UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OFFICE OF THE
GENERAL COUNSEL

November 9, 2001

Connie Nakahara, Esq.
Utah Attorney General's Office
160 East 300 South, 5th Floor
P.O. Box 140873
Salt Lake City, Utah 84114-0873

In the Matter of
Private Fuel Storage, L.L.C.
(Independent Spent Fuel Storage Installation)
Docket No. 72-22-ISFSI

Dear Ms. Nakahara:

In response to your E-mail message and letter of earlier today, please be advised as follows.

1. Neither I nor the NRC Staff ("Staff") has attempted to "restrict or limit" the ability of the State of Utah ("State") to depose Staff witnesses. While I regret that we were not able to identify our prospective witnesses on Contention Utah L, Part B, sooner, we did identify the witnesses as soon as we could.

2. We are agreeable to commencing the depositions of Staff witnesses on Monday, November 19, at 11:30 AM EST (although 11:00 AM appears to be preferable). We probably will need to break for lunch after a few hours, but we will work with you to assure that any breaks are reasonable, so as to allow the depositions to be completed by the end of Tuesday, November 20. We are also willing to stay until 7:00 PM on Monday, if necessary, unless the witnesses or reporter find that they are too tired to continue so late. However, I believe the deposition can be completed on Tuesday, November 20, and therefore cannot agree in advance to extend the deposition beyond that date -- particularly in consideration of the coming Thanksgiving holiday. I suggest we revisit this issue later, if you have not completed the deposition at the end of the Tuesday session.

3. We have arranged for a large conference room to be available at NRC headquarters for the deposition on Monday and Tuesday. Please have the reporter contact me for further information, and let me know if you need driving directions or the names of nearby hotels.

4. The Staff has heretofore identified two persons whom it expects to call as witnesses: Dr. John Stamatakos and Dr. Rui Chen. Copies of their qualifications are enclosed herewith. As I stated previously, we may name Dr. Martin McCann as our third witness; however, Dr. McCann has been away from his office this week, and I have to wait until Tuesday, November 13, to confirm whether he will be a witness. If he does appear as a witness, I will obtain and provide you with a copy of his qualifications, on November 13, 2001.

5. Drs. Stamatakos, Chen and McCann were among the authors of the Center for Nuclear Waste Regulatory Analyses (CNWRA) September 1999 report concerning the Private Fuel Storage, L.L.C. ("PFS") seismic exemption request, which the Staff produced to the State last year. Their testimony will address the bases for the Staff's determination to accept the PFS probabilistic seismic hazard analysis with a 2,000 year return period, which is discussed in the Staff's Safety Evaluation Report ("SER") of September 2000.

6. In response to your inquiry, you may recall that I previously stated that Dr. Chen was involved in the Staff's review of the seismic exemption request for the Three Mile Island Unit 2 ("TMI-2") ISFSI at the Idaho National Engineering and Environmental Laboratory ("INEEL"). The Staff has produced to the State a copy of the CNWRA report, which Dr. Chen co-authored, concerning that matter.

7. In response to your further inquiry, I have been advised that none of these three individuals was involved in developing the rulemaking plan in SECY-98-126 or the modified rulemaking plan in SECY-01-0178. I do not understand your additional inquiry as to whether they were involved in the "development or justification [of] guidance related to SECY-01-0178 or SECY-98-126," "any generic issues relating to NRC allowing ISFSI applicants to use a probabilistic seismic hazard analysis," or "the issue relating to allowing ISFSI applicants to use a probabilistic seismic hazard analysis." However, they were not part of the rulemaking effort.

8. Finally, in response to your inquiry, I cannot state whether I will claim any privileges during the deposition, since that will depend on the questions. However, I have stated my position that the Staff's internal discussions in the course of developing the generic rulemaking plan (as distinct from the final SECY papers, which we produced) constitute privileged, pre-decisional information; and that the disclosure of such pre-decisional information is not necessary for a proper decision in this proceeding.

I appreciate your willingness to work cooperatively in this matter, and look forward to working with you to resolve any outstanding issues.

Sincerely,

Sherwin E. Turk
Counsel for NRC Staff

Enclosures: As stated
cc w/Encl.: Service List

Rui Chen

11 Burney Drive
Chico, CA 95928

Primary Technical Areas:

* Computational, experimental, and theoretical rock mechanics and geological engineering
* Earthquake engineering and seismology, seismic hazard assessment, structural geology, and neotectonics
* Computer applications and programming

Summary of Qualifications:

* Fifteen years of post-graduate research experience
* Seven years of consulting/industrial experience
* Numerical modeling of rock deformation and fracturing
* Laboratory experience in rock testing and data acquisition
* Consulting experience in rock mechanics and geological engineering
* Application of U.S. regulations in radioactive waste management and disposal and associated compliance review

---

EDUCATION

1/89 - 2/93 Ph.D., Civil and Geological Engineering, The University of Manitoba, Winnipeg, Canada
Thesis: *In Situ and Laboratory Studies of Potash Deformation - with Reference to Saskatchewan Potash*

9/82 - 7/85 M.Sc., Seismotectonics, Graduate School, the University of Science and Technology of China and Institute of Geology, State Seismological Bureau of China, Beijing, China
Thesis: *Earthquake Mechanisms and Repeated Activities of the Western Branch of Xiaojiang Fault Zone, Southeastern Edge of the Qinghai-Tibet Plateau*

9/78 - 7/82 B.Sc., Seismology and Geomechanics, The Geological University of China at Wuhan, China
Thesis: *Earthquake Seismicity in Jiangchuang Basin*

EMPLOYMENT HISTORY

09/00 - present Independent consultant in geological engineering and geosciences

08/01- present Lecturer, Development of Civil Engineering and College of Natural Sciences, California State University, Chico

09/98 - 08/00 Senior Research Engineer, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas, USA.

04/95 - 09/98 Research Engineer, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas, USA.

07/93 - 04/95 Staff Engineer, RE/SPEC Inc., Rapid City, South Dakota, USA.

11/92 - 06/93 Consultant, RE/SPEC Inc., Rapid City, South Dakota, USA.

11/88 - 06/93 Graduate Assistant, Department of Geological Engineering, The University of Manitoba, Winnipeg, Manitoba, Canada.

09/85 - 10/88 Research Associate, Institute of Crustal Dynamics, State Seismological Bureau of China.

09/83 - 08/85 Research Assistant, Institute of Geology, State Seismological Bureau of China.

