UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
GEORGIA POWER COMPANY, et al.	)	Docket Nos. 50-424 (OL)
	)	50-425 (OL)
(Vogtle Electric Generating Plant, Units 1 and 2)	)	

Affidavit of D. S. Jagannathan,
Stephen J. Cereghino, and Mark L. Mayer

County of Los Angeles)
) ss.
State of California)

We, D. S. Jagannathan, Stephen J. Cereghino, and Mark L. Mayer, being duly sworn according to law, depose and say as follows:

1. We are employed by Bechtel Power Corporation. Our business address is Bechtel Power Corporation, 12440 East Imperial Highway, Norwalk, California, 90650. Summaries of our professional qualifications and experience are attached hereto as Exhibits A, B, and C.

2. The purpose of this affidavit is to support Applicants' Motion for Summary Disposition of Joint Intervenors' Contention 7. The affidavit describes the design features at

VEGP that prevent a significant accidental release of radioactive liquid to the ground-water. The affidavit also describes the extremely conservative assumptions that are implicit in Applicants' accidental spill analyses. We have personal knowledge of the matters stated herein and believe them to be true and correct.

I. Design of Tanks and Systems Outside Containment that Could Contain Radioactive Liquid

3. The operation of a nuclear power plant results in the production of radioactive materials which are almost entirely contained within the fuel elements of the reactor vessel. These radioactive materials are either direct products of the fission process or are materials activated in or near the reactor core. Radioactive materials originating from the fuel and those materials activated within the reactor core are contained within the closed loop reactor coolant system. Liquid radioactive materials are removed from the reactor coolant system under controlled conditions. The chemical and volume control system, boron recycle system and the liquid waste processing system are designed to contain and process liquid radioactive wastes and to maintain releases of liquid radioactive effluents to the environment below 10 C.F.R. Part 20 limits and "as low as reasonably achievable" under normal operating conditions.

4. Tanks and related piping containing radioactive liquids at Plant Vogtle are designed and constructed to stringent standards. Safety-related tanks and related piping are designed and constructed in accordance with Regulatory Guide 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants" (Rev. 3 1976). Non-safety related tanks and related piping are designed and constructed in accordance with Regulatory Guide 1.143, "Design Guidance For Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants" (Rev. 1 1979).

5. With the exception of the refueling water and reactor makeup water tanks, tanks containing radioactive liquids are located in containment, the auxiliary building, the radwaste transfer building, and the radwaste solidification building. The containment building is designed to withstand a major accident, and its failure is not considered credible.

6. The tanks in the auxiliary building, the radwaste transfer building, and the radwaste solidification building are located in rooms that have, as a minimum, 2-foot thick concrete walls; and the rooms either have curbs or watertight doors, or are entombed. The tanks are of stainless steel or Inconel construction. A leak detecting drain system in these buildings alarms tc alert the control room operator of a leak in the

various rooms. The drains are routed to the liquid waste processing system. Flood retaining rooms also have a wall-mounted level switch which would notify the control room operator of a tank rupture.

7. The auxiliary building is a seismic Category 1, reinforced concrete structure designed and constructed in accordance with Regulatory Guide 1.29, "Seismic Design Classification" (Rev. 3 1978) (i.e. it is designed to withstand the safe shutdown earthquake without fracture of the walls or basemat). The auxiliary building has a reinforced concrete slab (basemat). The basemat is 10 feet thick. The boron recycle holdup tank (RHT) is located directly on top of the ten foot thick basemat at elevation 119 (feet above mean sea level). The outside wall of the auxiliary building at this elevation consists of approximately 6-foot thick reinforced concrete. The auxiliary building's outside walls at elevation 196, where the waste evaporator concentrates holdup tank (WECHT) is located, consist of approximately 4-foot thick reinforced concrete. The prevention of ground-water seepage into the building and leakages out of the building is assured by the thick exterior concrete walls and basemat.

8. The radwaste transfer building and radwaste solidification building are designed for the operating basis earthquake conditions in accordance with Regulatory Guide 1.143. In

addition, the radwaste transfer building is designed to withstand the safe shutdown earthquake due to its close proximity to the auxiliary building, a seismic Category 1 structure. These buildings are reinforced concrete structures consisting of 1-foot six-inch thick exterior walls (minimum).

