1/1/73

QUALIFICATIONS OF APPLICANT'S WITNESSES

In the Matter of The

TENNESSEE VALLEY AUTHORITY

(Watts Bar Nuclear Plant Units 1 and 2)

DOCKET NOS. 50-390, 50-391

APPLICANT'S WITNESSES

William Albrecht

Bruce David Alitt (Westinghouse)

Ermer G. Beasley, Jr.

Ernest A. Belvin, Jr.

Doyle B. Bowen

Bevan W. Brown, Jr.

Robert J. Buehler

Jack R. Calhoun

Thomas Gerald Chapman

Jimmy L. Cross

James P. Darling

Robert H. Davidson

George R. DeVeny

Edward Ely Driver

William A. English

Jack E. Gilleland

John Morgan Kellberg

Jere C. Killian

Jack M. Leavitt

Homer E. McConnell

Joseph W. McReynolds

Harry G. Moore, Jr.

Charles A. Myers

Hugh G. Parris

John L. Parris

Michael J. Ray

John S. Rozek

Dr. Leonard A. Sagan

Gerald F. Schroedl

Lewis E. Stanford

Gilbert F. Stone

Felix A. Szczepanski

John R. Thurman

Clyde W. Voigtlander

C. S. Walker

W. Joe Warren

James E. Watson, Jr.

Robert A. Wiesemann (Westinghouse)

Thomas A. Wojtalik

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QUALIFICATIONS OF WILLIAM ALBRECHT
TENNESSEE VALLEY AUTHORITY

My name is William Albrecht. My business address is Tennessee Valley Authority, 221A Union Building, Knoxville, Tennessee 37902. I am employed by the Tennessee Valley Authority as a nuclear engineer in the Division of Engineering Design. In this capacity I am concerned with chemical engineering aspects of the design of nuclear power plants.

I received the degree of Bachelor of Science in Chemical Engineering from the University of Wisconsin in 1939, and the degree of Bachelor of Laws from Jackson College of Law, Jackson, Tennessee, in 1949.

I was employed by the Tennessee Valley Authority in the Division of Chemical Development in 1940. I participated in the design of a phosphate mining plant and in the design of a pilot plant for the manufacture of magnesium from olivine.

I served in the U. S. Navy from 1943 to 1946.

Upon rejoining the Tennessee Valley Authority, I transferred from the Design Branch of the Division of Chemical Development to the

division's Patent Staff. In this capacity I prepared patent applications on developments in fertilizer technology and operated a technical suggestions system. I became a registered Patent Agent.

In 1955 I transferred to TVA's Power Research Staff and was assigned on a loan basis to Oak Ridge National Laboratory (ORNL). For about a year I worked at data analysis and operation of the Thorex Pilot Plant, and for another year at preoperational testing of the chemical processing unit of the Homogeneous Reactor Test facility. I then spent about two years with the Long Range Planning Group of the ORNL Division of Chemical Technology, where, among other activities, I made fuel cycle cost studies. Next, I spent about one year with the ORNL Reactors Division, where I participated in design review of the Experimental Gas-Cooled Reactor (EGCR).

In 1960 TVA became the operating contractor for the EGCR. I was made Supervisor of the Chemical Engineering Section of the Technical Staff, and was responsible for review of the design of the helium purification, radioactive waste disposal, water treatment, decontamination, and fuel handling systems, and for review and preparation of portions of the operating manual and hazards report relating to these systems. I was responsible also for radiochemical analysis and radioactivity measurement, and in this connection I designed the laboratory and supervised procurement of equipment and preparation of the analytical program. I was source and special materials accountability representative for the EGCR, and supervised the development of the accountability program.

In addition to EGCR-related duties, during 1965 I prepared nuclear fuel cycle cost estimates for TVA studies comparing the costs of nuclear and coal-fired plants on the TVA system, and participated in the preparation of bid invitations for nuclear fuel supply for Browns Ferry Nuclear Plant.

Following termination of the EGCR project by AEC, I transferred to TVA's Division of Engineering Design in March 1966 where I serve as a nuclear specialist in the areas of coolant and fuel pool water cleanup, radioactive waste disposal, water treatment, decontamination, and fuel handling. In this capacity I review information submitted by nuclear steam supply system vendors and work with TVA design personnel in applying this information to plant design at Watts Bar Nuclear Plant as well as TVA's other nuclear plants. This involves interpretation and expansion of the manufacturer's information. I also review TVA and manufacturer's procurement specifications for adequacy of quality assurance provisions. I prepare material for use in licensing documents, including the Watts Bar Nuclear Plant PSAR, and review material prepared by others.

I have prepared or reviewed materials concerning radioactive discharges for the Watts Bar Nuclear Plant draft, supplement, and final environmental statements.

I am a member of the American Nuclear Society.

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QUALIFICATIONS OF BRUCE DAVID ALITT
WESTINGHOUSE ELECTRIC CORPORATION

My name is Bruce David Alitt. My business address is P.O. Box 355, Pittsburgh, Pennsylvania 15230. I am the Project Engineer, TVA Watts Bar Nuclear Plant, for the PWR Systems Division, Westinghouse Electric Corporation and have served in this capacity since August 1970. I am responsible for the administration and coordination of all Westinghouse activities relative to the supply of the Watts Bar Nuclear Plant Nuclear Steam Supply System and associated items within the Westinghouse scope of supply to the Tennessee Valley Authority. Prior to my present assignment, I had similar responsibility for the Sequoyah Nuclear Plant.

I was graduated from the United States Naval Academy in 1963 with a Bachelor of Science degree with a Mathematics Major. I then completed the United States Navy Nuclear Power School and Nuclear Reactor Prototype Training. During my six years of naval service I served as an officer on board nuclear submarines in positions of increasing responsibility including Communications, Reactor Control, Auxiliary, Operations and Navigation. This included over two years in a shipyard where, as

Reactor Control Officer, I helped supervise the loading and subsequent evaluation of a new reactor core. My specific responsibility in the operation was to ensure safety and overall progress. I joined Westinghouse directly after my Honorable Discharge from the Navy.

In the course of my duties I have participated in the preparation of the Preliminary Safety Analysis Report and amendments thereto for the Watts Bar Nuclear Plant. I have also attended and participated in many of the applicant's conferences with the AEC and ACRS.

