ROBERT B. WHORTON, P. E.

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EDUCATION:

B. S. Engineering (Civil – Structural) – University of South Carolina, 1970

REGISTRATION:

Professional Engineer – South Carolina, No. 06157, February 20, 1976

PROFESSIONAL HISTORY:

South Carolina Electric & Gas Company, Virgil C. Summer Nuclear Station, Consulting Engineer, 2008-11

South Carolina Electric & Gas Company, Virgil C. Summer Nuclear Station, Senior Engineer, 1981-2008

South Carolina Electric & Gas Company, Virgil C. Summer Nuclear Station, Engineer, 1971-81

PROFESSIONAL EXPERIENCE:

Mr. Whorton has served as Lead Engineer for South Carolina Electric & Gas Company (SCE&G) on a variety of projects involving civil, structural, seismic, design, siting and licensing issues for the Virgil C. Summer Nuclear Station (VCSNS) Unit 1 since its initial siting, design and construction. He has been responsible for the coordination and review of all civil/structural/seismic design inputs for VCSNS Unit 1 and provided engineering support in these areas during the construction and operation phases of the project. He was involved in the preparation and review of the civil/structural/seismological sections of the VCSNS Unit 1 Preliminary Safety Analysis Report (PSAR) and Final Safety Analysis Report (FSAR), and instrumental in the construction and operating license hearings for resolution of seismic and structural issues. He has served as Senior Engineer for the review of all civil/structural/seismic issues affecting VCSNS Unit 1 since its commercial operation in 1984. In this capacity he has coordinated and developed several Design Basis Documents (DBDs) as follows: Reactor Building Structure, Nuclear Safety-Related Structures, and Seismic Topical DBDs. Mr. Whorton has also been responsible for the consolidation of the civil/structural design calculations for VCSNS Unit 1 and has been involved in the review and development of the Seismic Equipment Qualification Files.

Since 1971, Mr. Whorton has worked with numerous Universities in the further understanding of the seismicity effects in the Eastern U. S. and South Carolina. He maintained a close working relationship with the University of South Carolina and The Citadel in the evaluation of seismicity in South Carolina, including Charleston and the VCSNS site area. Mr. Whorton is credited with the investigation and documentation of several of the earliest known earthquakes in the Charleston area, including discovery of documentation leading to the first reported earthquake in the U. S. in 1698.

Mr. Whorton has obtained a wealth of earthquake engineering experience over the past 40 years while working on resolution of seismic issues affecting the VCSNS site. These areas include: PSAR/FSAR development, coordination of seismologists and geologists in the initial design review of VCSNS Unit 1, coordination of seismologists and geologists in the resolution of faults discovered at VCSNS Unit 1, coordination of a large team of prominent seismologists and earthquake engineers during the ACRS and ASLB Operating License hearings for VCSNS Unit 1 on the resolution of Reservoir Induced Seismicity and other structural issues, coordination of a Seismic Confirmatory Program for resolution of ACRS and ASLB license confirmatory items, and coordination of the Seismic IPEEE Program.

Since 1983, Mr. Whorton has been an active participant in numerous industry committees involved in the oversight of seismic issues affecting nuclear power plants. These committees include: Seismicity Owners Group (SOG) Steering Committee for Resolution of the Charleston Earthquake Issue, SOG Hazards Evaluation Committee, AIF Seismic Design Basis Sub-Committee, NUMARC Seismic Issues Working Group, NEI Seismic Ad Hoc Advisory Committee, EPRI Seismic Design and Qualification Committee, EPRI Structural Reliability and Integrity Committee, and NEI Seismic Issues Task Force. As a member of these committees, Mr. Whorton has been instrumentally involved in the development and review of numerous industry reports, participated in interactive meetings with ACRS and NRC, and worked with many prominent earthquake engineering experts in the establishment of industry positions on regulatory matters. Significant issues for which Mr. Whorton has been an industry leader include: the Charleston Earthquake hazards resolution, development of the OBE Exceedance Criteria, requirements for plant seismic instrumentation, and justification for reduction in Seismic IPEEE programs.

Mr. Whorton has also served on several State of South Carolina Committees related to seismic hazards, including: South Carolina Seismic Safety Consortium, South Carolina Technology Transfer and Development Council, and the Governor's Nuclear Waste Consultation Committee on the High-Level Nuclear Waste Repository Program. In 1995 Mr. Whorton was invited by the International Atomic Energy Agency (IAEA) to participate in a meeting in Vienna, Austria to present the U. S. perspectives on requirements for seismic design and instrumentation for Eastern European Reactors. In 1996 and 1997, IAEA invited Mr. Whorton to participate with a team of experts on three missions to the Armenia Nuclear Power Plant (Metsmor). During these missions, Mr. Whorton was involved in upgrade of seismic design response spectra for the plant, installation of upgraded seismic instrumentation, and training of plant personnel.

Also during the 1990s, Mr. Whorton developed the VCSNS Unit 1 civil and structural inspection programs required to support the Maintenance Rule and Containment Inspection Program in accordance with ASME III (IWE/IWL). From 2000 – 2004, Mr. Whorton was the structural lead for License Renewal of VCSNS Unit 1 which incorporated and imposed these structural inspection programs for aging management.

In 2005, Mr. Whorton was selected as a member of the initial team for the VCSNS Units 2/3 project. In this capacity he was involved with the initial siting and layout for the two new Westinghouse AP1000 units, including initial geological investigations. Mr. Whorton coordinated review and development of Section 2.5 of the FSAR for the COL application, the Unit 2/3 site geotechnical investigations, along with

coordination of the Seismic Technical Advisory Group (TAG) which consisted of prominent industry experts for endorsement of the FSAR Section 2.5. Mr. Whorton also coordinated a working group of utilities who were in parallel submitting applications for the AP1000 design to ensure consistency among applications.

For VCSNS Units 2/3, Mr. Whorton has coordinated the geologic mapping program, including inspections by NRC and RII. In addition, he also has oversight responsibilities for the overall civil and structural design. Since 2009, Mr. Whorton has also participated in an industry oversight and review group for the AP1000 enhanced shield building design for AIA considerations.

PUBLICATIONS:

1. Somerville, M. R.; Redpath, B. B.; Whorton, R. B.; and Williams, D., "Experimental Investigation of Relative Foundation and Free-Field Response", 1984.

2. Whorton, R. B., et. al., "Earthquake Hazards, Risk and Mitigation in South Carolina and the Southeastern United States", Section 2 co-author, South Carolina Seismic Safety Consortium, August 1986.

3. Whorton, R. B., "High Frequency, High Amplitude and Low Energy Earthquake Study at V. C. Summer Nuclear Station", *Nuclear Engineering and Design (North Holland, Amsterdam)*, 1988.

4. O'Hara, T.; Reed, J. W.; and Whorton, R. B., "Justification for Reduction in IPEEE Program Based on Revised LLNL Seismic Hazard Results", NEI White Paper, April 1994.

5. Whorton, R. B., "Implementation of OBE Exceedance Criteria at Virgil C. Summer Nuclear Station", 5th Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping, Orlando, Florida, December 1994.

AFFILIATIONS:

Earthquake Engineering Research Institute (EERI), Member Since 1981