RAS 12684

U.S. NUCLEAR REGULATORY COMMISSION
In the Matter of SYSTEM ENERGY RESOURCES, INC.
Docket No. 52-009-ESP Official Exhibit No. SERI-1
OFFERED by: (Applicant/Licensee) Intervenor _____
NRC Staff Other _____
IDENTIFIED on 11/29/06 Witness/Panel _____
Action Taken: (ADMITTED) REJECTED WITHDRAWN
Reporter/Clerk _____

SERI EXHIBIT 1

STATEMENTS OF PROFESSIONAL QUALIFICATIONS OF SERI WITNESSES

Template=SECY-028

SECY-02

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF JEFFREY L. BACHHUBER, M.S., C.E.G.

PROFESSIONAL EXPERIENCE

Vice President, Senior Principal Engineering Geologist Engineering Geology, Geologic/Seismic Hazard, Rock/Soil Mechanics, Nuclear Site Geotechnical Characterization

William Lettis & Associates, Inc., Walnut Creek, CA	1993-date
Pacific Gas & Electric Company, San Ramon, CA	1988-1993
JCP Engineers and Geologists, Inc., Cupertino, CA	1985-1988

REPRESENTATIVE EXPERIENCE

Mr. Bachhuber is a Certified Engineering Geologist in California with over 20 years of professional experience performing geologic/geotechnical studies for nuclear and other critical facilities throughout the United States, Peru, Dominican Republic, Puerto Rico, Korea, Indonesia, Japan, and Turkey. He has performed detailed site investigations in a variety of geologic settings, in addition to regional hazard mapping and facility siting and routing studies. These projects involved assessment of earthquake hazard and sources, fault rupture and ground failure analysis, slope stability analysis and mitigation design, karst and void identification and treatment, foundation characterization with borings and geophysical techniques, laboratory testing, failure mode assessment, and development of foundation criteria for detailed static and dynamic stability and site response analyses (including soil-structure interaction).

Mr. Bachhuber has managed comprehensive site exploration studies for nuclear power and waste storage projects including: (1) PG&E Diablo Canyon power plant ISFSI waste storage and steam generator replacement storage facilities in California; (2) Korean Ulchin No. 5/6 new nuclear plant fault/foundation evaluation; (3) Entergy Grand Gulf ESP study in Mississippi; (4) Duke Lee COL study in South Carolina; (5) TVA/NuStart Bellefonte COL study in Alabama; (6) Entergy/NuStart Grand Gulf COL study; (7) SCE&G V.C. Summer COL siting/fatal flaw study in South Carolina; (8) FPL Turkey Point COL siting/fatal flaw study in Florida; (9) TXU Comanche Peak COL study in Texas; and (10) three confidential ongoing COL siting/fatal flaw studies. These projects were performed under formal QA/QC programs, and included preparation of detailed technical work plans and exploration equipment qualification and calibration oversight. In addition to directing the field and laboratory studies, he was responsible for preparing data reports, calculation packages, and portions of the project SAR's. He played a key role in the NRC RAI responses and participated in reviews by the NRC and ACRS staff for the Grand Gulf ESP.

Other important civil projects that Mr. Bachhuber has served as lead engineering geologist include liquefied natural gas facilities (platforms, pipelines, plants), seismic retrofit

investigations for highway bridges, gas and water supply pipeline hazard assessments, stability and instrumentation studies for concrete arch and rockfill dams, tunnel characterization and construction mapping, and regional hazard mapping throughout the U.S. and internationally. He was a recipient of the 1999 ASCE Rickey Medal for his participation as technical lead for geologic/geotechnical issues and chapter preparation for the "Guidelines for inspection and monitoring of in-service penstocks" and the 2001 CalTrans "Excellence in Transportation" Award for his Bixby Bridge retrofit project.

REPRESENTATIVE PROJECTS

Duke Power Greenfield and Cherokee COL Scope and Cost Analyses (2005)

Developed alternative work scopes and cost estimates for various Greenfield and exiting sites for a comparative analyses.

Duke Power COL Geologic/Geotechnical Study (2005-ongoing)

Lead geologist and technical expert for a COL application for a Duke Power Company site in North Carolina. Responsible for site field and laboratory geologic/geotechnical studies and analyses for SAR sections 2.5.4 to 2.5.6. Field characterization includes a variety of borings, wells, geophysics (surface and borehole) and complex laboratory testing.

Entergy Grand Gulf Nuclear Power Plant Early Site Permit (Mississippi, 2002-2003)

Detailed site geotechnical characterization for an Early Site Permit for a new nuclear reactor. Developed QA/QC technical procedures and workplans to guide all field and laboratory activities. Directed a field investigation consisting of geologic mapping, deep mud rotary borings, CPT soundings, borehole P-S velocity surveys, and SASW surface surveys. Obtained undisturbed samples for geotechnical index and dynamic testing, and developed testing program including sophisticated resonant column and torsional shear testing (UTEXAS). Results and data from previous studies for the existing operating unit were compiled, reviewed, and incorporated with new site data. All data and analysis were subject to a formal QA/QC review, and were summarized in a comprehensive engineering report. Prepared Sections 2.5.4 to 2.5.6 for the SAR, responded to NRC RAIs, and presented the project to the ACRS in a formal meeting.

PG&E Diablo Canyon Nuclear Power Plant and ISFSI Storage Project (California, 1993-2003)

Spent Generator Storage Facility (2005)

Performed a site and slope stability evaluation for a new spent generator storage facility located in an area of ancient and active landsliding. Site characterization by borings, test pits, and surface ReMi geophysical surveys. Performed detailed dynamic slope stability and displacement analysis.

ISFSI Stability and Design Study, Permitting and Construction Support (2000-2005)

Managed detailed siting, selection, characterization, stability, and design studies for an Independent Spent Fuel Storage Installation (ISFSI) on the power plant property. Served as Project Geologist for a 5-year sequence of increasingly detailed studies performed under stringent QA/QC protocol, including preparation of 10 basic data reports, 5 calculation packages, and the Safety Analysis Report. Interacted with the U.S. NRC on behalf of PG&E, and prepared responses to reviewer comments. The project included test trenches, borings (13 soil and rock borings), borehole geophysics, laboratory testing, and stability analyses for shallow and potential deep-seated failure. Evaluated dynamic slope and foundation deformation, faults, and rock cut reinforcement design. Managed response studies and reports to address formal RAI issued by the NRC during their project review. Currently performing permitting and construction support including preparation of topical reports (asbestos occurrence, expansion fill) and construction mapping.

Seacliff Retreat Studies and Security Enclosure (2004)

Performed an evaluation of long term and episodic sea cliff retreat of the Diablo Canyon seacliff to establish setbacks for the ISFSI transport road, and new security fence and camera system around the power block. The study included review of aerial photographs, LIDAR data, detailed seacliff mapping, evaluation of historic photographs and survey data, subsurface exploration with test pits, and determination of seacliff failure mechanisms. Developed estimates for long term and episodic retreat rates, and made recommendations for facility setbacks.

Class I Facility Slope Stability (1997)

Directed an evaluation of slope stability and safety for all Class I safety-related facilities in response to an NRC RAI issued regarding numerous landslides and areas of erosion that developed during a series of heavy rainstorms. The study included specific evaluation of the geologic/geotechnical conditions at each safety-related facility, assessment of existing static stability, identification of possible failure modes, and computer stability analysis. The results from the study were summarized in a technical report that was submitted to, and approved by, NRC.

Screening Studies for ISFSI Siting (1993-1997)

Directed a facility siting and preliminary screening study for a proposed ISFSI dry cask storage facility that included preparation of detailed hazard maps, evaluation of geotechnical constraints, and review of previous earthquake hazard and ground motion information from the PG&E Long Term Seismic Program. Subsurface exploration were performed at selected candidate sites, and each site was evaluated to determine relative stability, geotechnical foundation conditions, facility constructability, and identify possible constraints. The results from the screening studies were summarized in a series of large scale maps, cross sections, and technical reports.

Korea Nuclear Projects

Ulchin 5/6 Fault Hazard and Rock Foundation Stability Evaluation (1999)

Field and hazard evaluation of faults encountered in the excavation for the Ulchin No. 5 nuclear power plant in eastern Korea. Performed independent technical review of previous work, including fault mapping and fault gouge dating. Developed and performed marine terrace mapping program to evaluate recent activity of the fault. Evaluated fault-rock foundation behavior, and developed recommended foundation values for assessment of foundation dynamic response.

KINS Regulatory Review and Field Training (1999, 2000)

Review of U.S. NRC regulatory criteria and technology transfer/training for the Korean Institute of Nuclear Safety (KINS). Training included a workshop at the WLA office, information exchange, and a field review of the PG&E Diablo Canyon Power Plant Long Term Seismic Program study sites.

SELECTED REFERENCES

Bachhuber, J.L., Benoit, M., and Pajouhesh, D., 2005, Innovative seismic retrofit of historic long-span arch bridges along the highly seismic central coast of California: XV CNIS 20th Anniversary of Michoacan Mexico Earthquake Conference, Mexico City.

Hengesh, J., Kelson, K., Lettis, W., and **Bachhuber, J.**, 2005, A systematic approach for mitigating geohazards in pipeline design and construction [abs.]: EERI Annual Conference, Ixtapa, Mexico.

Ramirez, T., Angell, M., Witter, R., and **Bachhuber, J.**, 2005, Regional seismic source characterization for probabilistic seismic hazard analyses, Campeche Bay, Mexico and Central Coast Peru [abs.]: EERI Annual Conference, Ixtapa, Mexico.

Hengesh, J.V., Angell, M., Lettis, W.R., and **Bachhuber, J.L.**, 2004, A systematic approach for mitigating geohazards in pipeline design and construction: Proceedings of International Pipeline Conference, Oct. 4-8, 2004, Calgary, Canada.

Nisar, A., Honnegger, D., Ameri, A., Summers, P., Hitchcock, C., Liu, A., Louie, H., and **J. Bachhuber**, 2004, Mitigation of fault rupture hazard to water mains of a major metropolitan in the San Francisco Bay Area: 13th World Conference on Earthquake Engineering, Vancouver, B.C., Canada, Paper No. 1109.

Eidinger, J.M., O'Rourke, M., and **Bachhuber, J.**, 2003, Performance of a pipeline at a fault crossing (Thames Water Company 2.2 m diameter pipeline at 1999 Koceali earthquake fault rupture, Turkey): EERI 7th National Conference on Earthquake Engineering, Boston (July 2002).

Rathje, E.M., Karatas, I., and **Bachhuber, J.,** 2002, Coastal subsidence in Golcuk during the 1999 Koceali earthquake in Turkey, submitted to American Society of Civil Engineers Journal Geotechnical and Geoenvironmental Engineering.

Lettis, W.R., **Bachhuber, J.**, Witter, R., Brankman, C., Randolph, C.E., Barka, A., Page, W.D., and Kaya, A., 2002, Influence of releasing step-overs on surface fault rupture and fault segmentation: examples from the 17 August Izmit earthquake on the North Anatolian fault, Turkey: Bulletin Seismological Society of America, v. 92, no. 1, p. 19-42.

Lettis, W.R., **Bachhuber, J.L.**, and Witter, R., 2001, Surface fault rupture, *in* Youd, T.L., Bardet, J.P., and Bray, J.D. eds., Turkey earthquake of August 17, 1999 Reconnaissance report: Earthquake Engineering Research Institute Publication No. 2000-03.

Bachhuber, J.L., and Hengesh, J.V., 2000, Seismic hazard zonation of greater San Juan area, northern Puerto Rico Coastal Plain: Proceedings Sixth International Conference on Seismic Zonation: Earthquake Engineering Research Institute, November 2000, Palm Springs, California.

