentation of a model to calculate the radiological impact of intrusion into radioactive waste repositories.

Development of a general-purpose computer code for solving first-order differential equations using a hybrid Predictor-Corrector/Runge-Kutta method.

Studies on the potential radiological consequences of Magnox reactor accidents.

1974 - 1979 Medical Research Council Radiobiology Unit, Chilton, Didcot, Oxon, England

Development of dosimetric and metabolic models for use in ICRP Publication 30.

Studies on the metabolism of plutonium in bone and relationships to blood flow.

Theoretical studies on radionuclide metabolism and dosimetry.

Development of techniques in neutron-induced autoradiography and alpha imaging.

Image analysis studies of plutonium in bone, uranium in lungs, lysosomal inclusions in cells and heterochromatin.

Studies on the clearance of inhaled UO_2 .

Alpha spectroscopy in support of toxicity studies with Ra-224.

Data analysis in connection with experimental animal studies on the potential efficacy of neutron therapy using 42 MeV neutrons.

1971 - 1974 University of Sheffield

Experimental studies on the reaction $\gamma + p \rightarrow \pi^0 + p$ at photon energies between 1 and 3 GeV, using a linearly polarised photon beam.

PROFESSIONAL ACTIVITIES AND MEMBERSHIP

- Fellow of the Society for Radiological Protection and Immediate Past President
- Member of the Eco-ethics International Union
- Visiting Fellow at the Climatic Research Unit, University of East Anglia

SELECTION OF PUBLICATIONS

A measurement of the beam asymmetry parameter for neutral pion photoproduction in the energy range 1.2 - 2.8 GeV. P.J. Bussey, C. Raine, J.G. Rutherglen, P.S.L. Booth, L. Carroll, G.R. Court, A.W. Edwards, R. Gamet, C.J. Hardwick, P.J. Hayman, J.R. Holt, J.N. Jackson, J. Norem, W.H. Range, F.H. Combley, W. Galbraith, V.H. Rajaratnam, C. Sutton and M.C. Thorne. London Conference (1974) Abstract 997.

The measurement of the polarisation parameters S, P and T for positive pion photoproduction between 500 and 1700 MeV. P.J. Bussey, C. Raine, J.G. Rutherglen, P.S.L. Booth, L.J. Carroll, P.R. Daniel, C.J. Hardwick, J.R. Holt, J.N. Jackson, J.H. Norem, W.H. Range, F.H. Combley, W. Galbraith, V.H. Rajaratnam, C. Sutton, M.C. Thorne and P. Waller. Nuclear Physics, B104, (1976) 253-276.

The polarised beam asymmetry in photoproduction of eta mesons from protons 2.5 GeV and 3.0 GeV. P.J. Bussey, C. Raine, J.G. Rutherglen, P.S.L. Booth, L.J. Carroll, P.R. Daniel, A.W. Edwards, C.J. Hardwick, J.R. Holt, J.N. Jackson, J. Norem, W.H. Range, W. Galbraith, V.H. Rajaratnam, C. Sutton, M.C. Thorne and P. Waller. Physics Letters, 61B, (1976) 479-482.

Aspects of the dosimetry of plutonium in bone. M.C. Thorne. Nature, 259, (1976) 539-541.

The toxicity of Sr-90, Ra-226 and Pu-239. M.C. Thorne and J. Vennart. Nature 263, (1976) 555-558.

Radiation dose to mouse testes from Pu-239. D. Green, G.R. Howells, E.H. Humphreys and J. Vennart with Appendix by M.C. Thorne. Published in "The Health Effects of Plutonium and Radium", Ed. W.S.S. Jee, (J.W. Press, Salt Lake City, Utah, 1976).

The distribution and clearance of inhaled uranium dioxide particles in the repository tract of the rat. Donna J. Gore and M.C. Thorne. In "Inhaled particles IV", Ed. W.H. Walton, (Pergamon Press, Oxford, 1977) pp. 275-284.

Theoretical aspects of the distribution and retention of radionuclides in biological systems. M.C. Thorne. J. Theor. Biol., 65, (1977) 743-754.

Aspects of the dosimetry of emitting radionuclides in bone with particular emphasis on Ra-226 and Pu-239. M.C. Thorne. Phys. Med. Biol., 22, (1977) 36-46.

A new method for the accurate localisation of Pu-239 in bone. D. Green, G. Howells and M.C. Thorne. Phys. Med. Biol., 22, (1977) 284-297.

The measurement of blood flow in mouse femur and its correlation with Pu-239 deposition. E.R. Humphreys, G. Fisher and M.C. Thorne. Calcif. Tiss. Res., 23, (1977) 141-145.