COMPUTER SKILLS

- Finite element, finite difference, and boundary element modeling and programming. Familiar with a number of commercial numerical modeling software packages, including ABAQUS, FLAC, UDEC, 3DEC, ANSYS, MAP3D and special purpose software, including SPECTROM32 and SIMEX.
- Programming for data acquisition and servo-controlling in laboratory rock testing.
- Object-oriented programming for Web and Windows-based applications using html, JAVA, and VISUAL BASIC.
- Familiar with statistical software, BMDP, and programming of non-linear regression analyses of partial differential equations for evaluating model parameters and sensitivity studies for complex constitutive models for geological materials.
- Proficiency in other software tools, including GIS software (e.g., EarthVision).

SELECTED GRADUATE COURSES

Computational Mechanics Topics, Engineering Geology, Rock Engineering and Ground Support, Finite Element Methods, Solid Mechanics, Fracture Mechanics, Advanced Rock Mechanics and Rock Fracture Mechanics, Structural Geology, Seismology, Earthquake Engineering, Tectonophysics, Seismotectonics, Geomechanics, Theoretical Geophysics, Applied Geophysics, and Quaternary Geology and Geomorphology.

MEMBERSHIPS

International Society for Rock Mechanics
American Geophysical Union
Seismological Society of America
International Association for Computer Methods and Advances in Geomechanics

EXPERIENCE

Dr. Chen's experience includes academic-based research and industry-related consulting. Her areas of expertise include experimental, theoretical, and computational rock mechanics; seismology and earthquake engineering; neotectonics; structural geology; and software development.

Dr. Chen's professional activities began in 1983 when she headed the Institute of Geology at the State Seismological Bureau (SSB) of China, in Beijing, as a research assistant. There she was involved in research projects in seismicity and earthquake mechanisms along active fault zones and in active basins in Southwestern and Northwestern China. An early project included seismicity analyses in the Jiangchuang Basin on the Honghe River Fault Zone in Southwestern China. Other projects included mapping geological and geomorphic features along the 1920 Haiyuan Earthquake (M=8.5) Fault Zone and neotectonic and geomorphic mapping, paleoseismic trenching, and seismicity analyses along the Xiaojiang Active Fault Zone. The latter study resulted in the first qualitative evaluation of the slip rate and earthquake recurrence intervals along the fault zone. These results are included in the national database for large-scale active fault zones in China.

Dr. Chen's experience in interdisciplinary research started in 1985 when she joined the Rock Mechanics Division at the Institute of Crustal Dynamics, SSB of China, Beijing, as a research associate. There, she extended her professional activities to include computational and experimental rock mechanics. She managed a project on double-shear rock friction tests for investigating the stability of fractured rock mass. Results from this study were applied to evaluate the stability of concealed fault zones and salt solution-mining induced seismicity in Zigong Anticline, Sichuan Province of China. This work included constructing a structural model for the Zigong Anticline based on geophysical survey data and back analysis of the tectonic stress field using non-linear, viscoplastic finite element methods.

From 10/88 to 06/93, Dr. Chen worked on industrial research projects in the Department of Civil and Geological Engineering at the University of Manitoba as a graduate assistant. There, she led research in two areas of rock mechanics and mining: the yield behavior of deep potash pillars and rock bimodularity. She investigated mining-induced deformation and fracturing in potash mines under contract with the Potash Corporation of Saskatchewan, with matching funding from the Natural Sciences and Engineering Research Council of Canada. The accomplishments in this research included underground mapping of deformational patterns in exposed cross sections of yield pillars after substantial deformation, and correlation of the observed deformation to time-dependent finite strain and shear failure in the pillars using modern techniques in quantitative structural geology. The research led to better understanding of the stress-control design methodology in underground soft rock mining. It also led to several external reports, papers, and presentations to government, commercial, and scientific organizations. She also performed experimental and constitutive research on potash relaxation behavior and on the differences in elastic moduli for rocks in tension and compression, adapted the results on material bimodularity to a special-purpose finite element computer program to study the influence of bimodularity on the behavior of underground structures, and developed computer codes for test control and data acquisition for a sophisticated servo-controlled material testing system. While pursuing her Ph.D. education in the University of Manitoba, she provided technical consulting services to RE/SPEC Inc. on a legal case regarding water inflow into potash mines in Esterhazy, Canada. These services included evaluation of the microseismic monitoring system at the mines, seismic data analyses, and evaluation of the effects of seismicity on mine stability.

During her employment with RE/SPEC Inc. (7/93 - 4/95), Dr. Chen served as Technical Lead on industry and government contracts and performed numerous numerical (finite element and finite difference) simulations in support of experiments at the Waste Isolation Pilot Plant (WIPP) in New Mexico for long-term containment of radioactive wastes. The areas supported include engineering design alternative analyses, and the sealing and backfill programs (crushed salt consolidation and concrete bulkhead experiments). The analyses performed used predictive technology developed for the WIPP to simulate the thermal-mechanical behavior of salt to determine the response of repository seals and closure times for rooms and shafts. She was also involved in the evaluation of consolidation constitutive models for crushed salt in support of the sealing program at the WIPP, including a state-of-the-art literature survey to select candidate models, using BMDP (a statistical software package) and self-developed computer codes to evaluate parameters and their correlations, and constitutive model development. She has also performed numerous two and three dimensional finite element and boundary element modeling studies on underground mining and storage caverns to determine safe operating conditions and to evaluate structural integrity. This work was performed for commercial clients including DynMcDermott Petroleum Operations Company, the Dow Chemical Company, the Warren Petroleum Company, Texas Eastern Products Pipeline Company, and AKZO Mining Company, etc. Another of her interest areas is object-oriented software development for Windows-based applications. She developed a graphical user interface (Visual SalGas) for Solution Mining Research Institute's commercial software known as SALGAS (a numerical leaching model with cavity hydraulics and gaseous pad calculations for design of salt rock solution caverns). A demo-version of Visual SalGas was distributed to SMRI memberships world wild and the full-version has been purchased by companies in the United States, Canada, and Europe.