Hengesh, J.V., Pena, L.R., and **Bachhuber, J.L.**, 2000, Possible geologic evidence for surface fault rupture related to the 1562 Santiago Viejo earthquake, Dominican Republic [abs]: American Geophysical Union 2000 Fall Meeting.

Altunel, E., Barka, A., Cakir, Z., Kozaci, O., Hitchcock, C.S., Helms, J., **Bachhuber, J.**, and Lettis, W.R., 2000, What goes on at the eastern termination of the November 12, 1999 Duzce earthquake, M7.2, North Anatolian fault, Turkey [abs.]: American Geophysical Union Proceedings Volume, Fall Meeting, December, 2000 San Francisco, California.

Bachhuber, J.L., 1998, Future large earthquakes in the San Francisco Bay area, an update on when and where, *in* Lee, K.W., ed., Proceedings Second International Symposium on the Yangsan fault, Korea: May, 1998, Seoul, Korea.

Lettis, W.R. and **Bachhuber, J.L.**, 1999, Regulatory criteria and building code requirements for safe construction in earthquake hazard zones, *in* Karaca, M. and Ural, D.N., eds., Proceedings ITU-IAHS International Conference on the Koceali earthquake, 17 August 1999: Istanbul, Turkey, pp. 213-215.

Bachhuber, J.L., McManus, R.A., Allerton, W. and White, R.K., 1998 (ASCE, 1998), Geologic/Geotechnical evaluation (of penstocks); in, Ahlgren C.S. and Task Committee on Inspection and Monitoring of In-Service Penstocks, Guidelines for inspection and monitoring of in-service penstocks: American. Society of Civil Engineers, Publication No. 7844-0378-3/98.

Tsai, Y.B., Savage, W.U., Cluff, L.S., Ostrom, D., Nigbor, R.L., Silva. W., Brogan, G., and **Bachhuber, J.**, 1995, A study of local ground motion site response at the Lucerne Valley accelerograph site (1992 Landers earthquake): Earthquake Engineering Research Institute Proceedings, Annual Meeting, February 8-11, 1995 San Francisco, California.

Bachhuber, J.L., Page, W.D., and Renne, P.R., 1997, Evaluation of risk from surface fault rupture to a penstock using the 40AR/39AR dating technique, *in* Sowers, J.M., Noller, J.S., and Lettis, W.R. (eds.), Dating and Earthquakes: Review of Quaternary

Geochronology and its Application to Paleoseismology: U.S. Nuclear Regulatory Commission NUREG/CR 5562.

EDUCATION

M.S. Geology, San Jose State University, San Jose, CA, 1990

B.A Geology, San Jose State University, San Jose, CA, 1984

REGISTRATION

Certified Engineering Geologist, CA, No. 1534, 1990

Registered Geologist, California, No. 4909, 1990

AFFILIATIONS AND AWARDS

Caltrans Excellence in Transportation-Major Structures, 2001, Bixby Creek Bridge Seismic Retrofit

1999 ASCE Rickey Medal for Geology/Geotechnical lead In-Service Penstock Assessment Guidelines

Member, American Rock Mechanics Association

Member, American Society of Civil Engineers

Member, International Committee on Large Dams

Invited Speaker, ITU-IAHS Conference Koceali Earthquake, Istanbul, 1999

Invited Speaker Second Yangsan Fault Symposium, Seoul, Korea, 1999

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF
DAVID J. BEAN
ENERCON SERVICES, INC.

PROFESSIONAL EXPERIENCE

Experience Summary

- 30 years of experience in the Environmental Industry
- Well versed in environmental impact analysis/assessment, NEPA, and Strategic Environmental Management
- Extensive experience performing ES&H compliance strategy development, site evaluation and selection planning, risk assessment/analysis, and waste management.
- Managed million-dollar plus multi-disciplinary projects for industrial and government clients
- Experience in line management, supervision, and staff development.

Experience Description

Mr. Bean is currently managing all aspects of the development of the environmental report for the combined license application (COLA) for the Duke Lee site. Mr. Bean coordinated the preparation of the environmental sections of the Early Site Permit application for Entergy's Grand Gulf Nuclear Station near Port Gibson, MS. This is one of the first ESP applications to be prepared pursuant to NRC regulation 10 CFR Part 52. This regulation provides a licensing process to resolve safety and environmental issues early in the licensing process of a nuclear power facility. Responsibilities for this work included budget and schedule control and technical review of sections of the SSAR and ER. The evaluation included an assessment of the potential impacts on the terrestrial and aquatic environment of constructing and operating a new nuclear power generating facility at the proposed site. The approach to this ESP was unique it its use of a bounding "Plant Parameter Envelope (PPE)" which took the place of a specific reactor design. This approach was designed to provide maximum flexibility for the client's future construction options.

NATIONAL ENVIRONMENTAL POLICY ACT

Mr. Bean managed the preparation of the environmental impact statement (EIS) for the Spallation Neutron Source (SNS) at the Oak Ridge National Laboratory. He was responsible for all aspects of the EIS preparation, including budget and schedule planning, public scoping and comment meetings and preparation of the draft and final versions of the EIS. This EIS evaluated the potential impacts of the SNS at four candidate sites across the country. The preparation of this EIS took on a unique aspect in that the project team was not centralized. Communications and transmittal of technical material was facilitated by extensive use of the Internet. Large source documents were posted on and Internet site accessible by username and password. He

served as manager for the overall contract that included the EIS task, and received a performance evaluation score from the Department of Energy (DOE) of 4.0 out of 4.0 two years in a row.

Mr. Bean served as a senior technical expert for the preparation of the Programmatic Environmental Impact Statement for the Sequestration of Carbon Dioxide. His primary focus was on biological resources and technical review of other sections of the document.

Mr. Bean coordinated NEPA compliance for construction and operation of a nuclear production reactor at the Savannah River Site. He served as a member of the Environmental Coordinating Committee for DOE Office of New Production Reactors.

Mr. Bean led the multidisciplinary team of fourteen people tasked with preparing and "Environmental Information Document" for the Pantex Plant.. This team received Battelle's Key Contributor Award for the success of this project.

Mr. Bean prepared numerous NEPA documents, including EISs, EAs, and Categorical Exclusions, for DOE facilities at Pantex, Oak Ridge, and Savannah River. He investigated methods of including screening-level analyses of risk to human health and environment in EAs. He analyzed ecological impacts and prepared NEPA documentation for projects, modification and reuse of nuclear weapons components, terminal nuclear waste storage, and incinerator, flood control, coal combustion, and alternative fuels.

Environmental Compliance

Mr. Bean was responsible for environmental regulatory compliance planning for a nuclear production reactor at the Savannah River Site. This effort included developing strategies for compliance with the numerous environmental regulations including Clean Air Act, Clean Water Act, and RCRA, and obtaining consensus of State regulators. He also developed the comprehensive planning document New Production Reactor Capacity Environmental Regulatory Compliance Plan at the Savannah River Site.

As the Regulatory Project Manager for the Environmental Compliance Section of the Office of Nuclear Waste Isolation, Mr. Bean developed policies and strategies for compliance with federal and state environmental regulations. He implemented a process for systematically identifying environmental concerns associated with developing a high-level radioactive waste repository. Results were presented in three documents: *Environmental Issues Identification and Resolution Strategies, Environmental Impact Assessment Methods, and Environmental Information/Data Requirements.*

Comparative Evaluation and Site Selection

Mr. Bean developed and implemented comparative evaluation of potential sites and the selection of the preferred site for environmentally sensitive facilities. The process involved comparative evaluation of alternative sites, trade off analyses, and consensus building in a team of technical experts. The facilities included:

- The Environment Management Waste Management Facility for the Oak Ridge Reservation
- Geologic repository for high level radioactive waste (salt sites)
- Waste Management Central Verification Facility for the Oak Ridge Reservation

- Nuclear reactor for the production of tritium at the Savannah River Site

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Waste Management

As a manager and senior technical staff, Mr. Bean assisted in developing the strategic plan for the treatment of radioactive mixed wastes and for compliance with the Federal Facilities Compliance Agreement for management of these wastes at DOE's Oak Ridge Reservation. He developed and implemented the process for selecting the preferred treatment technologies for specific types of mixed wastes.

As senior team member, Mr. Bean facilitated the comprehensive, "cradle-to-grave" planning process for the management of wastes at the Oak Ridge Reservation. This effort included the use of systems engineering techniques for strategic road maps for the Environmental Restoration and Waste Management programs at DOE's Oak Ridge Reservation.

Mr. Bean managed the preparation of a RCRA Part B permit application for facilities at the Pacific Northwest National Laboratory.

Mr. Bean developed the strategy for NEPA compliance and incorporation of NEPA values into CERCLA documents for the Environmental Management Waste Management Facility (EMWMF) proposed for the Oak Ridge Reservation. He developed and implemented the comparative evaluation of potential sites on the Oak Ridge Reservation for this environmentally sensitive facility.

Museum Operations

As Acting Director of the American Museum of Science and Energy, Mr. Bean's responsibilities included short and long-term planning for exhibits and special events, schedule, and budget. He led the effort for the museum to become an affiliate of the Smithsonian Institution. He also facilitated partnering with other organizations, including the City of Oak Ridge Summer Camp program, Pellisippi State Community College, and the Oak Ridge National Laboratory.

Business Operations

Mr. Bean is experienced in many aspects of operating an office of more than thirty people including developing annual business and operational plans that include budgets, projected business volume, market assessments, staffing, and other related subjects. He was instrumental in negotiating teaming agreements with both small and large business in Oak Ridge, and is experienced in writing competitive proposals.

Education and Professional Recognition

M.S., Zoology, the Ohio State University, 1980

B.A. Biology, State University of New York at Oswego, 1973

Human Health and Ecological Risk Assessment, 24-hour (SENES Oak Ridge, Inc., 1993)

Team Building and Coaching (Career Track, Inc., 1993)

Mixed Waste Regulation Conference (Executive Enterprises, Inc., 1991)

Environmental Regulations Course (Executive Enterprises, Inc., 1989)

Principles of Management (Battelle Memorial Institute 1987)

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF MICHAEL D. BOURGEOIS

PROFESSIONAL EXPERIENCE

ENTERGY NUCLEAR, INC.

Manager of Project Management 4/2003
Managing various project for new reactor technology and licensing issues for 10 CFR 52. PM for DOE projects: GGN ESP, ALWR constructability study. Task Lead for Nustart Energy - Site Selection. Member on Task forces with NEI – ESP, COL, Seismic, CIPIMS

Manager, Outage & Work Control. ENI Office. 1/1998
Support both ENI initiatives and EOI outage management teams with assist visits, assessments, and on-site outage support. Developed standardized outage models for use at both BWR and PWR sites. Participate in the Outage Management Key process Team developing improvements to standards and practices. Also lead outage due diligence process at Indian Point 3, Fitzpatrick, Maine Yankee, and Pilgrim.

1/98 – 10/98	EOI Outage and Work Control Assessment and Support for GGN, RBS, W3
11/98 – 6/99	Transition Team Lead for Outage Support Team for Pilgrim Plant
2/00 – 5/00	Member of Corporate team to help complete Saltend co-generation power plant in Hull, UK
6/00 – 11/00	Transition Team and Outage consultant for Fitzpatrick Plant
1/01 – 6/01	Outage Management Support Grand Gulf Nuclear Station
6/01 -	Project Manager for Entergy's Early Site Permit projects.

Senior Outage Manger, Maine Yankee 2/1997
Responsible for developing and implementing outage plant recovery plan and schedule. Participated in the transition to Decommissioning, including de-staffing plan, scheduling the release and turnover of systems and preparation for the site characterization, decon and independent SFP island.

ENTERGY OPERATIONS, INC.