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QUALIFICATIONS OF ERMER G. BEASLEY, JR.
TENNESSEE VALLEY AUTHORITY

My name is Ermer G. Beasley, Jr. My business address is 310 Union Building Annex, Knoxville, Tennessee 37902. I am a nuclear engineer assigned to the Nuclear Design Staff of the Mechanical Design Branch, in the Tennessee Valley Authority's Office of Engineering Design and Construction.

I have a Bachelor of Science degree in Mechanical Engineering which I obtained from Tennessee Technological University in 1950 and a Master of Science degree in Mechanical Engineering which I obtained from the University of Tennessee in 1960. I am a graduate of the Oak Ridge School of Reactor Technology of the Class of 1955-56. I am a licensed engineer in the State of Tennessee.

I have been an employee of the Tennessee Valley Authority since September 1950. I worked as a designer in the Mechanical Design Branch of the Division of Engineering Design until 1955. After completing the ORSORT course in 1956, I was assigned by TVA to the Division of Reactor Technology in AEC headquarters, Germantown, Maryland. In this capacity

I served as a project engineer working in the area of the technical direction of research and development for gas-cooled power reactors. A major part of the work was in the design and development of the Gas-Cooled Reactor Experiment for the Army Reactors Branch, and the Maritime Gas-Cooled Reactor for the Maritime Reactors Branch.

In 1959 I was assigned to Oak Ridge National Laboratory. My work at the laboratory was principally in the area of design and development of gas-cooled in-pile material test loops.

In 1960 I was assigned to the EGCR technical staff which was responsible for the startup, testing, and operation of the Experimental Gas-Cooled Reactor. In this assignment I served as a supervisor of the Engineering Analysis Section. This section was specifically responsible for various functions associated with the design, evaluation, and testing of the EGCR fuel and the reactor coolant system. One of the major areas of work was plant safety, which was a primary responsibility of TVA.

I was assigned to my present position in November 1966. In this position I have assisted in the preparation of documents necessary for obtaining the construction permits and the operating licenses for TVA's nuclear plants, including the Watts Bar Nuclear Plant PSAR. I performed design reviews of certain plant systems and designed specific features related to biological shielding and radiation access control. Presently I am performing a review of the criteria and the design of certain systems and safety facets applicable to all TVA nuclear plants. I have participated in conferences with the AEC staff and with the ACRS in connection with the application for construction permits for the Watts Bar Nuclear Plant.

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QUALIFICATIONS OF ERNEST A. BELVIN, JR.
TENNESSEE VALLEY AUTHORITY

My name is Ernest A. Belvin, Jr. My business address is Tennessee Valley Authority, River Oaks Building, Muscle Shoals, Alabama.

After receiving a Bachelor of Science degree in Chemistry from Newberry College in 1954, I was employed by the E. I. DuPont de Nemours and Company at the Savannah River Plant as a health physicist until September 1964. During this period I was responsible for the immediate supervision of the applied health physics shift functions in the chemical separations and tritium production facilities for six years and in the reactor areas for two years. The remainder of the period was spent as a special studies engineer, analyzing various problems concerning radiation and contamination control. While employed there I wrote the "Radiation and Contamination Control Standard Operating Procedures for the Chemical Separation Facilities" and such technical reports as:

Iodine Monitoring in the Chemical Separations Facilities

Radiation Aspects of Thorium Processing in the Chemical Separations Facilities

Evaluation of Radiation Exposure to Personnel in the Chemical Separation Facilities

Also during this period of employment I received a Chemical Engineering degree from International Correspondence School.

I was employed in the Division of Health and Safety with the Tennessee Valley Authority in September 1964 as a health physicist at the Experimental Gas-Cooled Reactor, Oak Ridge, Tennessee. In this capacity I was responsible for the immediate direction of radiological health monitoring and control activities at EGCR. This included developing plans and methods for identifying radiological hazards; conducting health physics investigations to determine suspected or actual hazards; preparing work schedules and directing the activities of five health physics technicians.

I was transferred to Muscle Shoals, Alabama, in July 1966 as staff health physicist and in May 1969 promoted to Supervisor of the Radiological Hygiene Section of the Industrial and Radiological Hygiene Branch where I have immediate direction of health physics programs TVA-wide.

Specifically, I am responsible for planning and directing the radiological hygiene activities in preparation for the startup of Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants. This includes preparation of parts of the Safety Analysis Reports, review of plant design, development of environmental monitoring systems, specifying and selecting monitoring instruments and systems, selection and training of health physics staff, and participation in preparation of emergency plans and other reports necessary for plant operation.

I provide general supervision and guidance of the onsite health physics staffs in carrying out effective radiation protection programs at

the two nuclear plants; collaborating with plant superintendents and others in reviewing plant operations to assure that potential radiation hazards due to proposed changes are thoroughly evaluated.

I direct the procurement, installation, and effective operation of environmental monitoring instrument networks for radiological surveillance, and determine adequacy of existing systems and evaluate the need for changes in the monitoring systems.

I am further responsible for developing and reviewing radiation standards and procedures for all activities involved in use of radioactive materials, including development of manuals containing these criteria.

I have been responsible for the development of the BFNP Health Physics Manual, Radiological Hygiene Part of TVA's Hazard Control Manual, TVA Radiological Hygiene Training Manual, and the TVA Radiological Emergency Plan.

I am a member of the Health Physics Society. Technical papers which I have written and presented have been published in proceedings of that Society.

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QUALIFICATIONS OF DOYLE B. BOWEN
TENNESSEE VALLEY AUTHORITY

My name is Doyle B. Bowen. My business address is Tennessee Valley Authority, 300 Liberty Building, Knoxville, Tennessee. I am an Electrical Engineer employed by the Tennessee Valley Authority in the Division of Engineering Design.

My duties are to act as an electrical engineering consultant to TVA electrical design engineers and engineering groups responsible for the design and procurement of electrical systems, equipment, and components of Watts Bar Nuclear Plant. I review drawing and specifications of electrical aspects of the plant which are submitted by Westinghouse Electric Corporation and other contractors. I participated in the review and preparation of the Preliminary Safety Analysis Report of the Watts Bar Nuclear Plant. My particular emphasis is directed to safety, quality, and reliability in these reviews. My general areas of responsibility are the auxiliary electrical power system and its associated switchboard and wiring systems, criteria, electrical codes, standards, and guides.

I have a BEE degree which I received from Clemson University in 1950.

Following graduation I went to work for General Electric Company as a test engineer in their training program with their Small and Medium Turbine and Small Appliance Divisions. My primary responsibilities were collecting and processing test data.

