Nuclear Regulatory Commission
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SOUTHERN COMPANY

DONALD P. MOORE, P.E.

Consulting Engineer

B.S., Civil Engineering, University of Alabama, 1969
M.S., Engineering, University of Alabama at Birmingham, 1977

EXPERIENCE SUMMARY

Mr. Moore has over 40 years of experience in specialized technical positions and supervisory positions in the field of structural engineering with specific emphasis on seismic analysis and design and seismic qualification of equipment and subsystems. He provides the lead technical expertise for Southern Company on seismic issues and evaluations including seismic hazard and demand, seismic analysis and design, seismic soil-structure analysis, equipment seismic qualification, seismic walk-downs, and seismic margin assessments (SMA).

RELATED EXPERIENCE

From 1980 to the present, Mr. Moore *supervised the structural dynamics* groups at Southern Company including SCS Engineering and Southern Nuclear Operating Company. Since 1992, Mr. Moore has served as Southern Company's *consulting engineer* in the area of seismic issues and evaluations. During this time, he personally managed the development and implementation of a structural dynamic test program at SCS Engineering. He also had the lead responsibility for equipment qualification walkdown to support an U. S. Nuclear Regulatory Commission (NRC) Seismic Qualification Review Team Audit at Georgia Power's Plant Vogtle Unit 1.

Mr. Moore had technical responsibility for the trial Seismic Margin Assessment of a BWR nuclear plant (Georgia Power's Edwin I. Hatch Nuclear Plant) for the Electric Power Research Institute (EPRI). He was the technical director for the seismic evaluation of nuclear power plant equipment and structures at all three Southern Company nuclear power plants (Farley, Hatch, and Vogtle) to address seismic safety concerns. He serves as a Steering Group member of the Seismic Qualification Utility Group (SQUG) which utilized the use of past earthquake experience to verify seismic adequacy of equipment in existing nuclear power plants. Mr. Moore participated in the seismic walkdown of piping (seismic and non-seismic) to verify seismic integrity of existing piping for a BWR main steam isolation valve leakage issue and participated in NRC meetings providing technical basis for allowing increased allowable leakage rates. He has published several technical papers on structural vibration problems, the application of seismic margins and SQUG methodologies, and seismic analyses of dry cask storage installations.

Mr. Moore's design responsibilities included such work as the dynamic analysis of large induced draft fan foundations. It also included the structural analysis and design of a two story reinforced concrete flat slab industrial building and other miscellaneous reinforced concrete and steel structures. Mr. Moore had the lead responsibility for investigating vibration problems of existing structures and for performing dynamic analysis and design of special structures to support machines that produce dynamic loads. He performed structural evaluations of existing structures to determine their ability to withstand dynamic and static loads. He developed modifications to existing nuclear power plant Category I cable tray supports to increase their load capacity. He also reviewed seismic qualification test reports on Class 1E equipment for nuclear power plants and evaluated modifications to existing Category I Structures and Class 1E equipment with regard to their seismic qualifications.

During this time, Mr. Moore was an active member of the ASCE Dynamic Analysis Committee (which was an ASCE Seismic Task Group) of the Nuclear Structures and Material Committee. He was also a member of the joint ACI/ASME Committee on Concrete Pressure Components for Nuclear Service (ACI/ASME Committee 359) and the Subgroup on materials, construction and examination. In addition, he was the Leader of the Working Group for Analysis and Design of Electrical Cable Support Systems under the ASCE Committee on Materials and Structural Design. He was a member of ASCE Electric Power and Communication Lifelines of the Technical Council on Lifeline Earthquake Engineering. He is also a member of ASME QME Subgroup on Dynamic Qualification and the IEEE 344 Special Writing Group on Application of Experience Based Approaches.

Mr. Moore's ***structural design experience*** from 1969 to 1980 included being the lead engineer on design of an auxiliary building for a nuclear plant. This work included the structural layout, preliminary sizing of structural elements, and scheduling of the construction effort. He wrote a portion of Preliminary Safety Analysis Report to meet requirements of the NRC and served as a member of the Seismic Task Group of the ASCE Committee on Nuclear Structures and Materials.

Also during 1969 to 1980, Mr. Moore analyzed and designed large concrete structures for Georgia Power's Hatch Nuclear Power Plant. His work included the seismic analysis of reinforced concrete and structural steel buildings, tornado depressurization analysis, and also the supervision of others performing the analysis, design, and drawing/drafting of concrete slabs. He analyzed and designed structural steel cable tray supports for seismic and static loads. In addition he was responsible for structural review of seismic test and/or analysis of seismic Category I equipment and supports.