Project Manager - Outages, Arkansas Nuclear One 3/1993
Responsible for the outage budget ($25M-$30M). Responsible for developing the outage plan, organization and staffing, (direct, matrixed, and contracted) and outage execution. Responsible for setting standards: manuals, guidelines, reports, procedures and work packages, both for outage and on-line planning and scheduling activities. Active member of several system-wide

working groups: outage management, refueling, and shutdown safety. Chairman of CEOG Outage Management working group.

Assistant Project Manager, Outages *(U2)*, Arkansas Nuclear One. 5/1990
Managed 13 direct reports and 16 indirect (non-outage), >200 outage. Contractor Manager for outage Integrated Contract (Refueling, SG, & Turbine). Development and administration of Pre-outage Milestone Schedule, outage scope, manuals and reports. Development and implementation of the outage schedule. Development of Outage Risk Management Guidelines and Shutdown Operations Protection Plan (SOPP received high praise from NRC Region IV). Direct supervision of unit daily schedulers and overall NP&S activities. Direction of Maintenance Planners and work package development. Awarded Peak Performer in 1991. Awarded Special Chairman's Award in 1992.

MDB CORPORATION

Consultant to Project Manager
***Outages and Maintenance Manager*, Arkansas Nuclear One** 7/1989
Negotiated the integrated refueling contract. Was 2R7 refueling contract manager. Was MOVATS coordinator for 1 M89. Acting Project Manager, Outages, Unit 2. Assisted in reorganization of the Work Control Center to a unitized NP&S. Developed and initiated Business Plan items to correct NRC DET findings concerning the corrective maintenance backlog.

LOUISIANA POWER & LIGHT CO.

Operations Engineer/Refueling Director 5/1987
Waterford 3. Developed Waterford 3's Refueling Manual (procedure for refueling). Negotiated and managed refueling integrated contract (HP, Decon, SG), Primary Services, Rx Vessel ISI, Refueling. Coordinated all LP&L and Contractor activities in containment. Observation Team on European PWR outage tour (German, Switzerland, and Belgium). Awarded Waterford 3 Zero Defect Award in 1988.

Operations Shift Supervisor, Waterford 3. 3/1980
Normal on-line operations. Initial fuel load and power ascension testing. Cold hydro and hot functional testing. System turn-over and startup testing. Developed surveillance testing schedule and operation administrative guidelines. P&S operations coordinator. Operations procedure writing. Developed unique ID program for all components and systems. Completed Senior Reactor Operator (SRO) training in November 1983.

Operator, Waterford 3, Cold license training. 11/1977
Operations support of construction and startup.

MILITARY SERVICE

U.S. Navy – 1964-1971
Nuclear Schools: Machinist Mate A school, Nuclear Power School – Bainbridge, MD, DIG Proto type – New York, Engineering Lab Tech School at the prototype.

EDUCATION

B.S. Nuclear Engineering Technology, Thomas Edison State College, 1994

LICENSE

Senior Reactor Operator, 1983

OTHER VARIOUS BUSINESSES

1971 - 1977	B&B Amoco
	B&B Delivery Service
	International Air Courier
	Century Metalcraft

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF JOHN G. CESARE, JR. ENERCON SERVICES, INC.

PROFESSIONAL EXPERIENCE

Experience Summary

Over 24 years experience in the nuclear power industry in the areas of new reactor, operational and decommissioning licensing; special projects, organizational assessment, and management support.

Substantial experience in development of regulatory positions and problem/decision analysis in a wide range of licensing, operational, engineering, legal, and management issues. Skilled facilitator and communicator, working in utility, regulatory, and industry environments.

Provided primary regulatory interface, supporting licensing, operations, decommissioning, and new reactor licensing, interpretation of regulations; special project planning and management experience in a broad spectrum of licensing, operations, and management areas.

Strengths in special projects, project management, assessments, organizational studies, and strategic planning.

Experience Description

Mr. Cesare is a nuclear engineer with significant nuclear utility and consulting experience including over ten years in supervision and management at a BWR facility. In addition to a wide range of standard licensing experience (UFSAR, NRC interface, industry groups, etc.), Mr. Cesare has a broad and proven record in project management, organizational assessment, and strategic planning, particularly in regulatory affairs. He is knowledgeable in nuclear plant design and operations, with particular emphasis in BWR technology.

Part 52 ESP Application and Review. From 9/02 to PRESENT, Mr. Cesare supported the development of an Early Site Permit application as the lead licensing project engineer. The ESP seeks to demonstrate site suitability for a potential new commercial nuclear facility at the Grand Gulf Nuclear Station (GGNS) site. Mr. Cesare, as part of a larger ENERCON team, supported the development of the safety analyses, environmental report, and emergency planning assessment for the ESP application. This work involved active participation with the industry (NEI) Early Site Permit task force and included interface with and presentations to NRC staff. The Permit application is currently under NRC review. Mr. Cesare provided licensing support and coordination for NRC review, including site safety and environmental visits, RAI response, and ACRS reviews.

Part 52 COL Licensing. Mr. Cesare is an active member/contributor to the NEI COL Task Force, developing standards and guidance for Part 52 COL applications, included routine interface with NRC staff on behalf of the industry in the development of DG-1145 and supporting the Part 52

rulemaking. Currently, Mr. Cesare provides licensing support to NuStart in the development of a COL application for GGNS, intended to reference the GGNS ESP and ESBWR reactor design.

Decommissioning. He provided licensing project management support in decommissioning planning and licensing efforts at one of the lead, large-scale nuclear plants to be decommissioned under the latest NRC and MARSSIM criteria. Most recently Mr. Cesare is providing technical and quality reviews of FSS release reports, supporting a PWR decommissioning project. From 9/01 to 1/03, Mr. Cesare served as project manager for developing a substantial rewrite of the Maine Yankee License Termination Plan (LTP) supporting the decommissioning and dismantlement of the unit, currently in progress. As project manager, Mr. Cesare routinely discussed and supported resolution of issues with NRC, State of Maine, and local community interest groups. The Project was able to settle with principal intervenors in August 2001, avoiding costly ASLB proceedings. The LTP was revised, on schedule, to reflect changes in decommissioning strategy, enhanced State contamination release criteria, and hundreds of stakeholder comments and approved the NRC in 2/03. Mr. Cesare continues to support the Maine Yankee decommissioning effort by reviewing FSS release records for technical accuracy and consistency with FSS field data and LTP commitments.

INPO Evaluation Support. Mr. Cesare managed a team coordinating Millstone Unit 1 efforts in preparation for a special INPO visit (July 2000) to review the unit's decommissioning activities.

UFSAR Completeness Audit. In 2000, Mr. Cesare developed and implemented a limited, focused audit of UFSAR "completeness" at both Limerick and Peach Bottom. Review criteria was based on the industry guidance of NEI 98-03 (Rev. 1, 6/99) and lessons learned from other Enercon projects, as well as insight from the NRC staff, NEI, and industry contacts. The audit assessed how effectively the UFSARs were maintained to reflect necessary safety information from NRC generic communications. This effort also assessed other site processes having potential UFSAR impact, seeking opportunities for programmatic improvements.

In late 1999, Mr. Cesare co-authored site review criteria applying NEI 98-03 in the review and assessment of a portion of the Grand Gulf UFSAR in an effort to reduce UFSAR burden. The review supported the verification of key design basis information and sought to identify potential areas for UFSAR streamlining (labeling information as historical or removing excessive, obsolete, or redundant information).

UFSAR Verification. In 1998 and 1999, Mr. Cesare served as the Site Project Manager for ENERCON's PECO Energy Peach Bottom and Limerick UFSAR Verification Project. With team and client assistance, Mr. Cesare developed the necessary program plan and procedures to review and verify the UFSAR (as directed by PECO) to assess its consistency with the as-built plant. The work included discrepancy prioritization and resolution support. Also in 1999 Mr. Cesare functioned as Acting Licensing Manager at Cooper Nuclear Station for a portion of the year.

In 1998, Mr. Cesare also supported the Clinton Power Station's Licensing Department with preparation for restart NRC inspections, coordinated an assessment of the Department's

organizational and programmatic readiness for restart, and developed, with the Department's management team, a detailed "work management plan" for 1999 in support of Licensing work management and strategic planning improvement initiatives which included a survey of regulatory issues expected to "drive" work in the next 1 to 3 years.

Site Licensing Managment. Mr. Cesare provided management and licensing support to the Licensing Department at Entergy Operations' Waterford 3 facility (summer 1997). Principal task: research and development of legal and regulatory strategy for a potential escalated enforcement issue. Other tasks: licensing issue research, development of licensing positions, general review of regulatory correspondence quality, and management/organizational assessment services.

1993 – 1997: Period included study and work outside the nuclear industry

Corporate Licensing. Mr. Cesare developed Entergy Operations' Central Licensing department and served as its Director from 1990 to 1992. Central Licensing tasks: monitor/analyze new or long term generic regulatory issues; assess priority and significance to system nuclear units; facilitate an efficient, consistent, and proactive response for the Entergy plants; provide interface with key industry groups such as NUMARC/NEI. Also in this capacity Mr. Cesare was assigned to special projects and assessments assisting senior management, e.g., chairman of a special, multi-disciplined plant task force to study and address adverse trends in operator and plant performance at an Entergy plant and coordinator of Entergy peer groups in licensing and training.

Site Licensing Management (Grand Gulf). As the Director, Licensing at Grand Gulf Nuclear Station from 1987 to 1990, Mr. Cesare directed the activities of the Nuclear Licensing Department. Reported to VP, Nuclear Operations. Key tasks: principal interface with government agencies involved in nuclear plant licensing actions; preparation, submittal and defense of information supporting licensing actions; NRR/regional interface at a middle management level; Safety Review Committee member; Chairman of SRC subcommittee reviewing site 50.59 evaluations.

BWR 6, MKIII Initial Licensing, Startup, and Operations (Grand Gulf). Mr. Cesare served as Supervisor, Nuclear Licensing from 1981 to 1983 and as Manager, Nuclear Licensing from 1983 to 1987 at the Grand Gulf Nuclear Station. Reported to the Licensing & Safety Director. Key tasks: initial plant licensing; primary interface with NRC on licensing matters; coordination of NSSS vendor, A-E, and Station resources to respond to NRC RAI's; commitment tracking system development; quality and accuracy of NRC submittals; FSAR/ OL amendments and initial update to the FSAR.

BWR 6, MKIII Initial Licensing. From 1980 to 1981, Mr. Cesare was assigned as a Licensing Engineer to the Grand Gulf Nuclear Station. Key tasks: 10 CFR 50.55(e) reports; coordination and tracking NRC Q&A supporting plant licensing; FSAR changes; licensing position development and analysis; interface with NSSS vendor and A-E in response to NRC questions.

USN, Nuclear Submarine Service. Mr. Cesare served as a nuclear trained Commissioned Officer, aboard USS James Madison (SSBN-627 Blue) and USS Nautilus (SSN-571). USN active duty service period 1/72 through 6/76.

EDUCATION

B.S., Chemical Engineering, Mississippi State University, 1972

M.S./B.S., Nuclear Engineering, Mississippi State University, 1980

M.A. Theology, St. Mary's Seminary & University, 1995

TRAINING

Navy Nuclear Power School, Bainbridge NTC and S1C Prototype Training; Qualified Engineering Watch Officer, 1972-3

GE Grand Gulf Systems Technology and GE BWR/6 Simulator Familiarization Training, 1981

MP&L (SERI) Company Suprs Training and Kepner-Tregoe Problem Solving and Decision Making, 1985

Middle Management Course (MSU System Institute for Management Development), 1987

Nuclear Leadership Training (Entergy), 1988

Public Utility Management Course (University of Georgia), 1989

Quality Through Empowerment (Entergy), 1990

Entergy Graduate Exchange Program (Entergy), 1990

Total Quality Facilitator Training (Entergy), 1990

10 CFR 50.59 Training (PECO), 1998

MARSSIM Methodology (Oak Ridge Institute For Science and Education), 2002

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF
LORI M. EVANS, P.G.
ENERCON SERVICES, INC.