At the Center for Nuclear Waste Regulatory Analyses (CNWRA) at Southwest Research Institute (SwRI), Dr. Chen performed technical activities related to geological engineering to assist the Nuclear Regulatory Commission (NRC) in licensing the nation's first geological repository for high-level radioactive waste, which is proposed to be developed at Yucca Mountain, Nevada. She was involved in CNWRA analyses of mechanical, thermal, and hydrological processes in complex geomechanical and geotechnical engineering systems. She was involved in review of technical reports produced by the U.S. Department of Energy in supporting its license application for the proposed Yucca Mountain repository in areas such as site geology and seismology, repository design and construction (including seismic design of surface and subsurface facilities), and stability analyses of emplacement drifts and ground support under thermal and dynamic loads for preclosure safety and postclosure performance assessments. She performed independent confirmatory analyses and research to support such reviews. Her role at the CNWRA also includes a Project Manager for geomechanical analyses and their application in gas, oil, and underground storage industries for commercial clients. She was also a Principal Investigator in providing technical support, including evaluation of seismic hazard analyses and seismic design, for the NRC licensing activities related to the nation's spent nuclear fuel dry-storage facilities, including TMI-2 ISFSI and the proposed Private Fuel Storage Facility. These evaluations included review and independent analyses and provided input to the NRC safety evaluation reports, environmental impact statements, and other National Environmental Policy Act documentation required under Title 10 Code of Federal Regulations. She also conducted geotechnical review and independent analyses to support NRC regulation of the uranium mining industry, including slope stability, foundation stability, and liquefaction analyses.

Since relocating to California and becoming an independent consultant, she has provided technical assistance and consulting services to CNWRA at SwRI in solving a broad range of problems in underground rock engineering, seismic hazard assessment, and earthquake engineering. She is also teaching graduate and undergraduate courses at California State University, Chico.

LIST OF PUBLICATIONS

a). Refereed Journals and Conference Proceedings

Chen, R., G.I. Ofoegbu, and S.M. Hsiung. 2000. Modeling drift stability in fractured rock mass at Yucca Mountain, Nevada - Discontinuum approach. *Proceedings, the Fourth North American Rock Mechanics Symposium, Rock Around the Rim,* the University of Washington, Seattle, Washington, July 31 - August 3, 2000.

Ofoegbu, G.I., S. Painter, R. Chen, R.W. Fedors, and D.A. Ferrill. Geomechanical and thermal effects on moisture flow at the proposed Yucca Mountain Nuclear Waste Repository. *Nuclear Technology.* In press.

Chen, R. 1999. Analyses of drift stability and rockfall due to earthquake ground motion at Yucca Mountain, Nevada. *Proceedings of the 37th U.S. Rock Mechanics Symposium, Rock Mechanics for Industry*, B. Amadei, R.L. Kranz, G.A. Scott, and P.H. Smeallie, eds., 759-766.

Chen, R., M.P. Ahola, S.M. Hsiung, and A.H. Chowdhury. 1999. Thermal-mechanical stability of emplacement drifts for a proposed nuclear waste repository at Yucca Mountain. *Environmental Geotechnology 1&2: Proceedings, 4th International Symposium on Environmental Geotechnology and Global Sustainable Development,* August 9-13, 1998, Boston, MA.

Institutional Review - Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, Submitted to *The International Handbook of Earthquake and Engineering Seismology,* per invitation by the editor.

Stamatakos, J.A., D.A. Ferrill, A.P. Morris, D. Sims, and R. Chen. 1999. Structural evolution of Crater Flat Basin, South Central Nevada, USA. Accepted for presentation at *the 1999 International Geologic Conference*, to be held in Rio de Janeiro, August 2000.

Stamatakos, J.A., P.S. Justus, A. Ghosh, S. Hsiung, M. Miklas, R. Chen, and A-b.K. Ibrahim. Evaluation of radiological risk from seismotectonic processes at the candidate high-level repository at Yucca Mountain Nevada, USA, Accepted for presentation at *the 1999 International Geologic Conference*, to be held in Rio de Janeiro, August 2000.

Stamatakos, J.A., D.A. Ferrill, A.P. Morris, D. Sims, and R. Chen. 1999. Three-dimensional geometry of the Bare Mountain Fault (Nevada): Implications for Fault Kinematics and Basin Evolution. *EOS Supplement*, April 27., 1999 Spring Meeting, S328-S329.

Chen, R. and B. Stimpson. 1997, Simulation of deformation and fracturing in potash yield pillars, *Canadian Geotechnical Journal* 34(2): 283-292.

Chen, R. and L.J. Lorig. 1997. Numerical modeling of the effects of fault slip on fluid flow around extensional faults: Discussion. *Journal of Structural Geology* 19(11): 1423-1426.

Chen, R. and B. Stimpson. 1995. Triaxial stress relaxation tests on Saskatchewan potash. *Canadian Geotechnical Journal* 32: 11-21.

Chen, R., G.D. Callahan, M.C. Loken, and F.D. Hansen. 1995. Research on crushed-salt constitutive model development. Abstract for the *IUGG XXI General Assembly*, July 2-14, Boulder, Colorado.

Ratigan, J.L., J.D. Nieland, R.Chen, K.D. Mellegard, and T.W. Pfeifle. 1995. Numerical modeling of Weeks Island subsidence and laboratory testing of Weeks Island salt. *Proceedings of the Solution Mining Research Institute 1995 Spring Meeting*, April 30-May 3, New Orleans, Louisiana.

Zhang, B. C., R. Chen, and L. Hong. 1995. Relationship between seismicity and water injection in Ziliujing Anticline. *International Symposium on Reservoir-Induced Seismicity (ISORIS'95)*, Beijing, China.

Chen, R., W.C. Brisbin, and B. Stimpson. 1993. Mining induced deformation in potash yield pillars, Vanscoy, Saskatchewan. *Canadian Geotechnical Journal* 30: 297-307.

Chen, R. and B. Stimpson. 1993. Indirect tension tests on rock - analytical/numerical correction for material bimodularity. *ASTM Geotechnical Testing Journal* 16: 238-245.

Chen, R. and B. Stimpson. 1993. Interpretation of indirect tensile strength tests when moduli of deformation in compression and in tension are different. *Rock Mechanics and Rock Engineering* 26: 183-189.

Stimpson, B. and R. Chen. 1993. Measurement of rock elastic moduli in tension and in compression and its practical significance. *Canadian Geotechnical Journal* 30: 338-347.

Zhang, B.C., R. Chen, H. Li, Y.N. Qi, J.Z. Mao, P. Liu, and F.Q. Li. 1993. Relationship between seismicity and water injection in Ziliujing Anticline. *ACTA Seismologica Sinica* 6(3): 769-774.

Zhang, B.C., R. Chen, H. Li, Y.N. Qi, J.Z. Mao, P. Liu, and F.Q. Li. 1993. Relationship between seismicity and water injection in Ziliujing Anticline. *Earthquake Research* 15(2): 253-256 (in Chinese).