9. There are two radioactive tanks per unit located outside of buildings -- the refueling water and reactor makeup water tanks. The tanks are designed for seismic Category 1 conditions and are constructed of cylindrical, reinforced concrete shells that are 2-foot thick (minimum). Each tank is lined with a continuous stainless steel liner plate to ensure leaktight integrity. These tanks have concrete perimeter dikes to control runoff in the event of a tank overflow. Alarms are provided in the control room to alert the operator of a potential overflow condition. Provisions have been incorporated to sample collected water in the dikes and to transfer potentially contaminated water to the liquid waste processing system. Piping running between these tanks and the auxiliary building is enclosed in Seismic Category 1 tunnels.

10. For the purpose of analyzing a postulated spill, the RHT is the most critical tank containing radioactive liquid because it has a large volume (112,000 gallons) and has potentially the largest overall isotopic activity. The RHT is designed and constructed in accordance with Regulatory Guide

1.26. It is an atmospheric tank constructed of 1/4 inch (minimum) thick stainless steel. The RHT is located in the auxiliary building, below grade, in a flood retaining room. This room is equipped with a leak detecting drain system that provides a high level alarm to alert the control room operator of a leak. The drains are routed via a locked-closed valve to the liquid waste processing system. A wall mounted level switch would also notify the control room operator of a potential tank rupture.

11. The major contribution to the radioactive isotope inventory in the RHT is the reactor coolant system chemistry control bleed off. The activity of this process stream is essentially that of the reactor coolant system. For the purposes of analysis, it has been assumed that the activity released in the rupture of the RHT is that of the reactor coolant system for the expected failed fuel levels prescribed by ANSI N-237-1976, "Source Term Specification."

12. The WECHT has a specific isotopic activity comparable to that of the RHT and is therefore also of interest. The WECHT, however, has a much smaller volume (2,800 gallons) than the RHT. The WECHT is designed and constructed in accordance with Regulatory Guide 1.143. It is an atmospheric tank constructed of 3/16 inch (minimum) thick stainless steel. The WECHT is also located in the auxiliary building, below grade, entombed in a room equipped with a leak detecting drain system.

II. Assumptions for Spill Analysis

13. Of the several radionuclides present in the RHT and WECHT, three are critical because of relatively long half-lives. These are tritium (H-3), strontium-90 (Sr-90), and cesium-137 (Cs-137). The isotopic activity assumed for analysis of the rupture of either the RHT or WECHT are as follows:

Radionuclide	Initial Activity in RHT (uCi/cm3)	Initial Activity in WECHT (uCi/cm3)
H-3	1.0E-0	1.0E-0
Sr-90	1.0E-5	8.9E-6
Cs-137	1.9E-2	1.7E-2

14. To evaluate the worst consequences of a rupture of either the RHT or the WECHT, one must postulate not only total tank-failure, but also failure of the auxiliary building housing these tanks. The simultaneous failure of either tank and of the auxiliary building, however, is highly unlikely. As previously stated, the RHT is constructed of 1/4 inch thick stainless steel (minimum), the WECHT is constructed of 3/16 inch thick stainless steel (minimum), and the auxiliary building is a seismic Category 1 structure designed not to fracture when subjected to the safe shutdown earthquake.

15. Assuming that a catastrophic event occurred which caused fracturing of the auxiliary building walls, the fractures would likely not be continuous from the inside wall to the outside, due to the reinforcing bars which are ductile in

nature. Moreover, even if a fracture did traverse the entire thickness of the auxiliary building wall, flow through such a fracture would not necessarily be outwards. For example, because the RHT is at elevation 119 feet and the top of the water table aquifer is at approximately elevation 165 feet, the head differential would cause the fluid flow, if any, to be into the RHT room. The room would have to fill up with water before any outward leakage could occur.

16. The formation of a large fracture that would allow free flow of liquid from either the RHT or WECHT room to the ground is extremely small. Nonetheless, the analysis conservatively assumes that the entire tank is instantaneously introduced to the water table aquifer. No credit is taken for structural design capability of the tanks or the building to contain the fluid within the confines of the plant.