PROFESSIONAL EXPERIENCE

EXPERIENCE SUMMARY

Fourteen years of experience that include project management, a varied technical background, and environmental risk analysis.

Acting as task leader for hydrologic analysis for a proposed expansion of an existing nuclear power plant.

Assisted in development of new bank environmental policy guidance documents.

Has been responsible for managing multiple-site Phase I environmental site assessment projects.

Experience Description

Ms. Evans is currently supporting clients out of Enercon's Dallas office. Her experience as a senior project manager includes the following:

Acted as task leader for hydrologic analysis sections of the Early Site Permit for Entergy Potomac's Grand Gulf Nuclear Station near Port Gibson, MS. This was the first ESP to be prepared pursuant to NRC regulation 10 CFR Part 52. This regulation provides a licensing process to resolve safety and environmental issues early in the licensing process of a nuclear power facility. The ESP application included the Site Safety Analysis Report and the Site Environmental Report. The evaluation included an assessment of the potential impacts on the surface water and groundwater of constructing and operating a nuclear power generating facility at the proposed site.

Prepared hydrology analysis for license renewal of a uranium processing facility in Illinois for submission to the Nuclear Regulatory Commission. The analysis included data collection of existing surface water and groundwater quality information, information on historical groundwater levels and streamflow, information on groundwater and surface water uses in the area, and review of a previous RCRA groundwater investigation.

Conducting project management, senior review, and client communications for Phase I and Phase II environmental assessments.

Performing contract environmental review services for the Commercial Mortgage Backed Securities program at Bank of America.

Her previous experience as a Senior Environmental Analyst includes the following:

- Coordinated environmental investigations and remediation projects on a portfolio of bank-owned properties. Prepared Phase II and Phase III scopes of work and provided technical

management of environmental consultants retained by the bank. Interfaced with regulatory agencies, lending officers, and internal and external counsel.

- Responsible for technical review and analysis of environmental reports for multiple concurrent projects. Interpreted data to quantify risks associated with property. Properties included industrial facilities, automotive repair, retail gasoline stations, dry cleaners, and other commercial properties.
- Compiled standard review language for use by other environmental services associates. Assisted in development of new bank environmental policy guidance documents. Provided training about environmental issues and bank environmental policies to groups within the bank. Provided oversight of contract environmental analysts.

As a Project Manager, Ms. Evans has been responsible for the following:

- Prepared risk based assessments of leaking underground storage tank facilities to determine site specific cleanup levels, including contaminant fate and transport modeling. Wrote a corrective action plan for two of these facilities to meet the cleanup goals.
- Prepared subsurface assessment reports for regulatory agencies that included groundwater elevation contour maps, boring logs, and lithologic cross sections.
- Managed multiple-site Phase I environmental site assessment projects.
- Prepared and tracked budgets.

Ms. Evans' experience as an Environmental Geologist includes the following:

- Conducted on-site investigations for Phase I environmental site assessments. Collected samples of suspect asbestos-containing building materials for analysis. Performed tests for radon and for lead in paint and drinking water. Sites included raw land, commercial, industrial and residential properties in twenty-one states and two Caribbean islands.
- Conducted subsurface investigations of leaking underground storage tank facilities, dry cleaners, and an explosives load and assembly plant. Responsible for subsurface investigations and monitoring well installations using both hand augers and truck-mounted drilling rigs. Conducted soil and groundwater sampling.
- Assisted in a pilot study for a soil vapor extraction/air sparging remediation system for a leaking underground storage tank facility.
- Performed wastewater and stormwater evaluations for bus terminals including vehicle maintenance and passenger transfer facilities. Conducted on-site inspections and prepared Storm Water Pollution Prevention Plans for two manufacturing facilities and a transportation facility.

Education and Professional Recognition

B.S. Geology, Tennessee Technological University, Cookeville, Tennessee, 1991

Professional Geologist - Tennessee, Texas

TRAINING AND SPECIAL SKILLS

OSHA 40 hour health and safety training, current

Member of the ASTM Subcommittees E50.02 (Real Estate Assessment and Management), E50.04 (Corrective Action), E50.05 (Environmental Risk Management), and F20 (Hazardous Substances and Oil Spill Response)

AHERA Accredited Asbestos Inspector, 1994-2002; AHERA Asbestos Management Planner, 1997-2002

Innovative Treatment Technology Short Course, EPA, 1999

40 Hour Risk Based Assessment Training, National Groundwater Ass

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF WILLIAM R. LETTIS, Ph.D., C.E.G.

PROFESSIONAL EXPERIENCE

President, Principal Geologist 1990-Present
Seismic Hazard, Neotectonics, Engineering Geology
William Lettis & Associates, Inc., Walnut Creek, CA

Senior Geologist 1985-1990
Geomatrix Consultants, Inc., San Francisco, CA

Geologist
Bechtel Civil and Minerals, Inc., San Francisco, CA 1982-1985

Geologist
U.S. Geological Survey, Menlo Park, CA 1979-1982

REPRESENTATIVE EXPERIENCE

Dr. Lettis has over 20 years experience performing regional and site investigations to assess geologic and seismic hazards for large engineered facilities, including bridges, dams, nuclear and fossil fuel plants, pipelines, and LNG terminals. These investigations typically involve detailed site characterization to assess deterministic and probabilistic ground motions, liquefaction potential, surface fault rupture, and static and dynamic slope stability. With over 100 publications, Dr. Lettis is a recognized authority on the assessment of seismic hazards, both in California and throughout the world. He currently is serving on the California Earthquake Prediction Evaluation Council (CEPEC), an advisory committee to the Governor and Office of Emergency Services (OES) and was an invited speaker at the DSOD-sponsored seminar on earthquake engineering for the Association of State Dam Safety Officials on methods for assessing fault activity.

REPRESENTATIVE PROJECTS

Construction and Operating License Applications WLA Executive Director

Dr. Lettis currently is Executive Director for WLA's involvement in numerous COL Application studies. These studies include the seismic, geologic and geotechnical characterization of specific sites for a variety of reactor technologies. Investigated sites have included locations in South Carolina, Alabama, Mississippi, and Texas. For each of these projects, Dr. Lettis provided technical guidance, directed each of the WLA Project Managers, and provided interface with the utility and reactor technology provider.

Geologic and Seismic Studies for Early Site Permit Application – Vogtle Electric Generating Plant, Georgia

Dr. Lettis served as Project Manager for geologic and seismic studies in support of an Early Site Permit for the siting of a new nuclear reactor at the existing Vogtle Electric Generating Plant in Georgia. Studies of the Coastal Plain site include a comprehensive update of existing geologic, seismic, and geophysical data bases for the site region, detailed geologic mapping, and characterization of earthquake sources to update the Electric Power Research Institute (EPRI) seismic source model. Geologic and geomorphic mapping include analysis of aerial photography, field reconnaissance, and aerial reconnaissance in order to identify the presence of any potential capable tectonic sources or seismogenic sources that were not identified in the EPRI studies. Updating of the seismic source model for the PSHA included the development of a new model for the Charleston earthquake source, which is the most significant earthquake source in the region.

Early Site Permit, North Anna, Virginia

Dr. Lettis served as Project Manager for characterization of seismic sources for the Dominion North Anna Early Site Permit. The source model developed for North Anna involved a thorough evaluation and update of the Electric Power Research Institute (EPRI) seismic source model developed in the late 1980's. Dr. Lettis prepared sections 2.5.1, 2.5.2, and 2.5.3 of the SSAR related to the source model, including updated source parameters for the Charleston and Central Virginia source zones, and newly identified potential fault sources that extend the entire length of the Appalachian front and Coastal Plain. Dr. Lettis documented and defended the new seismic source model with NRC staff.

Early Site Permit, Grand Gulf, Mississippi

Dr. Lettis served asProject Manager for the Entergy Grand Gulf Early Site Permit. His responsibilities included completing all sections of 2.5.1 through 2.5.6 of the SSAR, including seismic source characterization and probabilistic seismic hazard analysis to develop the SSE design ground motion in compliance with Regulatory Guide 1.165, and geotechnical characterization of the site in partial compliance with Regulatory Guides 1.31 and 1.32. The seismic source model involved a comprehensive review and update of the Electric Power Research Institute (EPRI) source model developed in the late 1980's, including updated source parameters for the New Madrid source zone and the newly recognized Saline River source zone in the southern Untied States. Dr. Lettis documented and defended the new source model with NRC staff.

Diablo Canyon NPP, Long-Term Seismic Program

Dr. Lettis was Project Manager for a comprehensive 7-year investigation of seismic sources in central coastal California as part of the Pacific Gas and Electric Company's Long-Term Seismic Program for the Diablo Canyon NPP. The seismic source model was developed to provide an updated ground motion evaluation at the site, including both deterministic and probabilistic seismic hazard analyses. Over 20 capable and potentially capable faults were identified and characterized over a 3-year period through a comprehensive program of detailed mapping, paleoseismic trenching, and onshore and offshore geophysics. Each seismic source was characterized through the use of logic trees for input to the hazard analysis, including the Hosgri, San Simeon and Los Osos faults. Dr. Lettis documented and defended results of the seismic source characterization to NRC staff through numerous meetings and written responses over a

subsequent 4-year period. Dr. Lettis is continuing to provide assistance to PG&E on the NRC-mandated Diablo Canyon Long-Term Seismic Program.

Shivta-Rogem Nuclear Power Plant, Israel

Dr. Lettis currently is Project Manager for the Shivta-Rogem Nuclear Power Plant Project in the northern Negev Desert, Israel. He is directing a team of WLA and Israeli geologists, seismologists, and geophysicists to assess seismic hazards, perform probabilistic and deterministic ground motion analyses, and prepare a Preliminary Safety Analysis Report for submittal to the Israeli Atomic Energy Commission. Dr. Lettis documented and defended the PSAR source characterization and ground motion results to the IAEC Licensing Division staff.

U.S. Bureau of Reclamation and Army Corps of Engineers, western U.S.

Dr. Lettis conducted numerous seismic hazard evaluations for dams and water conveyance systems throughout the western United States. He was Project Manager for seismotectonic evaluations of 48 U.S. Bureau of Reclamation dams in the western United States and for two Army Corps of Engineer dams in the Sierra Nevada of California. These projects involved the geologic and seismologic characterization of known and potential earthquake sources in specific geologic provinces of the western United States, deterministic and probabilistic assessment of ground motions and assessment of liquefaction potential of alluvial foundation materials at specific dam sites.

Seismic Hazard Characterization, Conceptual Engineering for Calaveras Dam, Alameda County, CA

Dr. Lettis provided Senior Technical Peer Review for the SFPUC Calaveras Dam project. He reviewed and provided technical advise on the Calaveras Fault for evaluation of design ground motions and for potential surface fault rupture on secondary fault strands through the existing dam and potential footprints for a new dam. Dr. Lettis provided guidance for the detailed bedrock and Quaternary geologic mapping and paleoseismic trench program, in compliance with DSOD guidelines and criteria for identifying and characterizing active, conditionally active, and inactive faults.

Vulnerability Study Marin Municipal Water Agency, Marin County, California

Dr. Lettis was Project Manager for a seismic and geologic vulnerability assessment of the Marin Municipal Water District's backbone water supply system. Hazards assessed include liquefaction, earthquake-induced slope failure, surface fault rupture, and strong ground motions from three scenario earthquakes. The hazard information was used to identify, prioritize and mitigate hazard vulnerability to the MMWD system for their seismic improvement program.