Chen, R., W.C. Brisbin, and B. Stimpson. 1992. A hypothesis for yield pillar behavior in potash mining based on field observations. *Proceedings, 16th Canadian Rock Mechanics Symposium*, P.K. Kaiser & D.R. McCreath eds., June 15-19, Sudbury, Canada, 85-92.

Chen, R., M.L. Ayari, and B. Stimpson. 1991. Influence of material bimodularity on the behavior of underground mining structures. *Proceedings, 13th Canadian Congress of Applied Mechanics*, Winnipeg, Canada, 720-721.

Chen, R. and B. Stimpson. 1991. The measurement of rock moduli in compression and tension and its practical significance. *Proceedings, 44th Canadian Geotechnical Conference,* Sept. 29-Oct. 2, 1991, Calgary, Canada. Paper No. 34.

Stimpson, B. and R. Chen. 1991. A new technique for measuring the bimodularity of rock. *Proceedings, 13th Canadian Congress of Applied Mechanics*, Winnipeg, Canada, 788-789.

Chen, R., B.Z. Zhang, Y.N. Qi, S.G. Lo, and L. Pong. 1990. Inversion of tectonic stress field and construction of structural model for Zigong Anticline, Southwestern China. *Crustal Tectonic Movements* 3: 187-199 (in Chinese).

Chen, R. 1989. Grey system and its application in geological sciences. *Bulletin of Young Scientist Society in Institute of Crustal Dynamics, State Seismological Bureau of China* 3: 5-7 (in Chinese).

Zhao, X. and R. Chen. 1989. The wedge rotation basins and barrier structures in stick-slip fault zones. *Earthquake Research in China* 5(3): 55-60 (in Chinese).

Chen, R. and P. Li. 1988. Slip rate and earthquake recurrence intervals on the western branch of Xiaojiang Fault Zone in China. *Seismology and Geology* 10(2): 1-13 (in Chinese).

Chen, R., Y.S. Ma, and B.Z. Zhang. 1987. Distribution of stresses and displacement along fractures in double shear experiments. *Special Volume of the 2nd National Symp. on Tectonophysics*, Beijing, China, 344-368 (in Chinese).

Ma, Y.S. and R. Chen. 1987. Experimental research on double shear friction. *Special Volume of the Second National Symp. on Tectonophysics*, Beijing, China, 152-164 (in Chinese).

b). **Reports**

Chen, R. 2000. *Thermal-Mechanical Effects on Ground Support Design and Drift Performance in Fractured Rock Mass at Yucca Mountain, Nevada.* CNWRA2000-04. Prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission.

Chen, R., J. Stamatakos, and A.H. Chowdhury. 1999. *Review of the Probabilistic Seismic Hazard Analyses for the Paducah Gaseous Diffusion Plant - Final Report,* prepared by Center for Nuclear Waste Regulatory Analyses for Division of Fuel Cycle Safety and Safeguards, Nuclear Regulatory Commission, September.

Chen, R., P. Mackin, and J. Weldy. 1999. *Technical Evaluation Report, Kennecott Uranium Company Reclamation Plan for the Sweetwater Uranium Project.* Prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission. May.

Issue Resolution Status Report, Key Technical Issue: Repository Design and Thermal-Mechanical Effects—Revision 3, Prepared for Division of Waste Management Office of Nuclear Material Safety and Safeguards, Nuclear Regulatory Commission, July, 2000. (With S. Hsiung, G. Ofoegbu, A. Chowdhury, and R. Nataraja).

Issue Resolution Status Report, Key Technical Issue: Structural Deformation and Seismicity Chapter 4.0-Revision 3, Prepared for Division of Waste Management Office of Nuclear Material Safety and Safeguards, Nuclear Regulatory Commission, July, 2000. (With J. Stamatakos and others).

Hsiung, S., G. Ofoegbu, R. Chen, A. Chowdhury, and R. Nataraja. 1999. *Issue Resolution Status Report, Key Technical Issue: Repository Design and Thermal-Mechanical Effects-Revision 2*, Prepared by Center for Nuclear Waste Regulatory Analyses for Division of Waste Management Office of Nuclear Material Safety and Safeguards, Nuclear Regulatory Commission, July.

Stamatakos, J., R. Chen, M. McCann, and A. H. Chowdhury. 1999. *Seismic Ground Motion and Faulting Hazard at Private Fuel Storage Facility in the Skull Valley Indian Reservation, Tooele County, Utah - Final Report,* prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission, September.

Chen, R. 1998. *Analyses of Drift Instability and Rockfall Due to Earthquake Ground Motion at Yucca Mountain, Nevada*: Progress Report, prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission, September.

Chen, R. 1998. *Salt Deposits in China, Phase I: Reconnaissance Survey*, final project summary report, prepared by Center for Nuclear Waste Regulatory Analyses for Salt Mining/Storage & Pipeline Technology Center, The Dow Chemical Company, June.

Chen, R. and A.H. Chowdhury. 1998. *Seismic Ground Motion at Three Mile Island Unit 2 Independent Spent Fuel Storage Installation Site in Idaho National Engineering and Environmental Laboratory - Final Report,* CNWRA 98-007, prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission.

Chen, R., J. Stamatakos, and A.H. Chowdhury. 1998. *Final Review Plan for Probabilistic Seismic Hazard Assessment of Paducah Site*, letter report, prepared by Center for Nuclear Waste Regulatory Analyses for Division of Fuel Cycle Safety and Safeguards, Nuclear Regulatory Commission, April.

Deere, L., A. Armstrong, R. Chen, A. Chowdhury, B. Hill, P. Mackin, M. Miklas, D. Pomerening, J. Simonis, J. Weldy, and D. Deere. 1998. *Safety Evaluation Report of Three Mile Island Unit 2 Independent Spent Fuel Storage Installation Safety Analysis Report.* Prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission. November.

Ghosh, A., J. Stamatakos, S. Hsiung, R. Chen, A.H. Chowdhury, and H.L. McKague. 1998. *Key Technical Issue Sensitivity Analysis with SEISMO and FAULTO Modules Within the TPA (Version 3.1.1) Code*, letter report, prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission., February.

Green, R.T., R. Chen, A. Armstrong, and G. Rice. 1998. *Thermal-Hydrologic Modeling Progress Report,* letter report, prepared by Center for Nuclear Waste Regulatory Analyses for Division of Waste Management, Nuclear Regulatory Commission, May.