The distribution of plutonium-239 in the skeleton of the mouse. D. Green, G.R. Howells, M.C. Thorne and J. Vennart. In "Proceedings of the IVth International Congress of the International Radiation Protection Association Vol. 2 (Paris 1977).

The visualisation of fissionable radionuclides in rat lung using neutron induced autoradiography. D.J. Gore, M.C. Thorne and R.H. Watts. Phys. Med. Biol., 23 (1978) 149-153.

Lymphoid tumours and leukaemia induced in mice by bone-seeking radionuclides. J.F. Loutit and T.E.F. Carr with an appendix by M.C. Thorne. Int. J. Radiat. Biol., 33, (1978) 245-263.

Plutonium-239 deposition in the skeleton of the mouse. D. Green, G.R. Howells and M.C. Thorne. Int. J. Radiat. Biol., 34, (1978) 27-36.

Imaging of tissue sections on Lexan by alpha-particles and thermal neutrons; an aid in fissionable radionuclide distribution studies. D. Green, G.R. Howells, M.C. Thorne and R.H. Watts. *Int. J. Appl. Radiat. Isotopes*, 29, 285-295 (1978).

Analytical techniques for the analysis of multi-compartment systems. M.C. Thorne. *Phys. Med. Biol.*, 24, 815-817 (1979).

The initial deposition and redistribution of Pu-239 in the mouse skeleton: implications for rodent studies in Pu-239 toxicology. D. Green, G.R. Howells and M.C. Thorne. *Br. J. Radiol.*, 52, 426-427 (1979).

Bran and experimental colon cancer. M.C. Thorne. *Lancet*, ii, 13 January 1979, p.108.

Quantitative microscopic studies of the distribution and retention of Pu-239 in the ilium of the female CBA mouse. D. Green, G.R. Howells and M.C. Thorne. *Int. J. Radiat. Biol.*, 36, 499-511 (1979).

Techniques for studying the distribution of alpha emitting and fissionable radionuclides in histological lung sections. T. Jenner and M.C. Thorne. *Phys. Med. Biol.*, 25, 357-364 (1980).

Morphometric studies of mouse bone using a computer-based image analysis system. D. Green, G.R. Howells and M.C. Thorne. *J. Microscopy*, 122, 49-58 (1981).

A semi-automated technique for assessing the microdistribution of ²³⁹Pu deposited in bone. D. Green, G.R. Howells and M.C. Thorne. *Phys. Med. Biol.*, 26, 379-387 (1981).

Radionuclide distribution and transport in terrestrial and aquatic ecosystems, Volumes 1 to 6. P.J. Coughtrey, M.C. Thorne et al. A.A. Balkema, Rotterdam 1983-1985.

Dynamic models for radionuclide transport in soils, plants and domestic animals. M. C. Thorne and P. J. Coughtrey. In: *Ecological Aspects of Radionuclide Release* (Ed. P. J. Coughtrey). British Ecological Society Special Publication No. 3, Blackwell, Oxford, 1983.

Studies on the mobility of radioisotopes of Ce, Te, Ru, Sr and Cs in soils and plants. P.J. Coughtrey, M.C. Thorne, D. Jackson and G.F. Meekings. In: *CEC Symposium on the Transfer of Radioactive Materials in the Terrestrial Environment Subsequent to an Accidental Release to Atmosphere*. Dublin, April 1983.

A study of the sensitivity of a dynamic soil-plant-animal model to changes in selected parameter values. M.C. Thorne, P.J. Coughtrey and G.F. Meekings. In: *CEC Symposium on the Transfer of Radioactive Materials in the Terrestrial Environment Subsequent to an Accidental Release to Atmosphere*. Dublin, April 1983.

Microdosimetry of bone: implications in radiological protection. M.C. Thorne. In: *Metals in Bone*, N.D. Priest (Ed.) MTP Press, Lancaster (1985), pp. 249-268.

Non-stochastic effects resulting from internal emitters: dosimetric considerations. M.C. Thorne. *J. Soc. Rad. Prot.*, 6 (1986).

Pharmacodynamic models of selected toxic chemicals in man. Vol. 1. Review of metabolic data. M.C. Thorne, D. Jackson and A.D. Smith. MTP Press, Lancaster, 1986.

Pharmacodynamic models of selected toxic chemicals in man. Vol. 2. Routes of intake and implementation of pharmacodynamic models. A.D. Smith and M.C. Thorne. MTP Press, Lancaster 1986.

Generalised computer routines for the simulation of linear multi-compartment systems. D.Jackson, A.D. Smith, M.C. Thorne and P.J. Coughtrey. *Environmental Software*, 2 (1987), 94-102.