EBMUD, Seneca Reservoir

As Project Manager, Dr. Lettis completed an investigation of East Bay Municipal Utility District's Seneca Reservoir to evaluate leakage along the reservoir's margins. Suspected causes included aseismic creep along secondary structures associated with the Hayward fault, complex bedrock fractures, and regions of slope instability along the western margin of the reservoir. The project included geologic mapping, placement of geotechnical boreholes and monitoring wells, and excavation of test pits in the liner system of the reservoir. Dr. Lettis worked closely with members of EBMUD and with DSOD staff during all stages of the investigation to assure compliance with existing regulations and to facilitate regulatory review.

EBMUD South Reservoir

As Project Manager, Dr. Lettis directed an investigation of potential for surface fault rupture through South Reservoir along the West Chabot fault. Based on detailed mapping, trenching, and evaluation of borehole data, the "Carlos B" strand of the West Chabot fault was determined to underlie the reservoir but was shown to be inactive in compliance with DSOD criteria. Based on review, DSOD concurred with the conclusion of fault inactivity.

New Carquinez Bridge, California (2000)

Technical Advisory Board for development of seismic design criteria for large span bridge in the San Francisco Bay Area. Reviewed seismic source characterization, ground motion analysis, selection of time histories, and geotechnical evaluation of bridge pier and abutment foundation.

Caltrans District V Historic Concrete and Steel Arch Bridges Seismic Retrofit, Highway 1, California (1995-1999)

Technical Advisor for geologic and geotechnical site characterization and foundation retrofit studies for eight historic, large-span concrete and steel arch bridges on California Highway 1, including the Bixby Creek, Rocky Creek, Big Creek, and Cold Springs Canyon arches. The scope of work included site subsurface characterization, laboratory testing, development of seismic design/analyses criteria, foundation evaluation (spread footings, pier, and pile foundations), liquefaction and slope stability analyses, rock mass stability and response analysis, and development of retrofit foundation design. Retrofit design consisted of construction of CIDH pile-supported abutment blocks, and installation of high capacity rock anchors for overturning/uplift resistance (up to 1200 kip capacity).

Oromieh Bridge Earthquake Response Technical Review, Iran

Performed 3rd party review of probabilistic seismic hazard analysis and design spectra for a proposed new viaduct and bridge across Lake Oromieh in northern Iran that will be supported by driven or large diameter CIDH piles in layered soft to stiff lake sediments. Reviewed seismic reflection data for evaluation of potential for surface fault rupture. Prepared evaluation of regional and local seismic sources for input to revised PSHA source model.

New Tacoma Narrows Suspension Bridge technical review and advisory committee, Washington

Performed 3rd party review of probabilistic seismic hazard analysis and for proposed new large span suspension bridge. Review included evaluation of seismic source model, attenuation model, and identification of controlling earthquakes for design, with emphasis on the Cascadia subduction zone and Seattle fault system.

Chacau Bridge, Chile

Provided 3rd party peer review of seismic design and geotechnical characterization of proposed new large span suspension bridge. Reviewed seismic source model, attenuation relationships and time histories. Proposed bridge is within area of significant subduction zone tectonic subsidence from 1960 Chilean earthquake. Potential for secondary fault rupture and future tectonic subsidence was evaluated.

Pacific Gas and Electric Company Seismic Hazard Evaluations, San Francisco, CA

Dr. Lettis has conducted seismic hazard evaluations for numerous Pacific Gas and Electric Company (PG&E) facilities throughout California. He investigated the earthquake vulnerability of PG&E's entire gas supply and distribution system, including pipelines, compressor stations, terminals, and pressure-limiting stations. The project involved preparing liquefaction and slope stability hazard maps covering all of northern and central California, site assessments of above ground facilities, and assessments of fault activity at pipeline crossings, including 4 pipeline crossings of the Hayward fault. Dr. Lettis also was Project Manager for a comprehensive fault evaluation for PG&E's Lake Almanor and Butt Valley Dams in the Northern Sierra Nevada. The study involved detailed fault mapping and trenching to assess fault location, recency of activity, MCE and displacement per event. Dr. Lettis also managed a comprehensive, seven-year investigation of Quaternary faulting in central coastal California as part of PG&E's Long-Term Seismic Program for the Diablo Canyon Power Plant. For this study, Dr. Lettis directed a program of mapping, drilling, trenching and age dating to evaluate the capability and behavior of over 20 potentially capable faults including the San Simeon, Hosgri, and Los Osos faults.

Research Investigations

Dr. Lettis has been the Principal Investigator on 28 research projects sponsored by the U.S. Geological Survey, National Science Foundation and U.S. Nuclear Regulatory Commission to assess earthquake hazards in the United States. These studies have included paleoseismic investigations of the San Andreas, Calaveras, San Gregorio, Hayward, Green Valley, and Shannon-Monte Vista faults in the San Francisco Bay region, geomorphic analyses of the 1989 Loma Prieta, 1987 Whittier Narrows, 1992 Landers, and 1994 Northridge earthquakes, and liquefaction mapping of the Napa, San Francisco, and Stockton 1:100,000 scale quadrangles. For the U.S. Nuclear Regulatory Commission, Dr. Lettis performed an investigation of the late Quaternary history and seismotectonic setting of the Meers fault, Oklahoma, and prepared NUREG reports on Methods for Dating the Age of Active Faults and Methods for Differentiating between Tectonic and Non-tectonic Faults. Dr. Lettis recently conducted post-earthquake investigations of the 1999 Kocaeli and Duzce earthquakes in Turkey, the 1999 Chi Chi earthquake in Taiwan, and was the U.S. Team Leader for the 2002 Buhj earthquake in India, all sponsored by the NSF and Earthquake Engineering Research Institute.

Technical Peer Review

Dr. Lettis provides technical advice and peer review for geological seismic hazard investigations throughout the United States and abroad. For PG&E, he has reviewed several seismic and geotechnical investigations to assess hazards to their hydroelectric facilities in the northern and central Sierra Nevada, many of which were performed in compliance with DSOD requests. He has provided technical review for geologic and seismic hazard assessments of the Los Alamos National Laboratory and Sandia National Laboratory in the Rio Grande Rift, New Mexico, for nuclear facilities in Korea, LNG terminals in Trinidad and Tobago, Peru, and Mare Island in the San Francisco Bay Area, and for various USBR and ACOE dams in California and Colorado.

Expert Witness

Dr. Lettis provides expert witness services related to the identification and characterization of geologic hazards. He provided expert testimony on the cause, timing, and failure mechanism of a large debris flow for the Yuba County Water Agency, and on the geologic setting of the San Joaquin Valley for the Westlands Water District.

COMMITTEES AND EXPERT PANELS

Member, California Earthquake Prediction Evaluation Council (CEPEC), scientific advisory board to the Governor and Office of Emergency Services (OES), 2003 to 2007

Member, California Geological Survey Geologic Mapping Advisory Committee, 2000 to present

Co-Chairman, American Nuclear Society (ANS) Working Group Committee 2.27 to develop evaluation criteria for assessing seismic hazards for nuclear materials facility, 1996 to present

Member, Ethics Committee of the Earthquake Engineering Research Institute

Member, Board of Directors, Cooperating Organizations of Northern California for Earthquake Research and Technology (CONCERT) 1993 to 1996

Member, Expert panel to assess earthquake hazards in the southeastern United States, Lawrence Livermore National Laboratory/Department of Energy, 1990 to 1996

Member, California Division of Mines and Geology Advisory Committee on Liquefaction Hazards, 1991 to present

Member, California Seismic Safety Commission, Geology/Seismology Subcommittee, 1988 to 1990

Member, NASA Science Committee, 1985

LECTURES

Dr. Lettis was an invited lecturer on Evaluation and Mitigation of Seismic Hazards, sponsored by California Division of Mines and Geology, Southern California Earthquake Center, and University of California, Berkeley. He has been an invited lecturer on Quaternary Geology, regional tectonics, and remote sensing at Stanford University, 1982; University of California, Berkeley, 1982, 1984, 1985, and 1986; the Women Geoscientists of America, San Francisco Conference, 1985, and numerous professional meetings. He was invited Symposium Moderator, Earthquake Risk and Hazard Mitigation Symposium, Association of Geologists 38th Annual Meeting, 1995.

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Books

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Hall, N.T., Angell, M., De Wit, M.W., and **Lettis, W.R.**, 1994, Late Quaternary deformation of the southern Santa Cruz Mountains, California, *in* Alterman, I. B., McMullen, R.B., Cluff, L.S., and Slemmons, D.B., eds., Seismotectonics of the Central California Coast Ranges, Geological Society of America Special Paper p. 292.

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Wells, D.L., and **Lettis, W.R.**, 1990, Empirical assessment of earthquakes on reverse/thrust faults and surface deformation [abs.]: Seismological Research Letters, v. 61, p. 20.

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EDUCATION

Ph.D., Geology, University of California, Berkeley, CA, 1982

M.S., Geology, University of California, Berkeley, CA, 1979

B.S., Geology and B.S., Forestry, Humboldt State University, Arcata, CA; 1977

REGISTRATION

Certified Engineering Geologist, California, No. 1296, 1986

Professional Geologist, California, No. 4079, 1986

AFFILIATIONS AND AWARDS

American Association for the Advancement of Science

American Geophysical Union

Association of Engineering Geologists

Geological Society of America

Earthquake Engineering Research Institute

Seismological Society of America

Humboldt State University, 1998 Alumni of the Year Award

Geological Society of America, Penrose Grant, 1979

University of California Regents Fellowship, 1977-1978

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF
MARVIN MORRIS
ENERCON SERVICES, INC

PROFESSIONAL EXPERIENCE

Experience Summary

Over 30 years of experience in the nuclear industry in areas of design, analysis, licensing and operations support

Over 9 years BWR-6 experience in licensing and design

Experienced in licensing and design basis analysis and analysis of special events such as ATWS and Mark III containment hydrogen control

Experience Description

Mr. Morris is a consulting engineer and analyst in Enercon's Atlanta office. Mr. Morris is currently working on the GGNS, Duke, and TVA COL applications as well as evaluating the implementation of the RG 1.183 Alternate Source Term (AST) methodology at ANO Units 1 & 2 to resolve Control Room habitability issues. He has recently completed revision of the Davis Besse design basis accident analyses to incorporate the AST methodology. He has also developed an Integrated Safety Analysis for the Honeywell Metropolis Works UF_6 facility submitted to the NRC as part of the Honeywell license renewal process. He has provided technical support for the ANO Unit 2 and Waterford steam generator replacement and power uprate. He has performed reanalysis of the Fuel handling Accident (FHA) for ANO Units 1 and 2 establishing the required time delay for fuel movement after shutdown. He prepared engineering reports for ANO Units 1 and 2 to justify removal of MOVs from the ANO MOV program considering the requirements of GL 89-10. He revised/updated the GGNS feedwater line break analysis based on current design philosophy. He also updated the GGNS design basis LOCA analysis. Included in this effort was modification of the NRC TACT5 offsite dose computer program to incorporate additional regions of evaluation and control room dose analysis as well as preparation of the computer program documentation package. Additional support included; GGNS LER's, revision of the design basis LOCA analysis, preparation of a calculation and engineering report to address Information Notice 91-56, preparation of FSAR changes, and NRC presentation support. He also provided support to ANO in assessing control room habitability including revision of their design basis LOCA analysis.