In July 1951 I was employed by Miller Electric Company, the electrical contractor at the AEC's Savannah River Project. I was responsible for providing electrical technical assistance in the construction of a steam-electric generating station and support auxiliary facilities.

In 1953 I joined the Tennessee Valley Authority in the Division of Engineering Design as an electrical design engineer in the switchboard and wiring group. My responsibility was the preparation of electrical construction drawings.

In 1956 I joined the Dayton Rubber Company in Wagnerville, North Carolina. I was responsible for the maintenance of all the electrical equipment in the manufacturing plant.

In 1957 I rejoined the Tennessee Valley Authority in the Division of Engineering Design as an electrical design engineer. In December 1962 I assumed the responsibilities of a Senior Engineer in the switchboard and wiring group. My responsibilities were to direct the investigations and formulate studies and final designs of steam-electric plants relating to involved design of switchboard and protective

wiring. In May 1970 I assumed the responsibilities of an Electrical Principal Engineer. My primary responsibilities are to review final designs for compliance with quality assurance requirements and technical adequacy.

I am a member of IEEE and am a registered professional engineer in the state of Tennessee.

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QUALIFICATIONS OF BEVAN W. BROWN, JR.
TENNESSEE VALLEY AUTHORITY

Business Address

206 Evans Building, Knoxville, Tennessee 37902

Employer

Tennessee Valley Authority (1950 - date)

Professional Experience

1950-1961 - Civil Engineer, Flood Control Branch, TVA

1961-1964 - Head, Project Studies Section, Flood Control Branch, TVA

1964-date - Assistant Chief, Flood Control Branch, TVA

Education

Clemson University - B.S. in Mechanical Engineering, 1949

Clemson University - M.S. in Hydraulics and Hydrology, 1950

Stanford University - M.S. in Civil Engineering, 1968

Honors

Tau Beta Pi

Recipient 1967-68 President's Mid-Career Program in Systematic Analysis at Stanford University

Professional Societies

Registered Professional Engineer, Tennessee No. 3778

Member, American Society of Civil Engineers

Member, National Society of Professional Engineers

Member, Tennessee Society of Professional Engineers

Member, International Association for Hydraulic Research

Member, American Society for Engineering Education

Member, Technical Society of Knoxville

Professional Activities

National Director, District 6, ASCE (1972-1975)

Past President, Tennessee Valley Section, ASCE (1967)

First Vice President, Technical Society of Knoxville (1964)

Member, National Committee on Continuing Education (1971-1972)

Publications

1964 - Authored the subdivision "Hydraulic Routing" of Chow's Handbook of Applied Hydrology

1970 - "Probabilistic Selection of Project Design Floods" ASCE National Water Resources Engineering Meeting - Memphis, Tennessee, January 26-30, 1970

Nature of Work

As Assistant Chief of the Flood Control Branch, is responsible under the branch chief for the hydrology and river and reservoir hydraulics needed to plan and evaluate hydraulic and other structures in the Tennessee Valley

with particular reference to floods. More specifically, the responsibilities have included the following: Hydrology relating flood to rain for the watershed and its subwatersheds; evaluating the total range of flood potential for the Tennessee Valley watershed and its subwatersheds; flood-frequency analyses; the hydraulics of water movement in the Tennessee Valley rivers and reservoirs; the hydraulics of spillways and other outlets of Tennessee Valley dams; measuring land areas flooded by rivers and reservoirs; planning the flood control and flood safety aspects of TVA dams and reservoirs; evaluating annually the flood control effectiveness of the existing system of TVA dams and reservoirs; planning and evaluating local flood protection projects; preparing technical information on floods for use by communities in applying floodplain regulations for local flood damage prevention programs; preparing flood insurance loss rate studies for the Department of Housing and Urban Development; reviewing the adequacy of proposed private and public structures along streams and reservoirs as these would influence ongoing TVA programs; supplying flood flow and height information for planning safety from floods at developments along Tennessee Valley streams and reservoirs; and a wide variety of other hydrologic, hydraulic, and flood information.

Duties also included coordinating work of the Flood Control Branch with other branches of the Division of Water Control Planning and with other divisions as these relate to the adequacy of basic data on rainfall, streamflow, design considerations, and project costs.

Branch responsibilities have included the preparation of documentary reports on maximum possible floods for the Sequoyah, Browns Ferry, and Watts Bar Nuclear Plants.

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QUALIFICATIONS OF ROBERT J. BUEHLER
TENNESSEE VALLEY AUTHORITY

My name is Robert J. Buehler. My business address is 206 Evans Building, Knoxville, Tennessee, where I am employed by the Tennessee Valley Authority.

For the past nine years I have been Chief of the Flood Control Branch. Prior to this I was Assistant Chief for six years. In these positions I have been responsible for the hydrology and river and reservoir hydraulics needed to plan and evaluate hydraulic and other structures in the Tennessee Valley with special reference to floods. As branch chief I am responsible for coordinating the work of the Flood Control Branch with other branches of the Division of Water Control Planning and with other divisions of TVA as these relate to the acquisition of basic data on rainfall, streamflow, design considerations, and project costs.

The work of the branch for which I am responsible includes hydrology relating flood to rainfall for the watershed and its subwatersheds; evaluating the total range of flood potential for the

Tennessee Valley watershed and its subwatersheds; flood-frequency analyses; the hydraulics of water movement in the Tennessee Valley rivers and reservoirs; the hydraulics of spillways and other outlets of Tennessee Valley dams; measuring land areas flooded by rivers and reservoirs; planning the flood control and flood safety aspects of TVA dams and reservoirs; evaluating annually the flood control effectiveness of the existing system of TVA dams and reservoirs; planning and evaluating local flood protection projects; preparing technical information on floods for use by communities in applying floodplain regulations for local flood damage prevention programs; preparing flood insurance loss rate studies for the Department of Housing and Urban Development; reviewing the adequacy of proposed private and public structures along streams and reservoirs as these would influence ongoing TVA programs; supplying flood flow and height information for planning safety from floods at developments along Tennessee Valley streams and reservoirs; and a wide variety of other hydrologic, hydraulic, and flood information.

I received Bachelor of Science and Master of Science degrees in Civil Engineering from the University of Wisconsin in 1933. Following graduation, I worked briefly in erosion control activity in Wisconsin until coming to TVA as a junior engineer in mid-1934. At TVA I have had extensive experience with all of the techniques and activities of the Flood Control Branch.