The demonstration of a proposed methodology for the verification and validation of near field models. J-M. Laurens and M.C. Thorne. In: *Proceedings of an NEA Workshop "Near-field Assessment of Repositories for Low and Medium Level Radioactive Waste"*. pp. 297-310. NEA/OECD, Paris, 1987.

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The origins and work of the International Commission on Radiological Protection. H. Smith and M.C. Thorne. *Invest. Radiol.*, 22 (1987), 918-921.

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The use of expert opinion in formulating conceptual models of underground disposal systems and the treatment of associated bias. M.C. Thorne, Journal of Reliability Engineering and Systems Safety, 42 (1993), 161-180.

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UK Nirex approach to the protection of the natural environment, M J Egan, M C Thorne and M A Broderick, Stockholm Symposium.

Post-closure performance assessment: treatment of the biosphere, M A Broderick, M J Egan, M C Thorne and J A Williams, Winnipeg Symposium.

The application of constraint curves in limiting risk, M C Thorne, J. Radiol. Prot., Vol. 17, 275-280, 1997.

The biosphere in post-closure radiological safety assessments of solid radioactive waste disposal, M C Thorne, Interdisciplinary Science Reviews, Vol. 23, 258-268, 1998.

An illustrative comparison of the event-size distributions for γ -rays and α -particles in the whole mammalian cell nucleus, K Baverstock and M C Thorne, Int. J. Radiat. Biol., 74, 799-804, 1998.

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Use of a systematic approach for the Drigg post-closure radiological safety assessment, G Thomson, M Egan, P Kane, M Thorne, L Clements and P Humphreys, DisTec 2000, Disposal Technologies and Concepts 2000, Kontec Gesellschaft für technische Kommunikation mbH, Tarpenning 6, D-22419, Hamburg, 413-417, 2000.

Validation of a physically based catchment model for application in post-closure radiological safety assessments of deep geological repositories for solid radioactive wastes, M C Thorne, P Degnan, J Ewen and G Parkin, Journal of Radiological Protection, 20(4), 403-421, 2000.

An approach to multi-attribute utility analysis under parametric uncertainty, M Kelly and M C Thorne, Annals of Nuclear Energy, 28, 875-893, 2001.

Radiobiological theory and radiation protection, M C Thorne, British Nuclear Energy Society International Conference on Radiation Dose Management in the Nuclear Industry, May 2001.

Development of a solution method for the differential equations arising in the biosphere module of the BNFL suite of codes MONDRIAN, M M R Williams, M C Thorne, J G Thomson and A Paulley, Annals of Nuclear Energy, 29, 1019-1039, 2002.

A model for evaluating radiological impacts on organisms other than man for use in post-closure assessments of geological repositories for radioactive wastes, M C Thorne, M Kelly, J H Rees, P Sánchez-Frera and M Calvez, J. Radiol. Prot., 22, 249-277, 2002.

Background Radiation: Natural and Man-made, M C Thorne, BNES 4th International Conference on Health Effects of Low-level Radiation, 22-24 September 2002, Keble College, Oxford, UK, CD Available from BNES.

Background Radiation: Natural and Man Made, M C Thorne, Journal of Radiological Protection, 23, 29-42, 2003.

Comments from the Society for Radiological Protection on ICRP Reference 02/305/02 – Protection of Non-Human Species From Ionising Radiation, M C Thorne, Journal of Radiological Protection, 23, 107-115, 2003.

Modelling sequential BIOSphere Systems under CLIMate change for radioactive waste disposal. Project BIOCLIM, D Texier, P Degnan, M F Loutre, D Paillard and M Thorne, Proceedings of the 10th International High-Level Radioactive Waste Management Conference (IHLRWM), March 30th – April 2nd, Las Vegas, Nevada.

Estimation of animal transfer factors for radioactive isotopes of iodine, technetium, selenium and uranium, M C Thorne, J. Environ. Radioact., in the press.

**Curriculum Vitae:
GORDON R. THOMPSON**

August 2003

Professional expertise

Technical and policy analyst in the fields of energy, environment, sustainable development, and international security.

Current appointments

- Executive director, Institute for Resource & Security Studies (IRSS), Cambridge, Massachusetts.
- Research Professor, George Perkins Marsh Institute, Clark University, Worcester, Massachusetts.

Education

- D.Phil. in applied mathematics, Oxford University (Balliol College), 1973.
- B.E. in mechanical engineering, University of New South Wales, Sydney, Australia, 1967.
- B.Sc. in mathematics & physics, University of New South Wales, 1966.