Mr. Morris was assigned as Office Manager of the ABB Impell Russellville office from March 1991 to July 1992. While in this capacity, work was performed to support the operation of ANO-1 and ANO-2, Waterford-3, Grand Gulf Nuclear Station, and the South Texas Project Electric Generation Station. Provided technical direction, review and verification for ten Pressure/Temperature calculations for ANO-1 and ANO-2. Developed Technical Specification changes for ANO-1 and ANO-2. Provided responses to EARs and IRFs concerning the ANO M-83 and M-2083 Piping Class Summaries. Prepared Design Change Packages for Main Steam valve Modifications in response to the ANO GL 89-10 program requirements. This modification was installed during the 2R9 outage. Performed seismic calculations for the ANO GL 89-10

program. Performed verification and benchmark of the TACT5 computer code and developed the Computer Code Verification Package for GGNS. Provided technical basis and analytical results supporting an engineering evaluation of the feasibility of removing the GGNS Main Steam Isolation Valve Leakage Control System. Provided analytical support, developed engineering evaluation, and provided technical support during NRC review of the unfiltered bypass of the GGNS Standby Gas Treatment System and unfiltered control room inleakage. Prepared six system Design Basis Documents for Waterford-3. Prepared a Zero Discharge Study for the South Texas Project Electric Generation Station.

He was assigned as Senior Technical Consultant in the Design Engineering Department at Houston Lighting and Power's South Texas Project Electric Generating Station from September 1990 to March 1991 and was involved in the following activities.

- Prepared Engineering Change Notice Packages, Design Modifications and Design Change Notices to implement design changes. Performed design calculations, shielding calculations, and computer code verification. Responsible for the Control of Heavy Loads Program, engineering procedures and associated design changes. Performed Root Cause Analysis for Nonconforming Condition reports. Evaluated valve failures due to corrosion.
- Evaluated possible effect of parallel pump interaction. Performed stress corrosion and brittle fracture evaluations. Provided support to materials engineering by performing ASME/ASTM code equivalence evaluations. Evaluated primary system for gas binding of pumps, pressure locking of valves, water hammer, and thermal stratification effects.
- Provided responses to Engineering Requests for Action, Engineering Support Requests, Station Problem Reports, Nonconformance Reports, and Deficiency Reports. Engineering activities included responding to SER's, SOER's, IEN's, IEB's, and Generic Letters. Performed Reportability and 10CFR50.59 reviews, Unreviewed Safety Question evaluations, and prepared Licensing Change Notices.
- Prepared LER and Justification for Continued Operation following the failure of Unit 2 Standby Diesel Generator #22 due to stress risers. Performed evaluations of vendor deviations, relief valve failures, and RCP air shield failure. Performed evaluations of the effect of elevated ambient temperatures on plant operations. Provided engineering support to Equipment Qualification Efforts.
- Performed failure evaluation, prepared LER, and developed corrective design modification following failure of the Steam Generator Drain Line due to cyclic fatigue. Performed consequence analysis for unrecovered fuel grid strap. Prepared LER and Technical Specification change to allow testing of Pressurizer PORV's while maintaining Low Temperature
- Overpressure Protection. Performed cross-contamination review and developed necessary design modifications. Evaluated effect of foreign objects found in steam generators during FOSAR and cleanliness inspections.

From September 1981 to March 1990, Mr. Morris was assigned as a Senior Nuclear Engineer in the Design Engineering Department at Gulf States Utilities, River Bend Station. While in this capacity he performed the following work activities.

Engineering activities included responsibility for Anticipated Transient Without Scram (ATWS) rule Implementation, responsibility for the development of environmental design criteria for use in equipment qualification, and design responsibility for nuclear and NSSS systems. As part of his

system design responsibility, Mr. Morris served as technical advisor and provided direction to junior engineers for Post Accident Sampling System, Vibration Monitoring System, Solid Radwaste System, Liquid Radwaste System, Gaseous Radwaste System, Reactor Core Isolation Cooling System, Loose Parts Monitoring System, and Containment Monitoring System.

Participated in the development of the River Bend ALARA program, including writing of the River Bend ALARA reviews and serving as a member of the River Bend ALARA Review Committee. Engineering responsibilities also included the preparation of the design modification packages which included all design and work instructions from procurement of materials through installation and operational testing. Additional responsibilities included the preparation of 10CFR50.59 reviews and 10CFR50.55E evaluations. Participated in the development of the RBS Level 1 Probabilistic Risk Assessment. This effort included the development of system notebooks, event trees, and system fault trees.

- Additional significant activities included writing procedures covering the development, revision, and control of the environmental design criteria as well as procedural guidelines for the generation of input data and calculations for use in the River Bend Emergency Operation Procedures were written. A procedure for the verification and validation of computer codes and software for use in safety related applications was also written. Other activities were related to configuration control and included review of modification request procedures and document change control procedures.
- Licensing activities while at the River Bend Station included development of the River Bend Technical Specifications while a member of the BWROG Technical Specification Committee. In this capacity was responsible for the Technical Specification Review effort and direction of engineers performing review work. Also included in this effort was the presentation and defense of selected Technical Specifications before the NRC. Additional licensing activities included the development of the River Bend Station Emergency Operating Procedures. This effort included representing Gulf States Utilities on the BWROG Emergency Procedures Committee, justification to the NRC of deviations from the generic guidelines, and procedure verification and validation.
- During the development of the second generation River Bend Emergency Operation Procedures, directed a team of 15 engineers while developing operator action limits and taught operator requalification classes on new procedures. Additional activities included the supervision and direction of contractor and utility activities connected with the review and verification of the generic Emergency Procedure Guideline action limit calculational methodology. Additional activities included serving as the Gulf States Utilities representative on the BWROG committee to review the generic BWR Emergency Procedure Guidelines for severe accident applicability.
- Other licensing oriented activities included the development and implementation of the Gulf States Utilities' program to meet the requirements of the Hydrogen Control Rule (10 CFR 50.44). This effort included representation of Gulf States Utilities in the Hydrogen Control Owners Group, direction of the River Bend quarter scale testing effort, supervision of contractor and subcontractor activities, development of a suitable program of testing and analysis to demonstrate compliance with the rule, preparation of submittals to the NRC and ACRS, extensive interface with the NRC to resolve questions and concerns, and the preparation of schedules and budgets. Additional licensing activities have included supervision and direction

of team efforts to respond to the Nuclear Utility Group on Station Blackout. Subsequent efforts included responsibility for demonstrating compliance with the Station Blackout Rule (10 CFR 50.63). This included establishment of a station blackout coping duration, demonstration of coping ability, and review of the River Bend emergency, abnormal and station operating procedures in accordance with the criteria given in NUMARC-8700. Station blackout activities also included serving as the Gulf States Utilities representative at NUGSBO meetings. Other licensing activities have included the direction and training of utility engineers to enable Gulf States Utilities to prepare their own Regulatory Guide 1.21 semi-annual effluent reports. Additional significant licensing activities have included preparation of Condition Reports, FSAR, and USAR changes, Technical Specification changes, and Licensee Event Reports.

Mr. Morris was employed by Brown and Root, Inc. from 9/76 to 9/81, and during this time he performed the following functions.

- Mechanical Engineer on the South Texas Project. While at Brown and Root, assignments included Senior Licensing Engineer, Mechanical Engineer, and Nuclear Engineer on the South Texas Project.
- Responsible Licensing Engineer for Chapters 4, 6, 9, 11, 12, and 15 of the South Texas Project FSAR. Responsibilities included obtaining technical input from the various engineering disciplines, reviewing this input for technical adequacy, and writing the FSAR sections. Also had generic licensing responsibility for inservice inspection, reliability analysis, radwaste management, and radiation protection.
- Temporarily assigned in the Material Control Section to resolve material supply problems. In this capacity, provided direction and supervision to AE expediters located at each major supplier's fabrication facility. Also provided interface between the construction site, engineering, scheduling, and vendors.
- Mechanical Engineering responsibilities included the integration of Westinghouse design requirements into the design of assigned systems. Responsible design engineer for the incore instrumentation system, reactor coolant pump oil changing system, excore detector system, incore thimble racks, and reactor coolant pumps. Additional duties included performance of ALARA reviews and support for the solid and liquid radwaste systems. In addition to system design responsibilities, provided interface between vendors and support disciplines.
- Nuclear Engineering responsibilities included the development of computer codes necessary to perform accident analysis. These included codes to determine the off site radiological consequences of accidents, the control room accident doses, and radionuclide source term generation. Additional computer codes developed were used for modeling the concentration and buildup on radionuclides in liquid radwaste system components and for determining liquid radwaste releases. Additional responsibilities included performance of shielding analysis, containment analysis, the liquid radwaste state point analysis.

Education

B.S. Mathematics; University of Texas, Pan American, 1968

M.S. Physics, Sam Houston State University, 1974

Completed all course work toward **M.S. Nuclear Engineering**; Texas A&M University, 1975

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF
ALCUIN (AL) J. SCHNEIDER
ENERCON SERVICES, INC

PROFESSIONAL EXPERIENCE

Experience Summary

Over 33 years of technical and management experience in commercial nuclear power

Experience encompasses numerous lead and supervisory assignments in engineering, projects, technical support, preoperational and start-up testing programs, procedure upgrade and development, licensing, and outage planning and scheduling

Broad background in aspects of design and plant engineering, operations, project management, outage coordination, and licensing

10 CFR Part 52 Experience

Extensive experience in In-service Testing Program (IST) review and development

GE BWR Senior Reactor Operator Certified at three nuclear plants and two training facilities

Managed major projects including design of BWR/6 ECCS Suction Strainers for three BWR/6 plants, Early Site Permit Application preparation

Experience Description

Mr. Schneider is currently Manager of Projects for the New Plant Services Division of ENERCON. As Manager of Projects, he is responsible for the administrative (staffing, budget, schedule) and technical management of projects completed by the New Plant Services Division, either directly or through assigned project managers. He has extensive project management experience and has managed major projects such as the development of an Early Site Permit for the Grand Gulf Nuclear Station, provided project management services to NuStart in initiation of their COLA preparation project, the Enercon/NuStart ESBWR COLA preparation project, design of BWR/6 ECCS Suction Strainers for three BWR/6 plants, Technical Specification Surveillance Test Procedure Upgrade Projects, system design criteria review and development, comprehensive IST program reviews, and a ten-year IST program update. Mr. Schneider held the Manager of Projects position for the Engineering Services Division of ENERCON prior to his transfer to New Plant Services.

During his years with ENERCON, Mr. Schneider has managed and/or provided technical support for a number of engineering projects including: Waterford-3 extended power uprate; completion of a power uprate study for the Grand Gulf plant (for both extended uprate of 15%, and 1.7% uprate associated with installation of the LEFM flowmeters); UFSAR verification and consistency review projects; BWR system design basis document preparation, review and upgrade; BWR/6 (Grand Gulf, Perry and Clinton plants) ECCS Suction Strainer design; Emergency Diesel Generator starting air systems upgrade; PWR waste evaporator abandonment modification; BWR/6 Mark III containment hydrogen control system design and analysis; Station Blackout coping studies; motor operated valve torque switch setting and maximum expected differential pressure (MEPD)

calculations and specification development; MOV MEDP test procedure development; ASME XI ISI ten year hydrostatic test procedure development; equipment purchase/design specification development; development of a Procurement Evaluation Request engineering administrative procedure; development of corporate standards and procedures for ASME XI and welding activities and programs; PWR and BWR ASME XI IST program evaluations against GL 89-04, and MOV/AOV stroke time analysis for IST; ASME XI IST Program 10 year update, including development of a pump and valve safety function basis document; and ASME Class 1, 2 and 3 safety and relief valve setpoint review and evaluation for two nuclear plants.

He also performed a review of Technical Specifications instrument setpoint calculations in accordance with ISA standard DRP67-04; plant service water and circulating water systems pipe replacement cost-benefit analysis; wide range neutron monitoring system cost-benefit analysis; BWR/6 shroud head bolt replacement modification, and various other design modifications preparation and review.