I am a member of the American Society of Civil Engineers, a member and past president of The Technical Society of Knoxville, a

member of the International Association for Hydraulic Research, and a past member of the Association for Computing Machinery.

I supervised the preparation of the June 1972 report "Watts Bar Nuclear Plant Maximum Possible Flood." I have also participated in meetings with the AEC staff, the ACRS subcommittee, and the full committee of the ACRS relative to floods at the Watts Bar, Browns Ferry, and Sequoyah Nuclear Plant sites.

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QUALIFICATIONS OF JACK R. CALHOUN
TENNESSEE VALLEY AUTHORITY

My name is Jack R. Calhoun. My business address is Tennessee Valley Authority, 905 Edney Building, Chattanooga, Tennessee. I am employed by the Tennessee Valley Authority as Nuclear Operations Coordinator in the Division of Power Production.

I have been continuously employed by the Tennessee Valley Authority since 1949. Prior to this, I served for eight years in the United States Navy as an Electrical Officer on a light cruiser and an aircraft carrier. I was qualified as Engineering Officer-of-the Watch at sea on both ships.

I received the Bachelor of Science degree in electrical engineering from Tennessee Technological University in 1949. During this period, I was also the Executive Officer and Electronics Officer of the U. S. Naval Reserve Electronics Warfare Company located at Cookeville, Tennessee.

I started with TVA in 1949 as a student in the steam generating plant operator training program at the Watts Bar Steam Plant. I later was an instructor in the generating plant operator training program.

I was transferred to the Johnsonville Steam Plant in 1952 as a unit operator and later as an electrical engineer. In 1954 I was placed in charge of all electrical maintenance at the Johnsonville plant.

In 1958 I became assistant plant superintendent at the 1,500-mw Shawnee Steam Plant at Paducah, Kentucky.

In 1960, I became plant superintendent of the EGCR at Oak Ridge, Tennessee. During this period, I attended the Oak Ridge School of Reactor Technology. In 1961 I spent five months at the Berkeley Nuclear Power Station in Bristol, England, assisting in the startup of the reactor. While at Berkeley, I completed the reactor operator training course on a nuclear plant simulator used to train all reactor operators for the Central Electricity Generating Board.

In 1963 I was appointed Assistant Project Manager of the Experimental Gas-Cooled Reactor and was responsible for assisting the project manager in all phases of technical and operational work.

From 1963 to 1966, I was a member (for reactor operation) of a panel created by an agreement between the United Kingdom Atomic Energy Authority and the United States Atomic Energy Commission to exchange information on gas-cooled reactors. As a member of this panel, I made two trips to England to investigate and to observe the operation of the British Advanced Gas-Cooled Reactor in preparation for the startup of EGCR.

From February 1966 to February 1968, I held the position of Assistant to the Chief, Power Plant Maintenance Branch, Division of

Power Production in TVA. I assisted in the engineering and coordination of the electrical and mechanical maintenance of all TVA steam and hydro plants. I was also responsible for the operation and maintenance planning relating to future TVA nuclear power plants.

From February 1968 to July 1971, I held the position of Plant Superintendent of the Browns Ferry Nuclear Plant in Athens, Alabama.

My present position is nuclear operations coordinator. I am responsible to the Director of the Division of Power Production for the operation and maintenance of all TVA nuclear plants. In this respect, I am aware of the overall features of the unit under consideration in this proceeding and was responsible for directing the preparation of the Conduct of Operations section of the Watts Bar Nuclear Plant Preliminary Safety Analysis Report which describes the plan for training the plant staff.

I am a member of the American Nuclear Society.

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QUALIFICATIONS OF THOMAS GERALD CHAPMAN
TENNESSEE VALLEY AUTHORITY

My name is Thomas Gerald Chapman. My business address is 304 Union Building Annex, Knoxville, Tennessee 37902. I am a nuclear engineer assigned to the Nuclear Design Staff within the Mechanical Branch of the Division of Engineering Design of the Tennessee Valley Authority.

I have a Bachelor of Mechanical Engineering degree which I obtained from Georgia Institute of Technology in 1956 and a Master of Science degree in Mechanical Engineering which I obtained from Tulane University of Louisiana in 1957. I am a graduate of the Oak Ridge School of Reactor Technology of the class of 1962-63. I have 51 hours of additional credits in graduate study from the University of Tennessee in Nuclear Engineering. I am a registered professional engineer in the State of Tennessee.

I have been an employee of the Tennessee Valley Authority since November 1970. I have worked in the area of licensing of the nuclear plants for TVA. In particular, I participated in the writing and review of (1) the

PSAR for Watts Bar Nuclear Plant, (2) the responses to the questions on Browns Ferry Nuclear Plant, (3) the FSAR for Sequoyah Nuclear Plant, and (4) the PSAR for X-14 and X-15 Nuclear Plant. I have also participated in conferences with AEC and ACRS in connection with the construction permits for the Watts Bar Nuclear Plant.

Before joining the Tennessee Valley Authority, I spent about twelve years with the Oak Ridge National Laboratory. During this time I was assigned to the Reactor Division. The first year I was performing experimental work in heat transfer, fluid flow, bearing tests, and pressurized loop operations at temperature. The remainder of the time I was assigned to the Design Department. I worked on the design of both mechanical and thermal aspects of fuel elements, control rods, reflectors, reactor intervals, heat exchangers, reactor vessels, pumps, and heat removal systems. I also participated in fast reactor conceptual studies and evaluations, gas cooled reactor studies, liquid metal reactor studies for terrestrial and space power sources, and isotopic power sources. I also worked on the design of experiments to be inserted into research reactors. Finally, I was given special assignments to review the safety and design of reactor experiments, a safety review of an operating reactor, and a safety and design review of a replacement core for an operating reactor including fuel handling equipment modifications.

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QUALIFICATIONS OF JIMMY L. CROSS
TENNESSEE VALLEY AUTHORITY

My name is Jimmy L. Cross. My business address is Tennessee Valley Authority, 415 Power Building, Chattanooga, Tennessee. I am the supervisor of the System Development Section of the Power Supply Planning Branch, Division of Power Resource Planning.

In this position I am responsible for the development of recommendations for the type of generating capacity and for the most suitable location for such facilities. I am also responsible for recommending contractual provisions for fuel and major equipment contracts and evaluating results of vendors' proposals.