Hsiung, S., G. Ofoegbu, R. Chen, A. Chowdhury, and R. Nataraja. 1998. *Issue Resolution Status Report, Key Technical Issue: Repository Design and Thermal-Mechanical Effects-Revision 1*, Prepared by Center for Nuclear Waste Regulatory Analyses for Division of Waste Management Office of Nuclear Material Safety and Safeguards, Nuclear Regulatory Commission, June.

Stamatakos, J.A., D.F. Ferrill, D. Sims, and R. Chen. 1998. *Technical Input on Review and Acceptance Criteria for Issue Resolution Status Report, Rev 1.0, Key Technical Issue: Structural Deformation and Seismicity*. Prepared by Center for Nuclear Waste Regulatory Analyses for Office of Nuclear Material Safety and Safeguards, Nuclear Regulatory Commission. May.

Turner, D.R., J. Weldy, A. Armstrong, R. Chen, and A.H. Chowdhury. 1998. *Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation to Store the Three Mile Island Unit 2 Spent Fuel at the Idaho National Engineering and Environmental Laboratory*, NUREG-1626. Prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission.

Chen, Rui, G.I. Ofoegbu, and D.A. Ferrill. 1997. *Geomechanical Modeling of an Actively Deforming Salt Body*. Final Report, prepared by Center for Nuclear Waste Regulatory Analyses for Shell E&P Technology Co.

Turner, D.R., A. Armstrong, R. Chen, A.H. Chowdhury, and J. Weldy. 1997. *Initial Review to Evaluate the Adoption of the U.S. Department of Energy Programmatic Environmental Impact Statement and Environmental Assessment for the Nuclear Regulatory Commission Environmental Impact Statement*, letter report, prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission, August.

Ahola, M.P., R. Chen, H. Karimi, S.M. Hsiung, and A.H. Chowdhury. 1996. *A Parametric Study of Drift Stability in Jointed Rock Mass, Phase I: Discrete Element Thermal-Mechanical Analysis of Unbackfilled Drifts*. CNWRA 96-009, Prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission.

Ghosh, A., R. Chen, M.P. Ahola, and A.H. Chowdhury. 1996. *Review Comments on ESF Alvove Ground Support Analysis, and ESF Ground Support - Structural Steel Analysis*. Prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission.

Hsiung, S.M., R. Chen, A.H. Chowdhury, A. Ghosh, M.S. Nataraja, and B.N. Jagannath. 1996. Repository Design and Thermal-Mechanical Effects. *NRC High-Level Radioactive Waste Program Annual Progress Report: Fiscal Year 1996*, Chapter 7, NUREG/CR-6513, No.1, p. 7-1 through 7-19.

Stamatakos, J.A., P.S. Justus, D.A. Ferrill, R. Chen, and G.I. Ofoegbu. 1996. Structural Deformation and Seismicity, *NRC High-Level Radioactive Waste Program Annual Progress Report: Fiscal Year 1996*, Chapter 3, NUREG/CR-6513, No.1, p. 3-1 through 3-33.

Chen, R. and M.C. Loken. 1995. *Effect of Radial Clay Waterstop on DRZ Development Around the Shafts at WIPP*, Calculation File 325/10/01, prepared by RE/SPEC Inc., Rapid City, SD, for Sandia National Laboratories, Albuquerque, NM.

Chen, R. and H. Karimi. 1995. *Review Comments on Exploratory Studies Facility Design Package 2C: Topopah Spring North Ramp*, prepared by Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas, for Nuclear Regulatory Commission, Contract NRC-02-93-005.

Chen, R. and H. Karimi. 1995*b*. *Review Comments on Site Characterization Progress Report: Yucca Mountain, Nevada-Number 11*, prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission.

Callahan, G.D., M.C. Loken, L.L. Van Sambeek, R. Chen, T.W. Pfeifle, J.D. Nieland, and F.D. Hansen. 1995. *Evaluation of Potential Crushed-Salt Models*, SAND95-2143, prepared by RE/SPEC Inc., Rapid City, SD, for Sandia National Laboratories.

Hsiung, S.M., A. Ghosh, G.L. Stirewalt, B. Henderson, C.A. Fenrich, and R. Chen. 1995. *Development of Rock Mechanics Properties Database - Progress Report*, Prepared by Center for Nuclear Waste Regulatory Analyses for Nuclear Regulatory Commission.

Chen, R. 1994*a*. *DRZ Extent Around the Lower Short-Term Seal of the Air Intake Shaft*, Calculation File 325/03/03, prepared by RE/SPEC Inc., Rapid City, SD, for Sandia National Laboratories, Albuquerque, NM.

Chen, R. 1994*b*. *Literature Review of the Constitutive Model for Crushed Salt*, Calculation File 325/04/02, prepared by RE/SPEC Inc., Rapid City, SD, for Sandia National Laboratories, Albuquerque, NM.

Chen, R. and M.C. Loken. 1994. *Concrete/Steel Panel Seal Structural Response*, Calculation File 325/03/01, prepared by RE/SPEC Inc., Rapid City, SD, for Sandia National Laboratories, Albuquerque, NM.

Chen, R. and J.D. Nieland. 1994. *Determination of Effective Seal Vertical Thickness as a Function of Time*, Calculation File 325/05/02, prepared by RE/SPEC Inc., Rapid City, SD, for Sandia National Laboratories, Albuquerque, NM.

Chen, R. and J.D. Nieland. 1994. *Effect of Initial Density of Crushed Salt on WIPP Shaft Seals*, Calculation File 325/05/04, prepared by RE/SPEC Inc., Rapid City, SD, for Sandia National Laboratories, Albuquerque, NM.

Chen, R., J.D. Osnes, and J.L. Ratigan. 1994. *Visual SalGas User's Manual (Version 1.20)*, prepared by RE/SPEC Inc., Rapid City, SD, RSI-0528, for Marketing Recipients.

Chen, R., J.D. Osnes, and J.L. Ratigan. 1994. *Visual SalGas User's Manual (Version 1.10)*, prepared by RE/SPEC Inc., Rapid City, SD, RSI-0499, for Dow Hydrocarbons, Plaquemine, LA.

Chen, R. and J.L. Ratigan. 1994. *Incremental Casing Stresses in Warren Petroleum LPG Storage Well No. 23*, external memorandum, RSI(RCO)-171/4-94/38, prepared by RE/SPEC Inc., Rapid City, SD, for the Warren Petroleum Company.