Lo Jan Ma Than

Stephen J. Creyhin

Mark L. Mayer

OFFICIAL SEAL
JOANNE E HENRY
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My comm. expires NOV 22, 1985

Subscribed and sworn to before me this 10th day of July, 1985

My Commission expires: 11/22/85

Joanne E. Henry

EXHIBIT A

D. S. JAGANNATHAN
VOGTLE PROJECT CIVIL-STRUCTURAL LICENSING COORDINATOR

Bechtel Power Corporation, Western Power Division

EDUCATION

B.E. (Civil) - University of Madras, India - 1963
M. SC. Engg. (Structural) - University of Madras, India - 1967
Ph.D. (Structural Engg.) - University of Minnesota - 1974

EXPERIENCE SUMMARY

Twenty years teaching, analysis, design, construction coordination and supervisory experience in the field of Civil-Structural Engineering

EMPLOYMENT HISTORY

1974 to present:	Bechtel Power Corporation, Norwalk, California
1968 to 1974:	Part time at Wheeler and Tillitt, University of Minnesota, ESI, and Setter, Leach and Lindstrom, Minneapolis, Minnesota
1967 to 1968:	P.S.G. College of Technology, India
1963 to 1965:	Madras Public Works Department, India

PROFESSIONAL AFFILIATIONS

Registered Professional Engineer, California
Registered Structural Engineer, California

SPECIAL QUALIFICATIONS IN NUCLEAR POWER PLANT DESIGN

Eleven years with Bechtel Power Corporation, Norwalk, California. These years included the following positions held and duties performed.

- 3 years as a senior engineer performing seismic analysis and design of nuclear power plant structures, which included special assingments on Mark I Containment Study and review of seismic qualification of equipment. Last one year on seismic analysis in Vogtle Project.

- 2 years as a seismic group leader on the Vogtle project with the responsibility for the seismic analysis of all safety-realted structures.

- 3 years as an engineering group leader on the Vogtle project Civil-Structural discipline, responsible for all the design engineering work and construction coordination, for containment building for a brief period and following that for the auxiliary building, fuel handling building and diesel generator building.

- 3 years as a special assistant to the Vogtle project Civil-Structural engineering group supervisor, performing the functions of the licensing coordinator with responsibility for the coordination of all civil-structural engineering licensing activities with project licensing engineer.

EXHIBIT B

STEPHEN J. CEREGHINO

EDUCATION: B.S., United States Naval Academy
Naval Nuclear Power School
Naval Nuclear Power Training Unit
MBA, Business Administration, Whittier College

SUMMARY: 7 Years: Bechtel engineering responsibilities in licensing and systems integration on the Vogtle project.

6 Years: Various training, operational and maintenance responsibilities associated with the naval nuclear propulsion program.

EXPERIENCE: Mr. Cereghino is Project Vogtle's Nuclear Group Supervisor. In this capacity, he provides technical guidance and assistance in the licensing and design of Plant Vogtle. As licensing engineer, he coordinates the inter-discipline activities of project personnel and coordinates with the client, NSSS and NRC personnel to ensure consistent application of licensing commitments. Mr. Cereghino supervises the administration of the NSSS contract, including such activities as: NSSS vendor data review, evaluation of NSSS proposals, and coordination of A/E-NSSS interface activities. In the systems integration area, Mr. Cereghino is responsible for the analytical evaluation of potential plant hazards, such as: radiation, pressure, temperature, flooding, internal missiles and seismic interactions.

Prior to joining Bechtel, Mr. Cereghino was an officer in the United States Navy. His shipboard engineering assignments were as Reactor Controls Officer and Main Propulsion Assistant. He routinely supervised the operation of the reactor plant during all modes of operation, and directed the chemistry control and radiation protection programs for ships company. Mr. Cereghino's last assignment with the Navy was as a Division Director at the Naval Nuclear Power School; as such, he coordinated the instruction of Reactor Principles to enlisted plant operators. Before leaving the Navy, Mr. Cereghino successfully qualified to assume the responsibilities of Chief Engineer of a naval nuclear propulsion plant.

PROFESSIONAL AFFILIATIONS:

Professional Registration: Mechanical Engineering, State of California

EXHIBIT C

MARK L. MAYER
ENGINEER
Bechtel Power Corporation, Western Power Division

PROFESSIONAL QUALIFICATIONS

EDUCATION

BS, Nuclear Engineering, Massachusetts Institute of Technology-1981

EXPERIENCE SUMMARY

4 years as a nuclear engineer

EMPLOYMENT HISTORY

1981 to present: Bechtel Power Corporation, Western Power Division

PROFESSIONAL AFFILIATIONS:

Registered Professional Engineer, California

SPECIFIC QUALIFICATIONS IN THE RADIATION ANALYSIS FIELD

Four years with the VEGP nuclear engineering group. Responsibilities and duties have included:

- Input to, and review of, project radiation shielding calculations. These duties required the review and understanding of the plant layout, operation and radiation sources.

- Input to, generation of, and review of, project equipment radiation dose calculations. These duties required a review of radiation sources and accident scenarios to identify qualification doses.