In 1970 and 1971 the System Development Section was directly responsible for the coordination and preparation of environmental statements for new generating facilities. During this period I assisted and directed the organization, preparation, and coordination of several environmental statements, including the Watts Bar draft environmental statement. Until January 1972 I directed the development effort for the Watts Bar draft environmental statement, supplements and additions.

I graduated from the University of Kentucky in 1963 with a Bachelor of Science degree in Mechanical Engineering. At the University of Kentucky I became a member of the Tau Beta Pi and Pi Tau Sigma honorary engineering societies. Following graduation I began my employment with TVA as a power supply engineer in the System Development Section which involved preparing engineering and economic studies leading to the development of plans for adding to the system generation. I performed progressively more responsible duties as a power supply engineer until May 1971 when I was selected for my present position.

During the course of my work I have engaged in study which will lead to a Master of Science degree in Mechanical Engineering at the University of Tennessee at Chattanooga.

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QUALIFICATIONS OF JAMES P. DARLING
TENNESSEE VALLEY AUTHORITY

My name is James P. Darling. My business address is Tennessee Valley Authority, 415 Power Building, Chattanooga, Tennessee.

As Assistant Chief, Power Supply Planning Branch, Division of Power Resource Planning, I participate with the branch chief in the development and execution of the branch's work program and the formulation of future plans for expanding the system power supply through new generating facilities. As directed, I supervise and coordinate the work performed by the various sections of the branch and assume direct supervision of specific functions or activities required in carrying out special studies or investigations. At present I am directing the work of the unit responsible for preparing and coordinating environmental statements related to new generating facilities. I have supervised this group since January 1972, and during this period the supplements and additions to the Watts Bar Nuclear Plant draft environmental statement and the Watts Bar Nuclear Plant final environmental statement have been prepared.

I received a Bachelor of Science degree in Mechanical Engineering from Tennessee Technological University in 1959, a Master of Science degree in Industrial Engineering from Stanford University in 1967, and a Master of Business Administration degree from the University of Tennessee at Chattanooga in 1970.

I have been an employee of the Tennessee Valley Authority since 1959. I worked as power supply engineer in the Power Supply Planning Branch until 1965, preparing engineering and economic studies leading to the development of plans for adding to the system generation. For one year I held the position of mechanical engineer in the Power Plant Maintenance Branch of the Division of Power Production. In 1966 I was selected to participate in the Government's Mid-Career Educational Program in Systematic Analysis and attended Stanford University for a year of graduate studies in Federal Planning, Programming and Budgeting Systems. I returned to TVA as power program analyst in the Financial Planning Staff, with responsibility for the development and application of advanced techniques and procedures for the systematic analysis, review, and evaluation of components of the Office of Power program. I was selected for my present position in June 1971.

I am a member of the Tau Beta Pi (honorary engineering society) and Kappa Mu Epsilon (honorary mathematics society).

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QUALIFICATIONS OF ROBERT H. DAVIDSON
TENNESSEE VALLEY AUTHORITY

My name is Robert H. Davidson. My business address is Tennessee Valley Authority, 303 Power Building, Chattanooga, Tennessee. I am employed by the Tennessee Valley Authority as Chief of the Nuclear Engineering Branch. In this position, I am responsible for coordinating the securing of nuclear plant construction permits, operating licenses, and nuclear material and fuel licenses. This includes directing the preparation of licensing applications and coordinating the preparation of supporting information such as safety analysis reports, including the Watts Bar Nuclear Plant PSAR. Other major responsibilities include directing the preparation of nuclear fuel and operational quality assurance audit programs; development of fuel management programs and techniques; and technical review and analysis of proposed reactor designs, as required for evaluating performance of the reactor and safety-related components and systems. I am also Chairman of the Safety Review Board which is responsible for advising the Manager of Power on the adequacy of TVA's nuclear safety policies and programs.

I attended Auburn University and graduated in 1954 with a bachelor of science degree in physics. Following two years in the United States Navy, I returned to Auburn University and received a master's degree in (nuclear) physics in 1958. I was employed by Atomics International as a research engineer in 1958 where I performed nuclear analyses of various reactor systems.

In 1961 I was employed by Consumers Public Power District as a reactor engineer at the Hallam Nuclear Power Facility (HNPF), responsible for performing studies of reactor criticality, fuel programming, control rod worth, burnup, and fission product poisoning. I became engineering supervisor in 1964 and was responsible for engineering activities at the power generating station during the period of defueling of the HNPF.

In 1965 I began my employment with TVA as chief reactor physicist on the EGCR project.

I am currently serving on several industry committees, including the American National Standards Institute Nuclear Technical Advisory Board. I am a member of the American Nuclear Society and a registered professional engineer in the State of Tennessee.

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QUALIFICATIONS OF GEORGE R. DEVENY
TENNESSEE VALLEY AUTHORITY

My name is George R. DeVeny. My business address is 210 Mall Building, Knoxville, Tennessee 37902, and I am employed by Tennessee Valley Authority.

I have held the position of Regional Planner since July 1967; first, in the Office of the General Manager and since September 8, 1968, in the Division of Navigation Development and Regional Studies. However, I was on leave without pay during my military service from March 18, 1968, to March 23, 1970.

My formal education includes a Bachelor of Science in Engineering from Case Institute of Technology in 1965 and a Master of Regional Planning from the University of North Carolina in 1967.

Generally, my responsibilities are to integrate TVA projects and programs into the development plans for the area in which they are located, research the impact of major existing construction projects and estimate the impact of proposed projects, and primary responsibility for coordinating the division's contribution to nuclear plant environmental statements.

Specifically, I obtained or prepared most of the information in the Watts Bar environmental statement relating to land use, population distribution, and socio-economic impact. In addition, I kept abreast of TVA activities in the area which were aimed at informing and preparing the area for the expected impacts of plant construction. Finally, I assisted in responding to various agency comments on the draft environmental statement when appropriate.

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QUALIFICATIONS OF EDWARD ELY DRIVER
TENNESSEE VALLEY AUTHORITY

My name is Edward Ely Driver. My business address is P. O. Drawer E, Engineering Laboratory, Tennessee Valley Authority, Norris, Tennessee 37828.

I received a Bachelor of Science degree and a Master of Science degree from Vanderbilt University in 1962 and 1965, respectively, and an Engineer degree from Stanford University in 1967. I have been employed by the Tennessee Valley Authority as a Civil Engineer at the Engineering Laboratory since 1967.