Mr. Schneider provided project management and technical review functions for a Grand Gulf project to update the IST Program, to prepare a revised IST Program for the second 10-Year Interval, and to prepare a detailed IST Program Basis Document. The basis document provided documented safety function(s) for all ASME Class 1, 2 and 3 components, was fully referenced and verified. The current IST program update was based on existing code requirements (ASME XI 1980 Edition) and the second interval program was prepared to the ASME OM Code-1990. He recently managed a GGNS SDC and UFSAR consistency review project, which involved seven systems for review and one system for development of a new SDC. Additionally, he managed a verification review of Sections 7.3 and 7.4 of the GGNS UFSAR in which line-by-line verification of UFSAR text was verified to be consistent with design basis requirements and documents. Mr. Schneider was project manager for a Technical Specification Improvement Program procedure upgrade project involving revision of over 820 Grand Gulf surveillance and administrative procedures to reflect the Improved Technical Specifications. He completed gate valve evaluations for pressure locking and thermal binding concerns for Grand Gulf in response to Generic Letter 89-10, prepared MEDP calculations and test procedures.

From 1992 through 1999, he provided assistance to Entergy Operations Central Design Engineering (Corporate) in development of ASME Section XI Standards and Program Plans presenting the requirements for activities such as Repair and Replacement, Inservice Testing (based on ASME OM-1990 Code), ISI, Containment Inspections per IWE/IWL, and system pressure testing. He managed completion of an update of the Entergy Corporate Welding Program Manual to the 1994 Addenda of Section IX, and prepared a administrative procedure for control of the welding manual.

He was Project Manager for a Technical Specifications Bases review effort for Grand Gulf. The proposed Improved Technical Specifications Bases were evaluated against Grand Gulf's current Technical Specifications Bases, UFSAR, SER and other documents to determine which portions of the new bases could be considered applicable to Grand Gulf without further certification efforts.

Mr. Schneider has provided project management for numerous projects for CEI such as Generic Letter 89-10 MOV Program reviews, diesel generator seismic qualification review, and Service Water and Circulating Water fiberglass pipe replacement projects. He was on-site Project Manager for a field change request (FCR) backlog reduction project, and provided project management functions for development of a design package for reactor shroud head bolt replacement.

Mr. Schneider was Project Manager for a Surveillance Test Procedure Technical Adequacy Review Project which ENERCON conducted at the Calvert Cliffs Nuclear Power Plant. He had overall responsibility for all work performed by the project team. His primary responsibilities included administration of management controls and providing the necessary staffing to maintain the project schedule, and ensuring a comprehensive STP technical review effort. The project was designed to define the design and licensing bases of Technical Specifications Surveillance Requirements and provide a comprehensive review of the STPs to verify the technical adequacy of the procedures to satisfy the intent of the Technical Specifications Surveillance Requirements and their bases.

Mr. Schneider completed technical review of all Surveillance Requirements and LCO bases documents developed for Calvert Cliffs Technical Specifications. Additionally, a Technical Specifications Bases reference manual was developed which captured the research results into a user friendly reference that helped reduce the need for numerous interpretations of Technical Specifications. Project Management and lead technical reviewer functions were provided by Mr. Schneider for comprehensive reviews of the Grand Gulf Nuclear Station and the Calvert Cliffs ASME Section XI Pump and Valve Inservice Test (IST) Programs and associated implementing procedures. The IST programs and implementing procedures were compared to Generic Letter 89-04 requirements, and recommendations were provided to improve the programs and to bring them into conformance with the Generic Letter.

Mr. Schneider participated in an Independent Management Appraisal (IMA) conducted by ENERCON for Florida Power & Light as Lead Engineer with responsibility of coordinating the engineering section evaluation effort and preparing the final report detailing findings and recommendations of the engineering review team.

Mr. Schneider joined ENERCON Services after having worked for General Electric (GE) for over 14 years. His last assignment with GE was at the Tennessee Valley Authority (TVA), Knoxville Nuclear Engineering Branch. There he was responsible for development of procedures for the TVA Browns Ferry Unit 2 Design Baseline & Verification Program. He was assigned lead position for coordination of design change package review for effect on system design bases. In addition, Mr. Schneider developed the design criteria document (DCD) for the core spray system and was responsible for technical review of the RCIC and HPCI DCDs.

Assigned to the Grand Gulf Nuclear Station with GE, over a period of six years during initial plant testing and start-up through the first refueling outage, Mr. Schneider acted in various capacities. His last assignment was in the newly formed Plant Modification and Construction Section where he was responsible for program and procedure development for performance and control of post-design change test activities, and design change implementation process control. He also served in a number of lead assignments coordinating and supervising groups of test and system engineers for several major maintenance and modification outages, including the first refueling outage. Mr. Schneider was the NSSS preoperational test group leader during the Grand Gulf preoperational test program, responsible for coordinating the activities of up to 28 test engineers in all aspects of the test program from construction acceptance construction to preoperational test procedure development to system turnover to the plant. After fuel load at Grand Gulf, Mr. Schneider continued as group leader for remaining NSSS system testing and additional assigned BOP systems.

At Kernkraftwerk Leibstadt in Switzerland, a turnkey plant for GE, he was Operations Superintendent where he supervised a crew of eight startup operations shift supervisors. His responsibilities included coordination and execution of day to day operations activities in support of the startup test program including preparation, review and approval of schedules, procedures and plans. As the Preoperation Test Supervisor at Leibstadt, he supervised 24 engineers in all aspects of the preoperational test program for NSSS systems.

Mr. Schneider's prior experience also included: test director for initial checkout and post-delivery of a BWR/6 simulator at the vendor facility; operator training on a BWR/6 simulator including generation of simulator operating procedures and training lesson plans; NSSS preoperational test group leader at Hatch 2; Operations Superintendent for GE during the post fuel load startup test program at Hatch 2; GE Shift Supervisor during the startup testing program at Hatch 1; operating procedure development for BOP and NSSS systems for Hatch 2; third party technical reviewer of all system preoperational tests for GE at Hatch 2; system test engineer for various NSSS and BOP systems at Hatch 1 and 2 (e.g., RCIC, HPCI, Reactor Recirculation, Fuel Handling Equipment, Feedwater, Plant Heating, and Circulating Water).

Education and Training

B.S. Mechanical Engineering, University of Arkansas, 1972

M.S. Mechanical Engineering, University of Arkansas, 1974

GE BWR SRO Certifications:

BWR Simulator, Morris, Ill.

E.I. Hatch, Units 1 & 2

BWR/6 Simulator, Tulsa, OK

Kernkraftwerk Leibstadt Nuclear Plant

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF KYLE H. TURNER, PH.D.

PROFESSIONAL EXPERIENCE

Chief Executive Officer - McCallum-Turner, Inc., Evergreen, CO 1994 – present

He is Principal author for industry ESP Siting Guide, ESP Model Program Plan and Combined Operating License (COL) Model Program Plan for nuclear power plants and is currently managing an EPRI project to develop a model Program Plan for overall nuclear power plant development under Part 52 regulations. Since 2001, he has directed site selection studies for ten nuclear power plant sites for COL and ESP applications (Duke Power, Entergy Nuclear, Florida Power & Light, Progress Energy(2), NuStart, South Carolina Electric & Gas, two confidential clients). Provided management consultation and technical selection support for ESP and COL applications and strategic planning support for overall nuclear plant development under Part 52. Conducted independent evaluations of nuclear safety, work planning, nuclear safety processes and ISM systems for laboratory management at Oak Ridge National Laboratory. Conducted multiple ISM readiness reviews at Pacific Northwest National Laboratory, Brookhaven National Laboratory, and Oak Ridge National Laboratory. Conducted independent assessments of ISM mandated ES&H budget/risk prioritization, Waste and Environmental Management Division procedural compliance, ISM Phase I/II Verification readiness, management and independent assessment processes (10 CFR 830.120), and research grant evaluation and award practices at Brookhaven National Laboratory (BNL). Conducted independent oversight investigation of a waste management pile fire and a management assessment of Environmental Management Directorate work planning processes at BNL. Provided authorization basis/safety analysis and NEPA compliance support for Rocky Flats Environmental Technology Site. Provided operational management of the radioactive materials license for the first licensed geotechnical testing laboratory in Colorado. Provided nuclear technical issues/senior management review of twenty DOE program-level EISs (including those for clean coal technologies, research reactors, reactor-based plutonium disposition, isotope production, and tritium production) and senior consultation and support for two national public information/public involvement programs.

Managing Principal-in-Charge, Dames & Moore, Denver, CO 1992 – 1993

As senior corporate representative, provided management coordination of business and technical activities, personnel management, and facilities administration for 130-person operating office.

Manager, DOE and Nuclear Programs, Dames & Moore, Denver, CO 1989 – 1993

Responsible for marketing, operations and financial management of a $10 million profit center. Provided a broad spectrum of technical services to DOE sites including baseline risk assessments, treatability/feasibility studies, engineering evaluation support, contaminant fate and transport studies, RFI/RI, CMS/FS, NEPA compliance, regulatory analysis, safety analysis and health and safety support. Assignments were at DOE Chicago, Savannah River Site, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and involved active experience with Federal Facility Compliance Agreements (FFCA) at the Hanford Site, Idaho National Engineering

Laboratory, and Rocky Flats Plant. Projects include:

- Design support and safety analysis studies for Waste Characterization facility (INEL).
- Preparation of Performance Assessment Review Guide for DOE low-level radioactive waste sites, implementing DOE Order 5820.2A, Chapter III.
- Preparation of Safety Analysis Report for Environmental Restoration Activities at the INEL under DOE Orders 5481.1B, 5480.5, 5480.TSR (now .23).
- Safety analysis/risk assessment for Uranium Atomic Vapor Laser Isotope Separation (UAVLIS) pilot plant.
- Remedial investigation/feasibility studies and associated risk assessments at INEL's Test Reactor Area (WAG-2).
- Accident and Operational Impact Support Document preparation (RFETS).
- Safety analysis studies for the Central Drum Storage Facility (RFETS).
- Risk assessment and treatability studies at 881 Hillside Area (OU-1) (RFETS).
- Safety/industrial hygiene assessment for toxic gas handling at the Solar Energy Research Institute (now National Renewable Energy Laboratory).
- Health Physics/Health & Safety Plan oversight for sitewide geologic characterization program and Remedial Investigation activities at OU-1 (RFETS).
- Technical services to DOE-Richland in support of the Hanford Tri-party Agreement.

Prepared the 1992 industry Siting Guide for nuclear power plant Early Site Permits. This Guide was prepared for the nuclear power industry and presents a siting roadmap for the next generation of nuclear power plants; it addresses evolving licensing requirements, vendors' standard plant designs characteristics, and utility requirements developed by the Electric Power Research Institute.

Project Manger II, Dames & Moore, Atlanta, GA 1985-1989
Managed support services provided to the U.S. Department of Energy's Crystalline Repository Project, including site selection and site characterization studies, NEPA compliance planning, decision documentation and defense, and institutional support. Involvement included appearances at public briefings, legislative briefings, and meetings with state and local elected officials. Prepared the site characterization radiological investigation safety plan.

Project Manager I, Dames & Moore, Atlanta GA 1980 - 1984
Managed several Third-Party Environmental Impact Statements, under formal Memoranda of Understanding between the U.S. Environmental Protection Agency and permit applicants; managed route selection and site selection studies (including EISs) and permitting processes for several transmission line and pipeline projects; prepared a management plan for development of a proposed oil shale project.