Nieland, J.D., R. Chen, and J.L. Ratigan. 1994. *Numerical Modeling of Weeks Island Subsidence*, prepared by RE/SPEC Inc., Rapid City, SD, RSI-0509, for DynMcDermott Petroleum Operations Company, New Orleans, LA.

Ratigan, J.L., R. Chen, and J.D. Osnes. 1993. *Geomechanics Modeling of Salt Web Between Dow Wells No. 11 and No.14*, external memorandum, RSI(RCO)-288/9-93/20, prepared by RE/SPEC for Dow Chemical Company.

Chen, R., W.C. Brisbin, and B. Stimpson. 1991. Mining-Induced Deformation in Potash Yield Pillars. *Fracture in Potash*, NSERC Research Partnership Program, Department of Geological Engineering, University of Manitoba, Report No. 21, 1-19.

Chen, R. and B. Stimpson. 1991. *Material Bimodularity - Theoretical and Numerical Solutions*, report, Department of Geological Engineering, University of Manitoba.

Chen, R., Y.G. Yuan, and M.L. Ayari. 1991. *A Microcomputer-Based, Interactive FEM Program Incorporating Material Bimodularity*, report, Department of Geological Engineering, University of Manitoba.

Chen, R. and B. Stimpson. 1990. *Summary of Multiple-Stage Repeated Relaxation and Reverse Loading Triaxial Tests on Evaporites*, report, Department of Geological Engineering, University of Manitoba.

Li, F. Q., B. Z. Zhang, R. Chen. 1988. *Characteristics of Crustal Stress Field Around the Proposed Three Gorges Dam and Its Implications to Reservoir-Induced Seismicity*, progress report to State Council of China (in Chinese).

JOHN STAMATAKOS

Senior Research Scientist
Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute
6220 Culebra Rd. (Bldg. 189)
San Antonio, Texas 78238

EDUCATION:

B.A., Geology, Franklin and Marshall College, Lancaster, Pennsylvania, 1981
M.S., Geology, Lehigh University, Bethlehem, Pennsylvania, 1988
Ph.D., Geology, Lehigh University, Bethlehem, Pennsylvania, 1990

GENERAL QUALIFICATIONS:

Dr. Stamatakos is a structural geologist and geophysicist with international research experience in regional and global tectonics. Dr. Stamatakos has conducted research on a range of topics including paleomagnetism, neotectonics, kinematics of fault block rotations in strike-slip, normal, and thrust fault systems, effects of internal strain on the magnetic properties of deformed rocks, evolution of curvature in arcuate mountain belts, and age and sequence of deformation in folded and faulted mountain belts. This research has focused on the northern and central Appalachians in the eastern United States and Canada, the Hercynian mountains in Germany and northern Spain, the Rocky Mountains and Basin and Range in the western United States, and the northern Cordilleran Mountains in Alaska. Other strengths include numerical modeling of deformation, magnetostratigraphy, rock magnetism, and exploration geophysics.

As a Research Scientist in the Center for Nuclear Waste Regulatory Analyses, Dr. Stamatakos is a Principal Investigator for structural deformation and seismicity, including tectonics and neotectonics research. Tectonics research at CNWRA currently includes compiling a tectonics Geographic Information System (GIS) database, field analyses of the structural and tectonic elements of the Basin and Range province in southwestern United States, evaluation of seismic and faulting hazards at nuclear facilities, and the development of tectonic models for the region surrounding the proposed high-level nuclear waste repository at Yucca Mountain, Nevada. These investigations, sponsored by the U.S. Nuclear Regulatory Commission, currently support development of the tectonic framework for evaluation of risk of earthquakes and volcanic activity, and the effects of structures and tectonic processes on groundwater flow in the region surrounding Yucca Mountain.

Prior to coming to CNWRA, Dr. Stamatakos held positions as a visiting faculty at the University of Michigan and as a postdoctoral fellow at the Eidgenössische Technische Hochschule (ETH) in Zurich, Switzerland. At the University of Michigan, Dr. Stamatakos taught courses in field mapping, structural geology, geophysics, and tectonics.

Dr. Stamatakos has written or collaborated on nearly 50 papers and reports on structural geology, tectonics, and geophysics. He has made presentations at international conferences in the U.S., Canada, and Europe and has won an outstanding paper award from the American Geophysical Union.

Dr. Stamatakos is associate editor of the Geological Society of America Bulletin, former GP Editor for EOS of the American Geophysical Union, and is a regular reviewer of papers for the Journal of Geophysical Research, Earth and Planetary Science Letters, Journal of Geophysics, Journal of Structural Geology, Physics of the Earth and Planetary Sciences, Tectonophysics, Journal of Geology, Geophysical Journal International, Geological Society of America Bulletin, and Geophysical Research Letters as well as grant proposals for the National Science Foundation.

Acquired NSF and similar institutional grant support for research. Taught geology and geophysics at both undergraduate and graduate levels, including two summer field camp sessions. Co-developed and taught advanced field course for petroleum-industry geologists. Supervised undergraduate, master, and Ph.D. research, including service as external committee member on several masters theses and a Ph.D. dissertation.

Memberships: Geological Society of America, American Geophysical Union, Sigma Xi.

PROFESSIONAL EXPERIENCE

1996-2001: Senior Research Scientist, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

1995-1996: Research Scientist, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

1995-2001: Adjunct Research Scientist, Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan

1999-2001: Adjunct Professor, Incarnate Word University, Palo Alto College, University of Texas at San Antonio, all in San Antonio, Texas.

1992-1994: Visiting Assistant Professor, Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan.

1990-1992: Research Associate: Eidgenössische Technische Hochschule (ETH), Institut für Geophysik, Zürich, Switzerland.

1984-1990: Research and Teaching Assistant, Lehigh University, 1984–1990.

1981-1983: Petroleum Geologist, Analex Geosciences, 1981–1983.

RESEARCH INTERESTS:

Global and regional tectonics through the study of earthquake seismology, paleomagnetism, structural geology, neotectonics, magnetostratigraphy, potential-field geophysics (gravity and magnetics), fission-track thermochronology, and numerical modeling.

PUBLICATIONS

Stamatakos, J.A., J. M. Trop, and K. D. Ridgway, 2001, Late Cretaceous paleogeography of Wrangellia: Paleomagnetism of the MacColl Ridge Formation, southern Alaska, Revisited: *Geology*, v29, p.947–950.