My duties at Engineering Laboratory include testing by means of physical and analytical models hydraulic structures designed by the Office of Engineering Design to determine the adequacy of the design and to recommend changes as necessary to ensure their adequacy; development of condenser cooling water heat dispersal facilities for use at TVA thermal power plants; evaluation by means of physical and analytical models of the effect that these facilities will have on the thermal regime of the receiving water; and evaluation by means of analytical techniques of the

temperature die-off downstream from thermal plants. I have participated in the following projects involving thermal effects:

Cumberland Steam Plant--Three-dimensional, physical, heated-water model study to develop a condenser cooling water discharge canal to float the heated water on the surface of the receiving water; design of a skimmer wall to prevent recirculation; computation of receiving water surface temperatures downstream from the plant; preparation of report describing the effects of this plant on the thermo-hydrodynamic regime of the receiving water for the environmental statement.

Browns Ferry Nuclear Plant--Numerous studies including two- and three-dimensional physical models and analytical techniques to determine the thermo-hydrodynamic regime of the receiving water in the near, intermediate and far fields; preparation of reports describing the thermo-hydrodynamic regime for the environmental statement.

Sequoyah Nuclear Plant--Design of the diffuser-underwater dam-skimmer wall system; two-dimensional physical model studies to assess the effects of unsteady flows on the mixed temperature of the receiving water after mixing; preparation of report describing the effects of this plant on the receiving water for the environmental statement.

X-14, X-15 Nuclear Plant--Preparation of a report in which several alternative cooling schemes were evaluated.

With specific regard to Watts Bar, I made preliminary calculations and prepared a report assessing the feasibility of utilizing a diffuser system to discharge blowdown from the cooling towers into Chickamauga Lake. The report described alternative diffuser schemes and recommended model studies to obtain data for a rational design.

I have cooperated with other TVA personnel to answer questions concerning the dilution capabilities that may be achieved with a diffuser system and to discuss possible effects on the thermal regime of the receiving water which might be expected. I attended the TVA internal review session for the final environmental statement.

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QUALIFICATIONS OF WILLIAM A. ENGLISH
TENNESSEE VALLEY AUTHORITY

My name is William A. English. My business address is 202 Arnstein Building, Knoxville, Tennessee 37902, and I am employed by the Tennessee Valley Authority.

Currently I am Assistant Head Civil Engineer (Structural Steel and Bridges), Division of Engineering Design, with responsibility for coordination of the work of the Structural Steel and Bridges Design Group with the design sections and other groups and branches. This work includes preparation of designs, drawings, and specifications for the structural steel features for nuclear plants, steam plants, hydro and miscellaneous projects, and concrete and steel features for bridge projects. I have held this position since October 1972.

From January 1966 until October 1972, I was Principal Civil Engineer in the same group with responsibility for review and approval of design, drawings, and specifications for the structural steel features for nuclear plants, steam plants, hydro projects, and miscellaneous projects. In this position I was the Principal Civil Engineer for structural steel features of Watts Bar Nuclear Plant,

Cumberland Steam Plant, Paradise Steam Plant, Tellico Project, and other miscellaneous projects. This has included the design and procurement of powerhouse framing, coal handling facilities, office and service buildings, switchyard structures, containment structures, penstocks, trashracks, bridges, and other miscellaneous steel structures. I also participated in the preparation of that portion of the Preliminary Safety Analysis Report for Watts Bar Nuclear Plant applicable to structural steel features.

From December 1959 until January 1966, I was the Senior Civil Engineer for Structural Steel responsible for the supervision of a design section comprised of 8 to 12 engineers engaged in the design and procurement of structural steel features for many earlier TVA steam plants and miscellaneous projects.

During the period of June 1947 until December 1959, I was engaged in the design, checking, and supervision of designs and preparation of drawings in positions of increasing responsibility within the Civil Design Branch of the Division of Engineering Design.

I was graduated from the University of Tennessee in June 1947 with a Bachelor of Science degree in Civil Engineering.

I am a member of the American Society of Civil Engineers and a licensed professional engineer in the State of Tennessee.

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QUALIFICATIONS OF JACK E. GILLELAND
TENNESSEE VALLEY AUTHORITY

My name is Jack E. Gilleland. My business address is Tennessee Valley Authority, 831 Power Building, Chattanooga, Tennessee. I am employed by the Tennessee Valley Authority. I hold the position of Assistant to the Manager of Power. In this position, which I have held since June 1971, I have the responsibility, among others, of coordinating all phases of the Office of Power nuclear program.

I graduated from The Citadel in Charleston, South Carolina, in 1939 with a Bachelor of Science degree, and from the University of Tennessee in Knoxville, Tennessee, in 1940 with a Master of Science degree.

I was an instructor in the Civil Engineering Department at the University of Tennessee for one year and served on active duty in the U. S. Army from 1941 to 1946.

Since January 1946, except for 18 months (from August 1946 to February 1948) spent doing plant engineering design and maintenance for the Palmetto Quarries Company in Columbia, South Carolina, I have been employed continuously by the Tennessee Valley Authority.

I served with TVA in a number of engineering capacities related to the engineering and planning of the TVA power program and in 1955 became Chief of the Power Resources Branch. In that position I had the responsibility for developing programs and recommendations of the amount and type of new generating capacity which should be added to the TVA system, as well as the location of such capacity and the time when it should be added. In January 1970 I became Director of the Division of Power Resource Planning with responsibility for power supply planning, fuel planning, power research, and nuclear power planning activities. I had primary responsibility for directing work leading to the selection of nuclear power for the Watts Bar capacity addition and the Watts Bar site for location of the plant.

In June 1971 I became Assistant to the Manager of Power with a primary responsibility for coordinating the nuclear power program for the Office of Power. A major activity of this responsibility is the coordination of the procurement of construction permits and operating licenses for TVA's nuclear power plants.

I am a member of ASCE and IEEE and am a registered professional engineer in Tennessee and South Carolina.

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QUALIFICATIONS OF JOHN MORGAN KELLBERG
TENNESSEE VALLEY AUTHORITY

My name is John M. Kellberg. My business address is Tennessee Valley Authority, 442 Evans Building, Knoxville, Tennessee. I hold the position of Chief, Geologic Branch, with the Tennessee Valley Authority.

I received the Bachelor of Science degree from Pennsylvania State College in 1940, and have taken graduate courses in Soil Mechanics and Rock Mechanics at the University of Tennessee.

I have been employed by the Geologic Branch of the Tennessee Valley Authority since July 1941 with the exception of a period from October 1943 to November 1946 for military service with the Corps of Engineers, U. S. Army.