Project sponsors and tasks (selected)

- Tides Center, California, 2002-2003: conducted analysis for the Santa Susana Field Laboratory (SSFL) Advisory Panel regarding the history of offsite transfer of radioactive material from the SSFL.
- STAR Foundation, New York, 2002-2003: reviewed planning and actions for decommissioning of research reactors at Brookhaven National Laboratory.
- Attorney General of Utah, 2003: conducted technical analysis.
- Mothers for Peace, California, 2002-2003: analyzed risk issues associated with the Diablo Canyon nuclear power plant; prepared a Call for Action to protect US nuclear power plants and spent fuel.
- Citizens Awareness Network, Massachusetts, 2002-2003: conducted analysis on robust storage of spent nuclear fuel.
- Orange County, North Carolina, 1999-2002: assessed risk issues associated with the Harris nuclear power plant; identified risk-reduction options.
- STAR Foundation, New York, 2000-2001: assessed risk issues associated with the Millstone nuclear power plant; identified risk-reduction options.
- William and Flora Hewlett Foundation and other sponsors, 1999-2003: performed research and project development for conflict management projects, through IRSS's International Conflict Management Program.
- Massachusetts Water Resources Authority, 2000: evaluated risks associated with water supply and wastewater systems that serve greater Boston.

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- Canadian Senate, Energy & Environment Committee, 2000: reviewed risk issues associated with the Pickering Nuclear Generating Station.
- Greenpeace International, Amsterdam, 2000: reviewed impacts associated with the La Hague nuclear complex in France.
- Government of Ireland, 1998-2001: developed framework for assessment of impacts and alternative options associated with the Sellafield nuclear complex in the UK.
- Clark University, Worcester, Massachusetts, 1998-1999: participated in review of a major foundation's grant-making related to climate change.
- UN High Commissioner for Refugees, 1998: developed a strategy for conflict management in the CIS region.
- General Council of County Councils (Ireland), W. Alton Jones Foundation (USA), and Nuclear Free Local Authorities (UK), 1996-2000: assessed safety and economic issues of nuclear fuel reprocessing in the UK; assessed alternative options.
- Environmental School, Clark University, Worcester, Massachusetts, 1996: session leader at the Summer Institute, "Local Perspectives on a Global Environment".
- Greenpeace Germany, Hamburg, 1995-1996: a study on war, terrorism and nuclear power plants.
- HKH Foundation, New York, and Winston Foundation for World Peace, Washington, DC, 1994-1996: studies and workshops on preventive action and its role in US national security planning.
- Carnegie Corporation of New York, Winston Foundation for World Peace, Washington, DC, and others, 1995: collaboration with the Organization for Security and Cooperation in Europe to facilitate improved coordination of activities and exchange of knowledge in the field of conflict management.
- World Bank, 1993-1994: a study on management of data describing the performance of projects funded by the Global Environment Facility (joint project of IRSS and Clark University).
- International Physicians for the Prevention of Nuclear War, 1993-1994: a study on the international control of weapons-usable fissile material.
- Government of Lower Saxony, Hannover, Germany, 1993: analysis of standards for radioactive waste disposal.
- University of Vienna (using funds supplied by the Austrian government), 1992: review of radioactive waste management at the Dukovany nuclear plant, Czech Republic.
- Sandia National Laboratories, 1992-1993: advice to the US Department of Energy's Office of Foreign Intelligence.
- US Department of Energy and Battelle Pacific Northwest Laboratories, 1991-1992: advice for the Intergovernmental Panel on Climate Change regarding the design of an information system on technologies that can limit greenhouse gas emissions (joint project of IRSS, Clark University and the Center for Strategic and International Studies).
- Winston Foundation for World Peace, Boston, Massachusetts, and other funding sources, 1992-1993: development and publication of recommendations for strengthening the International Atomic Energy Agency.
- MacArthur Foundation, Chicago, Illinois, W. Alton Jones Foundation, Charlottesville, Virginia, and other funding sources, 1984-1993: policy analysis and public education on a "global approach" to arms control and disarmament.