RELATED PROJECTS

Mr. Moore provided the technical management of the Plant Hatch Unit 1 SMA project which was a pilot study for the Electric Power Research Institute (EPRI) as documented in EPRI NP-7217. He served as the technical director for the Farley, Hatch, and Vogtle USI A-46 and IPEEE programs using the Seismic Qualification Utility Group (SQUG) and EPRI SMA methodologies. He has actively participated in SQUG since 1986 and as a member of the SQUG Steering Group since 1993. Mr. Moore was asked to perform a Peer review of the SQUG walkdown training course and the SQUG course on the seismic adequacy of new and replacement equipment (NARE) as well as many of the SQUG technical documents. He participated as a trained Seismic Capability Engineer (SCE) on SQUG and IPEEE walk-downs for all six Southern Company nuclear units and the trial SQUG walkdown at Nine

Mile Point Nuclear Plant Unit 1. Mr. Moore was a principal author for EPRI SMA methodology document EPRI NP-6041. He was a co-author of numerous technical papers concerning seismic margin assessment and SQUG resolution to USI A-46. In addition, he was also responsible for the design of structures for nuclear and fossil power plants and analysis and design of foundations for rotating equipment such as fans and pumps. He had the lead responsibility for developing structural dynamic testing capabilities for SCS Engineering. He had lead responsibility for the seismic analysis of independent spent fuel storage installations at Hatch and Farley Nuclear Power Plants, and participated on the panel for the NRC sponsored project on seismic behavior of spent fuel storage cask systems. He is currently responsible for all seismic issues related to the Vogtle Early Site Permit and Vogtle Units 3 & 4 Combined Construction & Operating License Application. In addition he is currently a member of the Participatory Peer Review Panel of the Central and Eastern United States Seismic Source Characterization Program being sponsored by the NRC, USGS, and EPRI, and also a member of the Nuclear Energy Institute Seismic Issues Task Force addressing generic seismic issues for new nuclear power plants and siting for these new designs.

CERTIFICATIONS AND AFFILIATIONS

Mr. Moore participates as an active member on many industry committees that relate to seismic, structures, and structural dynamics, including:

- Seismic Qualification Utilities Group Steering Group
- EPRI Seismic Design and Qualification Committee, now EPRI Structural Reliability and Integrity Committee
- ASME QME Subgroup on Dynamic Qualification
- Advanced Reactor Corporation First-of a-Kind-Engineering Project to Develop Guidelines for Experience-Based Seismic Qualification, industry advisory member
- IEEE 344 Special Writing Group on Application of Experience Based Approaches
- ASCE Dynamic Analysis Committee
- ASCE Seismic Analysis Standards Committee
- ASCE 4 standard for Seismic Analysis of Nuclear Structures
- ASCE 43 standard for Seismic Design of Nuclear Facilities
- Joint ACI/ASME Committee on Concrete Pressure Components for Nuclear Service (ACI/ASME Committee 359)

- ASCE Electric Power and Communication Lifelines of the Technical Council on Lifeline Earthquake Engineering
- Nuclear Management and Resources Council (NUMARC) Seismic Issues Working Group.
- NEI Seismic Issues Task Force
- American Society of Civil Engineers
- American Concrete Institute
- Chi Epsilon
- Tau Beta Pi

AWARDS AND HONORS

In 1992, Mr. Moore received Southern Company's Ruble Thomas Award of Excellence. The award was established to recognize engineering excellence in the field of nuclear power in memory of Ruble Thomas, the former SCS vice president who spearheaded Southern Company's involvement in nuclear energy. Mr. Moore was specifically recognized for his initiative and leadership in the field of seismic and dynamic analysis. Mr. Moore also received the Electric Power Research Institute 1990 Technology Transfer Award for leadership in demonstration of EPRI Seismic Margin Assessment Methodology.

PUBLICATIONS AND PRESENTATIONS

Moore, Donald P., et al., "Seismic Analysis of Plant Hatch ISFSI Pad and Stability Assessment of Dry Cask," (ICONE-8499), presented at the 8th International Conference on Nuclear Engineering, Baltimore MD, April 2-8, 2000.

Hsu, P., Jones, G. V., Moore, D. P., Springfield, T. H., and Walden, S. D., "Design of Plant Hatch Independent Spent Fuel Storage Installation Pads," (ICONE-8498), presented at the 8th International Conference on Nuclear Engineering, Baltimore MD, April 2-8, 2000.

Moore, Donald P., et al., "Seismic IPEEE and USI A-46: Representative Results," *Proceedings of the Fifth Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping*, Orlando, Florida, December 1994.

Moore, Donald P., et al., "Application of Seismic Margin Assessment Methodology for the IPEEE/USIA-46 at the Hatch Plant," *Proceedings of the Fourth Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping*, Orlando, Florida, December 1992.

Donald P. Moore, P.E.

Moore, Donald P., et al., "Results of the Seismic Margin Assessment of Hatch Nuclear Power Plant," *Proceedings of the Third Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping*, Orlando, Florida, December 1990.

Moore, Donald P., et al., "Seismic Margin Assessment of Hatch Nuclear Plant", presented at the 10th International Conference on Structural Mechanics in Reactor Technology, Anaheim, California, August 14-18, 1989.

Moore, Donald P., et al., "Seismic Evaluation of Relays for the Plant Hatch Seismic Margin Assessment," presented at the 10th International Conference on Structural Mechanics in Reactor Technology, Anaheim, California, August 14-18, 1989.

Moore, Donald P., et al., *ASCE Standard: Seismic Analysis of Safety-Related Nuclear Structures and Commentary on Standard for Seismic Analysis of Safety Related Nuclear Structures*, American Society of Civil Engineers, New York, New York, 1986.

Moore, Donald P., and Garrett, Phillip W., "Dynamic Testing of a Large Timber Cooling Tower", presented at the American Society of Civil Engineers Structural Conference, Atlanta, Georgia, 1984.

Moore, Donald P., et al., *Structural Analysis and Design of Nuclear Plant Facilities*, American Society of Civil Engineers, New York, New York, 1980.