With the Geologic Branch of the Tennessee Valley Authority I have held the following positions: July 1941 to January 1942 - Assistant Geologic Aide; January 1942 to May 1942 - Geologic Aide; May 1942 to January 1943 - Junior Geologist; January 1943 to October 1947 - Assistant Geologist; October 1947 to November 1951 - Associate Geologist; November 1951 to July 1957 - Geologist; July 1957 to March 1970 -

Senior Geologist; March 1970 to October 1970 - Assistant Chief Geologist; October 1970 to date - Chief, Geologic Branch.

Since 1941, I have performed a wide range of engineering geologic assignments including preliminary geologic investigations of dam and thermal power plant sites; detailed investigations of such sites for design purposes; geologic work during the construction period of major projects including foundation evaluation and mapping, foundation treatment and grouting; mineral damage claim investigations; blast damage investigations and studies; tunnel and quarry site investigations; and groundwater studies. From July 1957 to October 1970 I was head of the Engineering Geology Section of the Geologic Branch and in this position was directly responsible for the conduct of geologic work required in the various types of engineering projects built by TVA.

I am a member of the following professional organizations: Fellow, Geological Society of America; Certified Professional Geologist, American Institute of Professional Geologists; Association of Engineering Geologist; United States Committee on Large Dams; Society of Economic Geologists; and Tennessee Academy of Science.

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QUALIFICATIONS OF JERE C. KILLIAN
TENNESSEE VALLEY AUTHORITY

My name is Jere C. Killian. My business address is Tennessee Valley Authority, Box 2000, Spring City, Tennessee 37381. I am employed by the Tennessee Valley Authority as Project Manager, Watts Bar Nuclear Plant, Division of Construction. In this position I am responsible for all site engineering and construction activities required for Watts Bar Nuclear Plant.

In 1942 I worked for a short period as a machinist apprentice; then served in the U. S. Air Force from 1942 to 1946. In 1946 I worked at Oak Ridge, Tennessee, as operator for Tennessee Eastman Corporation and in 1947 as laboratory technician for Monsanto Chemical Corporation.

I studied engineering at University of Chattanooga, Chattanooga, Tennessee, for two years, leaving there in 1949. I received the degree of Bachelor of Science in Mechanical Engineering from Georgia Institute of Technology, Atlanta, Georgia, in 1951.

In 1951 I was employed by the Tennessee Valley Authority as a mechanical engineer, Division of Construction, Widows Creek Steam Plant, a 6-unit (853 MW) fossil-fueled power plant located near Stevenson,

Alabama. My primary duties were to assist in the checking of permanent materials and equipment installations required for the plant.

In 1954 I transferred to Gallatin Steam Plant, a 4-unit (1255.2 MW) fossil-fueled power generating plant located near Gallatin, Tennessee. Initially I had responsibility for checking installation of piping and other mechanical features for the plant. I soon became principal assistant to the head of the Mechanical Engineering Unit with responsibility for supervising checking and erection of all permanent mechanical equipment and piping. In 1955 I took charge of the Mechanical Engineering Unit and served as principal assistant to the Construction Engineer with responsibility for planning and supervising all field engineering work related to installation of mechanical equipment and facilities.

In 1960 I transferred to the Paradise Steam Plant, a 2-unit (1408 MW) fossil-fueled power generating plant located near Drakesboro, Kentucky, where I continued to serve as supervisor of the Mechanical Engineering Unit and principal assistant to the Construction Engineer as described above. In 1963 I became Assistant Construction Engineer for the Paradise Steam Plant construction program.

In 1964 I became Assistant Construction Engineer at the Bull Run Steam Plant, a single-unit (950 MW) fossil-fueled power generating plant located near Oak Ridge, Tennessee. In 1966 I became Acting Project Manager in charge of all construction and site engineering work at Bull Run Steam Plant.

In 1967 I became Assistant Construction Engineer at the Browns Ferry Nuclear Plant, a 3-unit (3456 MW) nuclear-fueled power generating plant, located near Athens and Decatur, Alabama. In 1968 I was named Construction Engineer for this project, directing all engineering and quality assurance activities in connection with construction of the plant.

In 1970 I came to Knoxville, Tennessee, as Assistant to the Director of Construction. My duties included providing technical and administrative assistance to the Division Director in the overall planning, coordination, direction, and administration of policies, programs, and activities of the division. Later in 1970 I was named Project Manager for a new nuclear-fueled power generating plant and assigned to the Division Director's office. My work involved planning and scheduling for the new plant and preparing the division's inputs for environmental statements, including the Watts Bar Nuclear Plant environmental statement.

In July 1972 I was named Project Manager of the Watts Bar Nuclear Plant.

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QUALIFICATIONS OF JACK M. LEAVITT
TENNESSEE VALLEY AUTHORITY

My name is Jack M. Leavitt. My business address is Tennessee Valley Authority, River Oaks Building, Muscle Shoals, Alabama. My position is Staff Meteorologist, Air Quality Branch, Division of Environmental Research and Development.

I received a Bachelor of Arts degree in Meteorology from the University of California at Los Angeles in 1951. From March 1952 to 1955, I held various positions including meteorologist at the Dugway Proving Ground, Utah; classified atmospheric diffusion field studies in urban areas, including analysis and evaluation of the data collected; and aviation forecaster at La Guardia Airport, New York. In July 1955 I was employed as air pollution meteorologist with the U. S. Weather Bureau Research Station, a supporting agency to the U. S. Public Health Service air pollution program. I was in charge of planning and supervision of meteorological field operational activities required for support of the air pollution field survey and special study programs. I also lectured on air pollution meteorology and instrumentation at training courses at the Robert A. Taft Sanitary Engineering Center, U. S. Public Health Service, in Cincinnati.

From January 1960 to December 1963 I was in the Weather Bureau's aviation forecast program and was principal meteorologist at the Weather Bureau Airport Station in Anchorage, Alaska. Most of this work involved preparation of upper air charts and flight forecasts for jet aircraft flying to Asia and Europe.

In January 1964 I transferred to TVA as meteorologist in charge of the air pollution control section. In my present position I have principal responsibility for designing air monitoring networks and selecting appropriate air sampling and meteorological instrumentation, maintaining required standards in the collection and analysis of air monitoring data, providing meteorological support required in the planning and conduct of special air quality studies, providing meteorological support for investigations of air quality incidents which might result from atomospheric emissions from TVA plant operations, and preparing reports on all other meteorological aspects of the air pollution control program. I have had the principal responsibility for preparing the meteorological sections of the environmental statements and Safety Analysis Reports for the Browns Ferry, Sequoyah, Watts Bar, and X-14, X-15 Nuclear Plants.