- Energy Research Foundation, Columbia, South Carolina, and Peace Development Fund, Amherst, Massachusetts, 1988-1992: review of the US government's tritium production (for nuclear weapons) and its implications.
- Coalition of Environmental Groups, Toronto, Ontario (using funds supplied by Ontario Hydro under the direction of the Ontario government), 1990-1993: coordination and conduct of analysis and preparation of testimony on accident risk of nuclear power plants.
- Greenpeace International, Amsterdam, Netherlands, 1988-1990: review of probabilistic risk assessment for nuclear power plants.
- Bellerive Foundation, Geneva, Switzerland, 1989-1990: planning for a June 1990 colloquium on disarmament and editing of proceedings.
- Iler Research Institute, Harrow, Ontario, 1989-1990: analysis of regulatory response to boiling-water reactor accident potential.
- Winston Foundation for World Peace, Boston, Massachusetts, and other funding sources, 1988-1989: analysis of future options for NATO (joint project of IRSS and the Institute for Peace and International Security).
- Nevada Nuclear Waste Project Office, Carson City, Nevada (via Clark University), 1989-1990: analyses of risk aspects of radioactive waste management and disposal.
- Ontario Nuclear Safety Review (conducted by the Ontario government), Toronto, Ontario, 1987: review of safety aspects of CANDU reactors.
- Washington Department of Ecology, Olympia, Washington, 1987: analysis of risk aspects of a proposed radioactive waste repository at Hanford.
- Natural Resources Defense Council, Washington, DC, 1986-1987: preparation of testimony on hazards of the Savannah River Plant.
- Lakes Environmental Association, Bridgton, Maine, 1986: analysis of federal regulations for disposal of radioactive waste.
- Greenpeace Germany, Hamburg, 1986: participation in an international study on the hazards of nuclear power plants.
- Three Mile Island Public Health Fund, Philadelphia, Pennsylvania, 1983-1989: studies related to the Three Mile Island nuclear power plant.
- Attorney General, Commonwealth of Massachusetts, 1984-1989: analyses of the safety of the Seabrook nuclear plant.
- Union of Concerned Scientists, Cambridge, Massachusetts, 1980-1985: studies on energy demand and supply, nuclear arms control, and the safety of nuclear installations.
- Conservation Law Foundation of New England, Boston, Massachusetts, 1985: preparation of testimony on cogeneration potential at a Maine papermill.
- Town & Country Planning Association, London, UK, 1982-1984: coordination and conduct of a study on safety and radioactive waste implications of the proposed Sizewell nuclear plant.
- US Environmental Protection Agency, Washington, DC, 1980-1981: assessment of the cleanup of Three Mile Island Unit 2 nuclear plant.
- Center for Energy & Environmental Studies, Princeton University, Princeton, New Jersey, and Solar Energy Research Institute, Golden, Colorado, 1979-1980: studies on the potentials of renewable energy sources.

- Government of Lower Saxony, Hannover, Federal Republic of Germany, 1978-1979: coordination and conduct of studies on safety aspects of the proposed Gorleben nuclear fuel cycle center.

Other experience (selected)

- Principal investigator, project on "Exploring the Role of 'Sustainable Cities' in Preventing Climate Disruption", involving IRSS and three other organizations, 1990-1991.
- Visiting fellow, Peace Research Centre, Australian National University, 1989.
- Principal investigator, Three Mile Island emergency planning study, involving IRSS and Clark University, 1987-1989.
- Co-leadership (with Paul Walker) of a study group on nuclear weapons proliferation, Institute of Politics, Harvard University, 1981.
- Foundation (with others) of an ecological political movement in Oxford, UK, which contested the 1979 Parliamentary election.
- Conduct of cross-examination and presentation of evidence, on behalf of the Political Ecology Research Group, at the 1977 Public Inquiry into proposed expansion of the reprocessing plant at Windscale, UK.
- Conduct of research on plasma theory (while a D.Phil candidate), as an associate staff member, Culham Laboratory, UK Atomic Energy Authority, 1969-1973.
- Service as a design engineer on coal-fired plants, New South Wales Electricity Commission, Sydney, Australia, 1968.

Publications (selected)

- "Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States" (with Robert Alvarez, Jan Beyea, Klaus Janberg, Jungmin Kang, Ed Lyman, Allison Macfarlane and Frank N. von Hippel), *Science and Global Security*, Volume 11, 2003, pp 1-51.
- "Health, Human Security and Social Reconstruction in Afghanistan" (with Paula Gutlove and Jacob Hale Russell), in John D. Montgomery and Dennis A. Rondinelli (eds), *Beyond Reconstruction in Afghanistan*, Palgrave Macmillan, in press.
- *Psychosocial Healing: A Guide for Practitioners, based on programs of the Medical Network for Social Reconstruction in the Former Yugoslavia* (with Paula Gutlove), IRSS, Cambridge, Massachusetts and OMEGA Health Care Center, Graz, Austria, May 2003.
- *A Call for Action to Protect the Nation Against Enemy Attack on Nuclear Power Plants and Spent Fuel*, and a Supporting Document, Mothers for Peace, San Luis Obispo, California, April 2003 and May 2003.
- "Human Security: Expanding the Scope of Public Health" (with Paula Gutlove), *Medicine, Conflict and Survival*, Volume 19, 2003, pp 17-34.
- *Social Reconstruction in Afghanistan through the Lens of Health and Human Security* (with Paula Gutlove and Jacob Hale Russell), IRSS, Cambridge, Massachusetts, May 2003.