Ferrill, D.A., A.P. Morris, J.A. Stamatakos, and D. Sims, 2000, Crossing Conjugate Normal Fault: *American Association of Petroleum Geologists*, v. 84, p. 1543–1559.

Connor, C.B., J.A. Stamatakos, D.A. Ferrill, B.E. Hill, G.O. Ofoegbu, M.F. Conway, B. Sagar, and J. Trapp, 2000, Geological factors controlling patterns of small-volume basaltic volcanism: Application to a volcanic hazards assessment at Yucca Mountain, Nevada: *Journal of Geophysical Research*, v. 105, p. 417–432.

Ferrill., D.A., J.A. Stamatakos, and D. Sims, 1999, Normal fault corrugation: Implications for growth and seismicity of active normal faults: *Journal of Structural Geology*, v. 21, p.1027-1038, 1999.

D. Sims, D.A. Ferrill, and J.A. Stamatakos, 1999, Role of ductile décollement zone horizons in the development of pull-apart basins: Experimental results and natural examples: *Journal of Structural Geology*, v. 21, p. 533–554.

Stamatakos, J.A., and D.A. Ferrill, 1998, Comment on "Strike-slip fault system in Amargosa Valley and Yucca Mountain, Nevada," *Tectonophysics*, v. 294, p. 151–160.

Stamatakos, J.A., D.A. Ferrill, and K.P. Spivey, 1998, Paleomagnetic constraints on the tectonic evolution of Bare Mountain, Nevada, *Geological Society of America Bulletin*, v. 100, p. 1530–1546.

Connor, C.B., J.A. Stamatakos, D.A. Ferrill, and B.E. Hill, 1998, Comment on "Anomalous strain accumulation in the Yucca Mountain area", Nevada, *Science*, v. 282, p.107b.

Ferrill, D.A., Morris, A.P., S.M. Jones, and J.A. Stamatakos,1998, Extensional layer-parallel shear and normal faulting, *Journal of Structural Geology*, v. 20, p. 355–362.

Gray, M. B., and J. A. Stamatakos, 1997, A new model for evolution of fold and thrust belt curvature based on integrated structural and paleomagnetic results around the Pennsylvania salient, *Geology*, v. 25, p.1067–1070.

Clyde, W. C., J. P. Zonneveld, J. A. Stamatakos, G. G. Gunnell, and W. S. Bartels, 1997, Magnetostratigraphy across the Wasatchian-Bridgerian boundary (Early to Middle Eocene) in the western Green River basin, *Journal of Geology*, v. 105, p. 657–669.

Ofoegbu, G. I., D. A. Ferrill, K. J. Smart, and J. A. Stamatakos, 1997, Uncertainties in earthquake magnitudes from surface displacements based on finite element modeling, *International Journal of Rock Mechanics and Mining Science*, v. 34, no 3-4, paper number 233.

Van der Voo, R., J. A. Stamatakos, and J. M. Parés, 1997, Kinematic constraints on thrust-belt curvature from syndeformational magnetizations in the Lagos del Valle Syncline in the Cantabrian Arc, Spain, *Journal of Geophysical Research,* v. 102, p.10,105–10,119.

Connor, C. B., S. Lane-Magsino, J. A. Stamatakos, R. H. Martin, P. C. LaFemina, B. H. Hill, and S. Lieber, 1997, Magnetic surveys help reassess volcanic hazards at Yucca Mountain, Nevada, *EOS, Transactions of the American Geophysical Union,* v. 78: p. 73, 77–78.

Ferrill, D.A., J.A. Stamatakos, and H.L. McKague, Quaternary slip history of the Bare Mountain fault (Nevada) from the morphology and distribution of alluvial fan deposits: REPLY, *Geology,* v. 25, p. 190.

Conway, F.M., D.A. Ferrill, C.M. Hall, A.P. Morris, J.A. Stamatakos, C.B. Connor, A. Halliday, and C. Condit, 1997, Timing of volcanism along the Mesa Butte Fault in the San Francisco Volcanic Field, Arizona from $^{40}AR/^{39}Ar$ Ages: Implications for the longevity of cinder cone alignments, *Journal of Geophysical Research,* v. 102, p. 815–824.

Stamatakos, J.A., C.B. Connor, and R.H. Martin, 1997, Quaternary volcanism and basin evolution of Crater Flat, Nevada from detailed ground magnetic surveys of the Little Cones, *Journal of Geology,* v. 105, p. 319–330.

Ferrill, D.A., Stamatakos, J.A., S.M. Jones, Rahe, B., McKague, H.L., R.H. Martin, and A.P. Morris, 1996, Quaternary slip history of the Bare Mountain Fault (Nevada) from the morphology and distribution of alluvial fan deposits, *Geology,* v. 24, p. 559–562.

Todaro, S. M., J. Stamatakos, B. A. van der Pluijm, and R. Van der Voo, 1996, Near-Laurentian paleogeography of the Lawrence Head volcanics of central Newfoundland, northern Appalachians, *Tectonophysics,* v. 263, p. 107–121.

Parés, J. M., R. Van der Voo, and J. Stamatakos, 1996, Paleomagnetism of Permian and Triassic redbeds of NW Spain and their bearing on the tectonic evolution of the Cantabrian Arc, *Geophysical Journal Internationa*l, v. 126, p. 893–901.

Stamatakos, J., A. M. Hirt, and W. Lowrie, 1996, The age and timing of folding in the central Appalachians from paleomagnetic data, *Geological Society of America Bulletin,* v. 108, p.815–829.

Stamatakos, J., A. Lessard, R., B. A. van der Pluijm, and R. Van der Voo, 1995, Paleomagnetic and magnetic fabric results from the Springdale and Wigwam redbeds of Newfoundland and their implications for the Silurian paleopole controversy, *Earth and Planetary Science Letters,* v. 132, p.141–155.

Pares, J. M., R. Van der Voo, J. Stamatakos, and A. Pérez-Estaún, 1994, Remagnetization and post-folding oroclinal rotations in the Cantabrian/Asturian Arc, northern Spain, *Tectonics,* v. 13, p.1461–1471.

Clyde, William C., J. Stamatakos, and P. D. Gingerich, 1994, Chronology of the Wasatchian Land-Mammal Age (Early Eocene): Magnetostratigraphic results from the McCullough Peaks Section, northern Bighorn Basin Wyoming, *Journal of Geology,* v. 102, p. 367–377.