Senior Engineer, Dames & Moore, Atlanta, GA 1978-1979
Managed site selection studies for nuclear (land-based and floating), coal, and lignite fueled power plants; managed site characterization, EIS, public information and institutional support for a proposed uranium mining project; performed licensing safety analysis and Appendix I dose calculations (operating license stage) for: nuclear power plants, including:

- Virgil C. Summer Nuclear Station
- Wolf Creek Nuclear Generating Station
- South Texas Project

Project Engineer - Dames & Moore, Atlanta, GA 1975-1977
Managed site investigations, license and permit applications, route selection studies, and environmental report studies for a variety of utility facilities and mining operations; provided Quality Assurance for operational nuclear power plant meteorological program at San Onofre Nuclear Generating Station.

Staff Engineer - Dames & Moore, Atlanta, GA 1973 - 1974
Managed multi-disciplinary nuclear power plant environmental report studies; provided Quality Assurance for nuclear power plant site investigations and safety analyses; conducted air quality analyses and prepared air quality permit applications for industrial facilities: performed licensing safety analysis and Appendix I dose calculations (construction permit stage) for several nuclear power plants, including:

- Virgil C. Summer Nuclear Station
- Allens Creek Nuclear Generating Station
- Wolf Creek Nuclear Generating Station
- Calloway Plant Nuclear Generating Station
- South Texas Project
- Comanche Peak Steam Electric Station
- Carroll County Nuclear Station

Senior Research Manager-Science Technology and Research Corporation [STAR] 1972 -1973
Managed NASA-sponsored research on the safety and dynamic behavior of an advanced nuclear reactor concept. The model included algorithms for criticality, heat transfer, compressible fluid flow, and assessed system stability under system perturbations and evaluated of a variety of reactor control mechanisms.

REPRESENTATIVE EXPERIENCE

Dr. Turner has more than 30 years' experience providing technical, business, and management consulting services to commercial industry and government; his management responsibilities have ranged in budget up to $16 million and 200 professional staff. He is Principal author for industry ESP Siting Guide, ESP Model Program Plan and Combined Operating License (COL) Model Program Plan for nuclear power plants and is currently managing an EPRI project to develop a model Program Plan for overall nuclear power plant development under Part 52 regulations. Since

2001, he has directed site selection studies for ten nuclear power plant sites for COL and ESP applications (Duke Power, Entergy Nuclear, Florida Power & Light, Progress Energy (2), NuStart, South Carolina Electric & Gas, two confidential clients). He also has extensive experience in siting fossil-fueled power plants, high- and low-level waste facilities, and major transmission lines. Dr. Turner has conducted independent management reviews for regulatory, procedural, and Integrated Safety Management (ISM) compliance and has consulted on compliance for a wide variety of programs and activities which are governed by Nuclear Regulatory Commission (NRC) Regulations, the National Environmental Policy Act (NEPA), the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Clean Air Act (CAA), the Clean Water Act (CWA), and/or Department of Energy (DOE) Orders. His background includes DOE laboratories (BNL, INL, PNNL, ORNL, LANL, LLNL, reactor and non-reactor nuclear facilities, coal and gas-fired power plants, transmission lines and pipelines, environmental restoration and waste management programs, measurement laboratories, and field data collection (e.g., drilling) programs; he has provided expert testimony regarding investigations conducted by him and under his direction. Dr. Turner holds an active Department of Energy "Q" Clearance.
His specific experience includes:

- Twenty-eight siting, routing, site characterization and permitting projects for nuclear and fossil-fueled power plants, transmission lines, pipelines, mining projects and chemical plants;
- Twenty independent management assessments addressing a variety of management systems, ISM, internal procedures and practices, and event investigations ;
- Twelve licensing projects (NRC regulations), including site characterization, safety analysis, risk assessment, environmental report preparation, and technical specification preparation;
- Twenty Safety Analysis Report (SAR) projects: Nine at DOE sites which addressed relevant DOE Orders and Interagency Agreement (IAG) milestones; seven at commercial nuclear power plants, including site safety investigations, Preliminary and Final Safety Analysis Report (PSAR, FSAR) preparation under applicable Nuclear Commission (NRC) guidance;
- Thirty NEPA compliance projects involving preparation and/or senior technical review of energy program and facility NEPA documents (EIS, EA, and Environmental Reports);
- Fifteen environmental restoration/waste management projects at DOE sites, including remedial investigation/feasibility studies, treatability studies, human health risk assessments, and waste characterization studies; and
- Seven assignments involving the design and execution of major public involvement and/or public information programs.

PUBLICATIONS

"EPRI Technical Update: Program on Technology Innovation: New Plant Deployment Program Model: Activities in 2005," EPRI, Palo Alto, CA: 2006. 1013102 (Principal Investigator).

"Combined Operating License Model Program Plan", EPRI, Palo Alto, CA: 2003. 1002997 (Principal Investigator).

"Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application, EPRI, Palo Alto, CA: 2002 10006878 (Principal Investigator).

"Early Site Permit Model Program Plan", EPRI, Palo Alto, CA, 2002. 1002996 (Principal Investigator).

"Nuclear Power for the Future: Implications of Some Crisis Scenarios", Transactions of the American Nuclear Society, Volume 72, June 1996.

"A Detailed Roadmap to ECO Compliance", McCallum-Turner, Inc., prepared for Metro Transportation Group, Inc. and presented to the Transportation Management Association of Central Lake County and the Northern Illinois Business Association, January 1994 (with R. F. McCallum).

"The Role of ANS in Enhancing Public Understanding of Advanced Nuclear Energy Plants", International Nuclear Congress (INC) 93, Toronto, Canada, October 3-6, 1993 (with E. L. Quinn).

"The Early Site Permit Siting Guide: Criteria and Procedures for Selecting an ALWR Site", Transactions of the American Nuclear Society, Volume 68 Part A, June 1993 (with T. F. McKinney and E.A. Blocher).

"Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application," Prepared under contract to EPRI, March 1993 (Principal Investigator).

"Social and Institutional Evaluation Report for Greater-than Class C Low-Level Radioactive Waste Disposal", Prepared for the National Low-Level Waste Management Program under Contract DE-AC07-761DO1570, June 1993, (with T. L. Anderson, et. al.).

"The Role of ANS in Enhancing Public Understanding of Advanced Nuclear Energy Plants," ANS Annual Meeting, Boston, MA, June 1992 (with E.L. Quinn).

"Rocky Flats Plant Sitewide EIS Normal Operation and Accident Impact Analysis", Prepared for EG&G Rocky Flats, October 1992, (with T. L. Anderson, et. al.).

"Performance Assessment Review Guide for DOE Low-Level Radioactive Waste Disposal Facilities", U.S. Department of Energy DOE/LLW-93, October 1991 (with E. L. Wilhite, et. al.)

"Nuclear Power - Strategic Planning for the Next Generation," Transactions of the ANS, Volume 59, June 1989.

"Radiological Evaluations in Selection of Routes for High-Level Nuclear Waste Transportation," Waste Management '89, Tucson, Arizona, February, 1989.

"A Dose-Based Method for Evaluating Alternative Radioactive Waste Transportation Routes," DOE Model Conference, Oak Ridge, Tenn., October 3-7, 1988.

"A Model of the Dynamic Behavior of the Coaxial-Flow Gaseous-Core Nuclear Reactor", Nuclear Technology, Volume 20, Number 1, October 1973 (with J. D. Clement).

"Dynamic Analysis of the Gas-Core Reactor System - Final Report", NASA-CR-121253, NASA-Lewis Research Center, March, 1973.

"A Dynamics Model of the Coaxial Flow Gaseous Core Nuclear Reactor System", Ph.D. Thesis, Georgia Institute of Technology, December 1971.

EDUCATION

B.S., Electrical Engineering, Georgia Institute of Technology, 1968

M.S., Nuclear Engineering, Georgia Institute of Technology, 1969

Ph.D., Nuclear Engineering, Georgia Institute of Technology, 1971

HONORS AND AFFILIATIONS

Georgia Tech Academy of Distinguished Engineering Alumni

Board of Advisors, Georgia Tech Nuclear and Radiological Engineering/Health Physics Program

American Nuclear Society Leadership Award (1996)

American Nuclear Society: Board of Directors 1999 – 2003, Treasurer (2001 – 2003), Chair, Power Division 2000 – 2001

Member: Institute of Electrical and Electronics Engineers, Health Physics Society

STATEMENT OF PROFESSIONAL QUALIFICATIONS OF GEORGE A. ZINKE

PROFESSIONAL EXPERIENCE

ENTERGY NUCLEAR, INC.
Project Manager, Business Development

2004 - Present

NuStart Licensing Lead.
Responsible for regulatory affairs associated with the NuStart COL Development Project

Entergy Nuclear New Plant Licensing Lead.
Responsible for regulatory affairs and quality assurance associated with the Entergy COL Development Projects

2001 – Present

Project Manager, ENI Business Development.
Responsible for regulatory issues associated with new plant development and the GGNS Early Site Permit project.

1997 - 2001

Director, Nuclear Safety & Regulatory Affairs, Maine Yankee.
Responsible for licensing, quality assurance, worker concerns program, emergency preparedness, and environmental programs associated with decommissioning.

Manager, Regulatory Affairs, Maine Yankee.
Responsible for licensing functions, 50.59 process. Major projects included preparation, submittal, and approval of Defueled Technical Specifications.

Quality Programs Manager, Maine Yankee.
Responsible for quality assurance and quality control function associated with restart preparations and decommissioning.

ENTERGY OPERATIONS, INC.

1994 - 1996

Quality Assurance Manager, River Bend Station.
Responsible for quality assurance, quality control, and non-destructive examination testing functions.

Technical Assistant to Director,
Nuclear Safety & Regulatory Affairs, River Bend Station.
Assisted director with licensing functions. Responsible for INPO coordination and preparations. Responsible for Nuclear Review Board coordination.

1982 - 1993

Technical Assistant to Director,
Nuclear Safety & Regulatory Affairs, Grand Gulf Nuclear Station.
Assisted director in responsibilities for licensing and other regulatory functions.

Manager, Nuclear Safety, Grand Gulf Nuclear Station.
Responsible for licensing functions, operating experience program, Independent Safety Engineering Group.

Licensing Superintendent, Grand Gulf Nuclear Station.
Responsible for routine and special reports (e.g., Licensee Event Reporting, Violation Response), license basis maintenance, technical specification implementation and interpretation, NRC resident interface, and 50.59 process.

System Engineering Superintendent, Grand Gulf Nuclear Station.
Responsible for development and implementation of system engineering organization. Member of Plant Safety Review Committee.

Technical Engineering Supervisor, Grand Gulf Nuclear Station.
Responsible for system engineering type functions, and technical specification surveillance testing program. Responsible for Technical Specification and Surveillance rewrite project in 1982/1983 including NRC interactions on Technical Specification changes.

GENERAL ELECTRIC

1980 - 1981

Preoperational Test Engineer, Grand Gulf Nuclear Station.
Responsible for writing and performance of various preoperational tests including ECCS integrated testing.

1977 - 1979

Startup Test Engineer, Hatch Nuclear Plant.
Responsible for preoperational testing of Unit 2 batteries and feedwater heating controls, major modifications on Unit 1 and 2 condensate and feedwater systems, and general system engineer duties.

1974 - 1976

Field Engineer.
Responsible for installation, testing, modification, and warranty work at a variety of industrial sites in Texas and New Mexico. Equipment included steam turbines, gas turbine, precipitator controls, medium and low voltage switchgear, transformers, compressors, diesel generators.

U. S. ARMY SIGNAL CORPS (1973 – 1974)

Second Lieutenant

EDUCATION

Bachelor of Science, Electrical Engineering, Wichita State University, 1973

PROFESSIONAL CERTIFICATIONS

Registered Professional Engineer, Mississippi, 1982 (registration dropped in 2002)

Senior Reactor Operator (Certified), Grand Gulf Nuclear Station