- *Robust Storage of Spent Nuclear Fuel: A Neglected Issue of Homeland Security*, a report commissioned by Citizens Awareness Network, Shelburne Falls, Massachusetts, January 2003.
- *Medical Network for Social Reconstruction in the Former Yugoslavia: A Survey of Participants' Views on the Network's Goals and Achievements*, IRSS, Cambridge, Massachusetts, September 2001.
- *The Potential for a Large, Atmospheric Release of Radioactive Material from Spent Fuel Pools at the Harris Nuclear Power Plant: The Case of a Pool Release Initiated by a Severe Reactor Accident*, a report for Orange County, North Carolina, 20 November 2000.
- *A Review of the Accident Risk Posed by the Pickering 'A' Nuclear Generating Station*, a report for the Standing Committee on Energy, Environment and Natural Resources, Canadian Senate, August 2000.
- *High-Level Radioactive Liquid Waste at Sellafield: An Updated Review*, a report for the UK Nuclear Free Local Authorities, June 2000.
- *Hazard Potential of the La Hague Site: An Initial Review*, a report for Greenpeace International, May 2000.
- *A Strategy for Conflict Management: Integrated Action in Theory and Practice* (with Paula Gutlove), Working Paper No. 7, IRSS, Cambridge, Massachusetts, March 1999.
- *Risks and Alternative Options Associated with Spent Fuel Storage at the Shearon Harris Nuclear Power Plant*, a report for Orange County, North Carolina, February 1999.
- *High Level Radioactive Liquid Waste at Sellafield: Risks, Alternative Options and Lessons for Policy*, IRSS, Cambridge, Massachusetts, June 1998.
- "Science, democracy and safety: why public accountability matters", in F. Barker (ed), *Management of Radioactive Wastes: Issues for local authorities*, Thomas Telford, London, 1998.
- "Conflict Management and the OSCE" (with Paula Gutlove), *OSCE/ODIHR Bulletin*, Volume 5, Number 3, Fall 1997.
- *Safety of the Storage of Liquid High-Level Waste at Sellafield* (with Peter Taylor), Nuclear Free Local Authorities, UK, November 1996.
- *Assembling Evidence on the Effectiveness of Preventive Actions, their Benefits, and their Costs: A Guide for Preparation of Evidence*, IRSS, Cambridge, Massachusetts, August 1996.
- *War, Terrorism and Nuclear Power Plants*, Working Paper No. 165, Peace Research Centre, Australian National University, Canberra, October 1996.
- "The Potential for Cooperation by the OSCE and Non-Governmental Actors on Conflict Management" (with Paula Gutlove), *Helsinki Monitor*, Volume 6 (1995), Number 3.
- "Potential Characteristics of Severe Reactor Accidents at Nuclear Plants", "Monitoring and Modelling Atmospheric Dispersion of Radioactivity Following a Reactor Accident" (with Richard Sclove, Ulrike Fink and Peter Taylor), "Safety Status of Nuclear Reactors and Classification of Emergency Action Levels", and "The Use of Probabilistic Risk Assessment in Emergency Response Planning for Nuclear Power Plant Accidents" (with Robert Goble), in D. Golding, J. X. Kaspersen and R. E. Kaspersen (eds), *Preparing for Nuclear Power Plant Accidents*, Westview Press, Boulder, Colorado, 1995.