Stamatakos, J., R. Van der Voo, B. van der Pluijm, S. Potts, and T. Torsvik, 1994, Comment on the Early Silurian Paleolatitude of the Springdale Group redbeds of central Newfoundland: A paleomagnetic determination with a remanence anisotropy test for inclination error, *Geophysical Journal International,* v. 119, p.1009–1013.

van Der Pluijm, B. A., R. Van der Voo, S. S. Potts, and J. Stamatakos, 1993, Early Silurian paleolatitudes for central Newfoundland from paleomagnetism of the Wigwam Formation: Discussion, *Canadian Journal of Earth Sciences*, v. 30, p.644–645.

Stamatakos, J. and A. M. Hirt, 1993, Paleomagnetic considerations of the development of the Pennsylvania salient in the central Appalachians, *Tectonophysics,* v. 231, p. 237–255.

Stamatakos, J. and K. P. Kodama, 1991, The effects of grain scale deformation on the Bloomsburg Formation pole; *Journal of Geophysical Research*, v. 96, p. 17,919–17,933.

Stamatakos, J. and K. P. Kodama, 1991, Flexural flow folding and the paleomagnetic fold test; An example of strain reorientation of remanence in the Mauch Chunk Formation; *Tectonics,* v. 10, p. 807–819.

Stamatakos, J., K. P. Kodama, T. P. Pavlis, and L. Vittorio, 1989, Paleomagnetism of Cretaceous and Paleocene sedimentary rocks across the Castle Mountain Fault, south central Alaska: in J. W. Hillhouse ed., *Deep Structure and Past Kinematics of Accreted Terranes, IUGG, Geophysics Monograph 50*, p. 151-177.

Stamatakos, J., K. P. Kodama and T. P. Pavlis, 1988, Paleomagnetism of Eocene plutonic rocks, Matanuska Valley, Alaska, *Geology*, v. 16, p. 618–622.

Reports

Waiting, D.J., R. Chen, J.G. Crider, W.M. Dunne, R.W. Fedors, D.A. Ferrill, M.B. Gray, B.E. Hill, P.C. LaFemina, H.L. McKague, A.P. Morris, D.W. Sims, and J.A. Stamatakos. 2001. Technical Assessment of Structural Deformation and Seismicity at Yucca Mountain, Nevada: Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

Stamatakos, J.A., S, Hsiung, and A.H. Chowdhury. 2001. Final Review Plan for Seismic and Geotechnical Hazards Assessment of Mixed Oxide Fuel Fabrication Facility, Savannah River Site, South Carolina: Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

Stamatakos, J.A, and K.P. Kodama. 2001. Strain and Paleomagnetism in the Bloomsburg Formation at the Delaware Gap Fold: *Guidebook for the 66th Annual Field Conference of Pennsylvania Geologists*, p. 28–34.

Stamatakos, J.A., A.H. Chowdhury. M.P. Miklas, R.T. Green, T. Krauthammer, and C.B. Connor, 2000, Review of Site Characteristics of Naval Reactors Spent Fuel ISFSI Site at INEEL: Preliminary Safety Evaluation Report - Final Letter Report, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

Farrell, D.A., A. Armstrong, J.R. Winterle, D.R. Turner, D.A. Ferrill, J.A. Stamatakos, N.M. Coleman, M.B. Gray, S.K. Sandberg. 1999. Structural controls on groundwater flow in the Yucca Mountain region, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

Chen, R., J.A. Stamatakos, A.H Chowdhury. 1999. Review of the Probabilistic Seismic Hazard Analyses for the Paducah Gaseous Diffusion Plant - Final Report, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

Stamatakos, J.A., R. Chen, M.W. McCann, Jr, A.H. Chowdhury. 1999. Seismic Ground Motion and Faulting Hazard at Private Fuel Storage Facility in the Skull Valley Indian Reservation, Tooele County, Utah, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

Justus, P.S., J.A., Stamatakos, D.A., Ferrill, and H.L.McKague. 1998, U.S. Nuclear Regulatory Commission's Resolution Report on Type I Faults and Tectonic Models: *Proceedings of the Eighth International Conference of High-Level Radioactive Waste Management, American Nuclear Society*, p. 233–235.

Chen, R., J.A. Stamatakos, and A.H. Chowdhury. 1998. Final Review Plan for Probabilistic Seismic Hazard Assessment of Paducah Site: Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

Ferrill., D.A., J.A. Stamatakos, and D. Sims, 1997, Faults, traps, compartments and conduits: What hydrocarbons find that you may miss, Advance Field Course for Petroleum Geologists. Southwest Research Institute, San Antonio, Texas.

Stamatakos, J.A., P.S. Justus, D.A. Ferrill, R. Chen, and G.I. Ofoegbu, 1997, Structural Deformation and Seismicity, in *NRC High-Level Radioactive Waste Program Annual Progress Report: Fiscal Year 1996. NUREG/CR-6513, CNWRA96-OIA*, Budhi Sagar, ed., San Antonio, Texas.

Stamatakos, J.A., D.A. Ferrill, D.P. Cederquist, and R. Van der Voo, 1996, Structural framework of Alleghanian sequential deformation in the southwestern limb of the Pennsylvania salient from paleomagnetic and rock magnetic studies, in R. P. Nickelsen ed., *61st Annual Field Conference of Pennsylvania Geologists Guidebook*, p. 14–26.

McKague, L. J.A. Stamatakos, and D.A. Ferrill, 1996, Type I faulting in the Yucca Mountain Region, CNWRA 96-007, Center for Nuclear Waste regulatory Analyses, San Antonio, Texas.

Stamatakos, J.A., and D.A. Ferrill, 1996, *Tectonic Processes in the Central Basin and Range Region*, NRC High-Level Radioactive Waste Research at CNWRA, July-December, 1995, CNWRA 95-02S,B. Sagar, ed., Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas, p. 6.1–6.25.

Ferrill, D.A., G.L. Stirewalt, D.B. Henderson, J.A. Stamatakos, A.P. Morris, B.P. Wernicke, and K.H. Spivey, 1996, *Faulting in the Yucca Mountain region: Critical review and analyses of tectonic data from the Central Basin and Range*, NUREG/CR-6401, CNWRA 95-017, Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas.

Ferrill, D.A., D.B. Henderson, J.A. Stamatakos, K.H. Spivey, and A.P. Morris, 1995, Tectonic *Processes in the Central Basin and Range Region*, NRC High-Level Radioactive Waste Research at CNWRA, January-June, 1995, CNWRA 95-01S, B. Sagar, ed., Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas, p. 6.1–6.27.