- *A Data Manager for the Global Environment Facility* (with Robert Goble), Environment Department, The World Bank, June 1994.
- *Preventive Diplomacy and National Security* (with Paula Gutlove), Winston Foundation for World Peace, Washington, DC, May 1994.
- *Opportunities for International Control of Weapons-Usable Fissile Material*, ENWE Paper #1, International Physicians for the Prevention of Nuclear War, Cambridge, Massachusetts, January 1994.
- "Article III and IAEA Safeguards", in F. Barnaby and P. Ingram (eds), *Strengthening the Non-Proliferation Regime*, Oxford Research Group, Oxford, UK, December 1993.
- *Risk Implications of Potential New Nuclear Plants in Ontario* (prepared with the help of eight consultants), a report for the Coalition of Environmental Groups, Toronto, submitted to the Ontario Environmental Assessment Board, November 1992 (3 volumes).
- *Strengthening the International Atomic Energy Agency*, Working Paper No. 6, IRSS, Cambridge, Massachusetts, September 1992.
- *Design of an Information System on Technologies that can Limit Greenhouse Gas Emissions* (with Robert Goble and F. Scott Bush), Center for Strategic and International Studies, Washington, DC, May 1992.
- *Managing Nuclear Accidents: A Model Emergency Response Plan for Power Plants and Communities* (with six other authors), Westview Press, Boulder, CO, 1992.
- "Let's X-out the K" (with Steven C. Sholly), *Bulletin of the Atomic Scientists*, March 1992, pp 14-15.
- "A Worldwide Programme for Controlling Fissile Material", and "A Global Strategy for Nuclear Arms Control", in F. Barnaby (ed), *Plutonium and Security*, Macmillan Press, UK, 1992.
- *No Restart for K Reactor* (with Steven C. Sholly), Working Paper No. 4, IRSS, Cambridge, Massachusetts, October 1991.
- *Regulatory Response to the Potential for Reactor Accidents: The Example of Boiling-Water Reactors*, Working Paper No. 3, IRSS, Cambridge, Massachusetts, February 1991.
- *Peace by Piece: New Options for International Arms Control and Disarmament*, Working Paper No. 1, IRSS, Cambridge, Massachusetts, January 1991.
- *Developing Practical Measures to Prevent Climate Disruption* (with Robert Goble), CENTED Research Report No. 6, Clark University, Worcester, Massachusetts, August 1990.
- "Treaty a Useful Relic", *Bulletin of the Atomic Scientists*, July/August 1990, pp 32-33.
- "Practical Steps for the 1990s", in Sadruddin Aga Khan (ed), *Non-Proliferation in a Disarming World*, Proceedings of the Groupe de Bellerive's 6th International Colloquium, Bellerive Foundation, Geneva, Switzerland, 1990.
- *A Global Approach to Controlling Nuclear Weapons*, Occasional Paper published by IRSS, Cambridge, Massachusetts, October 1989.
- *IAEA Safety Targets and Probabilistic Risk Assessment* (with three other authors), Greenpeace International, Amsterdam, August 1989.
- *New Directions for NATO* (with Paul Walker and Pam Solo), published jointly by IRSS and the Institute for Peace and International Security (both of Cambridge, Massachusetts), December 1988.

- "Verifying a Halt to the Nuclear Arms Race", in F. Barnaby (ed), *A Handbook of Verification Procedures*, Macmillan Press, UK, 1990.
- "Verification of a Cutoff in the Production of Fissile Material", in F. Barnaby (ed), *A Handbook of Verification Procedures*, Macmillan Press, UK, 1990.
- "Severe Accident Potential of CANDU Reactors," Consultant's Report in *The Safety of Ontario's Nuclear Power Reactors*, Ontario Nuclear Safety Review, Toronto, February 1988.
- *Nuclear-Free Zones* (edited with David Pitt), Croom Helm Ltd, Beckenham, UK, 1987.
- *Risk Assessment Review For the Socioeconomic Impact Assessment of the Proposed High-Level Nuclear Waste Repository at Hanford Site, Washington* (edited; written with five other authors), prepared for the Washington Department of Ecology, December 1987.
- *The Nuclear Freeze Revisited* (with Andrew Haines), Nuclear Freeze and Arms Control Research Project, Bristol, UK, November 1986. Variants of the same paper have appeared as Working Paper No. 18, Peace Research Centre, Australian National University, Canberra, February 1987, and in *ADIU Report*, University of Sussex, Brighton, UK, Jan/Feb 1987, pp 6-9.
- *International Nuclear Reactor Hazard Study* (with fifteen other authors), Greenpeace, Hamburg, Federal Republic of Germany (2 volumes), September 1986.
- "What happened at Reactor Four" (the Chernobyl reactor accident), *Bulletin of the Atomic Scientists*, August/September 1986, pp 26-31.
- *The Source Term Debate: A Report by the Union of Concerned Scientists* (with Steven C. Sholly), Union of Concerned Scientists, Cambridge, Massachusetts, January 1986.
- "Checks on the spread" (a review of three books on nuclear proliferation), *Nature*, 14 November 1985, pp 127-128.
- Editing of *Perspectives on Proliferation*, Volume I, August 1985, published by the Proliferation Reform Project, IRSS.
- "A Turning Point for the NPT ?", *ADIU Report*, University of Sussex, Brighton, UK, Nov/Dec 1984, pp 1-4.
- "Energy Economics", in J. Dennis (ed), *The Nuclear Almanac*, Addison-Wesley, Reading, Massachusetts, 1984.
- "The Genesis of Nuclear Power", in J. Tirman (ed), *The Militarization of High Technology*, Ballinger, Cambridge, Massachusetts, 1984.
- *A Second Chance: New Hampshire's Electricity Future as a Model for the Nation* (with Linzee Weld), Union of Concerned Scientists, Cambridge, Massachusetts, 1983.
- *Safety and Waste Management Implications of the Sizewell PWR* (prepared with the help of six consultants), a report to the Town & Country Planning Association, London, UK, 1983.
- *Utility-Scale Electrical Storage in the USA: The Prospects of Pumped Hydro, Compressed Air, and Batteries*, Princeton University report PU/CEES #120, 1981.
- *The Prospects for Wind and Wave Power in North America*, Princeton University report PU/CEES # 117, 1981.
- *Hydroelectric Power in the USA: Evolving to Meet New Needs*, Princeton University report PU/CEES # 115, 1981.

- Editing and part authorship of "Potential Accidents & Their Effects", Chapter III of *Report of the Gorleben International Review*, published in German by the Government of Lower Saxony, FRG, 1979--Chapter III available in English from the Political Ecology Research Group, Oxford, UK.
- *A Study of the Consequences to the Public of a Severe Accident at a Commercial FBR located at Kalkar, West Germany*, Political Ecology Research Group report RR-1, 1978.

Expert presentations and testimony (selected)

- European Parliament, 2003: gave an invited presentation to members regarding safety and security issues at the Sellafield nuclear site; discussed broader implications.
- US Congress, 2002 and 2003: gave member-sponsored staff briefings on vulnerabilities of nuclear-power facilities and options for improved defenses.
- Numerous public forums in the USA, 2001-2003: gave invited presentations to public officials and general audiences regarding vulnerabilities of nuclear-power facilities and options for improved defenses.
- UK Consensus Conference on Radioactive Waste Management, 1999: provided invited testimony on information and decision-making.
- Joint Committee on Public Enterprise and Transport, Irish Parliament, 1999: provided invited testimony on nuclear fuel reprocessing and international security.
- UK and Irish Parliaments, 1998: gave members' briefings on risks and alternative options associated with nuclear fuel reprocessing in the UK.
- Center for Russian Environmental Policy, Moscow, 1996: presentation at a forum in parallel with the G-7 Nuclear Safety Summit.
- Lacey Township Zoning Board, New Jersey, 1995: testimony regarding radioactive waste management.
- Ontario Court of Justice, Toronto, Ontario, 1993: testimony regarding Canada's Nuclear Liability Act.
- Oxford Research Group, seminar on "The Plutonium Legacy", Rhodes House, Oxford, UK, 1993: presentation on nuclear safeguards.
- Defense Nuclear Facilities Safety Board, Washington, DC, 1991: testimony regarding the proposed restart of K-reactor, Savannah River Site.
- Conference to consider amending the Partial Test Ban Treaty, United Nations, New York, 1991: presentation on a global approach to arms control and disarmament.
- US Department of Energy, hearing on draft EIS for new production reactor capacity, Columbia, South Carolina, 1991: presentation on tritium need and implications of tritium production options.
- Society for Risk Analysis, 1990 annual meeting, New Orleans, special session on nuclear emergency planning: presentation on real-time techniques for anticipating emergencies.
- Parliamentarians' Global Action, 11th Annual Parliamentary Forum, United Nations, Geneva, 1990: presentation on the potential for multilateral nuclear arms control.
- Advisory Committee on Nuclear Facility Safety, public meeting, Washington, DC, 1989: submission on public access to information and on government accountability.

- Peace Research Centre, Australian National University, seminar on "Australia and the Fourth NPT Review Conference", Canberra, 1989: proposal of a universal nuclear weapons non-proliferation regime.
- Carnegie Endowment for International Peace, Conference on "Nuclear Non-Proliferation and the Role of Private Organizations", Washington, DC, 1989: options for reform of the non-proliferation regime.
- US Department of Energy, EIS scoping hearing, Columbia, South Carolina, 1988: appropriate scope of an EIS for new production reactor capacity.
- International Physicians for the Prevention of Nuclear War, 6th and 7th Annual Congresses, Koln, FRG, 1986 and Moscow, USSR, 1987: relationships between nuclear power and the threat of nuclear war.
- County Council, Richland County, South Carolina, 1987: implications of severe reactor accidents at the Savannah River Plant.
- Maine Land Use Regulation Commission, 1985: cogeneration potential at facilities of Great Northern Paper Company.
- Interfaith Hearings on Nuclear Issues, Toronto, Ontario, 1984: options for Canada's nuclear trade and Canada's involvement in nuclear arms control.
- Sizewell Public Inquiry, UK, 1984: safety and radioactive waste implications of the proposed Sizewell nuclear plant.
- New Hampshire Public Utilities Commission, 1983: electricity demand and supply options for New Hampshire.
- Atomic Safety & Licensing Board, US Nuclear Regulatory Commission, 1983: use of filtered venting at the Indian Point nuclear plants.
- US National Advisory Committee on Oceans and Atmosphere, 1982: implications of ocean disposal of radioactive waste.
- Environmental & Energy Study Conference, US Congress, 1982: implications of radioactive waste management.