I have taken the special training courses "Diffusion of Air Pollution - Theory and Application" and "Air Pollution Data Evaluation" at the Robert A. Taft Sanitary Engineering Center, U. S. Public Health Service, Cincinnati, in 1965 and 1966.

I am a member of the American Meteorological Society and the Air Pollution Control Association, and an associate member of the Tennessee Valley Section, American Industrial Hygiene Association.

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QUALIFICATIONS OF HOMER E. McCONNELL
TENNESSEE VALLEY AUTHORITY

My name is Homer E. McConnell. My business address is Tennessee Valley Authority, 309 Union Building, Knoxville, Tennessee. I am a nuclear engineer employed by the Tennessee Valley Authority in the Division of Engineering Design.

My duties are to act as nuclear engineering consultant to TVA electrical design engineers and engineering groups responsible for design of electrical systems, equipment, and components for the Watts Bar Nuclear Plant. I review drawings and specifications of the electrical aspects of the plant which are submitted by Westinghouse Electric Corporation and other contractors. I participated in review and preparation of the Preliminary Safety Analysis Report for the Watts Bar Nuclear Plant. My general areas of responsibility are the auxiliary electrical power system and its associated equipment, low-voltage control power systems, electrical codes, standards, guides, and criteria.

I have a BEE degree which I received from Clemson University in 1952.

Following graduation from Clemson University I began work with Tennessee Valley Authority where I was employed from 1952 to 1966 in several electrical engineering positions.

From 1952 to 1953 I was assigned to the Chattanooga office with duties related to performing engineering studies on problems of both hydro and steam plants.

From 1953 to 1954 I was assigned to the Boone Hydro Plant where I participated in the initial testing and startup of the Boone and Fort Patrick Henry Hydro Plants. My duties also included instruction of plant operators.

From 1954 to 1960 I was assigned to the Kingston Steam Plant as Assistant Maintenance Supervisor in charge of electrical maintenance. My duties included assessment of maintenance requirements and prescription of repair procedures for all types of electrical equipment and controls used in modern steam-electric generating plants. I also conducted training courses in electrical circuits and electronics.

From 1960 to 1966 I was assigned to the Experimental Gas-Cooled Reactor Project in Oak Ridge, Tennessee. My position was Electrical Engineer in charge of maintenance. In addition to supervisory duties, I was responsible for testing of the alarm, distribution and communication systems, preparing test procedures, conducting tests and evaluating test results. I directed the fabrication of a training simulator used to train reactor operators. While at the project I completed special courses in vibration analysis and plant fire protection.

From 1966 to 1970 I was employed by Oak Ridge National Laboratory in Oak Ridge, Tennessee, as a Staff Electrical Engineer. I was responsible for planning, operation, and maintenance of the Laboratory's power distribution system. My duties included performing adequacy and reliability studies, approving and coordinating new construction activities, and scheduling and coordinating maintenance activities for the distribution system.

In 1970 I returned to the Tennessee Valley Authority as an electrical engineer on the research, development, specifications, and procurement staff. My duties included investigations and development of design characteristics and specifications of electrical equipment and materials for nuclear power plants.

In 1971 I was promoted to the position of Nuclear Engineer with the following duties: perform investigations and analyses related to AEC licensing, contribute information to PSAR and FSAR documents, participate in meetings and hearings on licensing activities on behalf of TVA, responsible for the Electrical Branch of TVA to assure that necessary design criteria for nuclear safety related electrical systems are prepared, interpret codes and standards related to purchased equipment to assure compliance with AEC regulations, provide technical consultation on electrical aspects to staff specialists and those engaged in detailed design and procurement on nuclear plant projects.

In 1972 I assumed additional duties related to quality assurance activities of the Electrical Branch. In my present position

as Principal Nuclear Engineer I am responsible for coordinating all aspects of the quality assurance program to assure that the electric power systems for each nuclear plant comply with all AEC regulations. In this capacity I participated in such activities for the Watts Bar Nuclear Plant.

I am a member of IEEE.

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QUALIFICATIONS OF JOSEPH W. McREYNOLDS
TENNESSEE VALLEY AUTHORITY

My name is Joseph W. McReynolds. My business address is 302 Arnstein Building, Knoxville, Tennessee, and I am employed by Tennessee Valley Authority.

Currently I am Principal Civil Engineer (Steam) with responsibility for the civil engineering portions of licensing applications for nuclear plants, including the Watts Bar Nuclear Plant PSAR. I have held this position since January 11, 1970.

I obtained a Bachelor of Science degree in Civil Engineering from the University of Tennessee in 1949.

All my work experience has been with the Division of Engineering Design, Tennessee Valley Authority. The first five years were spent in the preparation of designs and construction drawings for concrete structures for hydro power plants. The next seven years were spent in the preparation of designs and supervision of the preparation of construction drawings for concrete structures for fossil-fired steam plants. These

structures were powerhouse substructure retaining walls, powerhouse superstructure floor slabs, turbine foundations, circulating water conduits, pumping stations, skimmer walls, coal-handling hoppers, tunnels, building substructures, and conveyor foundations.

In 1961 I was promoted to Senior Civil Design Engineer with responsibility as a Supervisor in charge of design of concrete phases of fossil-fired steam plants. In 1965 I was given the same responsibility for the Browns Ferry Nuclear Plant at which time I also participated in the preparation of those parts of the Browns Ferry Design and Analysis Report applicable to civil and concrete features.

In 1968 I was promoted to Principal Civil Engineer (Steam) with responsibility for the review and approval of layouts and designs of concrete and other civil features for nuclear and fossil steam power plants.

I am a member of the American Society of Civil Engineers, American Concrete Institute, and a licensed professional engineer in the State of Tennessee.

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QUALIFICATIONS OF HARRY G. MOORE, JR.
TENNESSEE VALLEY AUTHORITY

My name is Harry G. Moore, Jr. My business address is Tennessee Valley Authority, 708 Edney Building, Chattanooga, Tennessee.

I received a Bachelor of Engineering Degree in Civil Engineering in 1965 and a Master of Science Degree in Sanitary and Water Resources Engineering in 1966 from Vanderbilt University. I received a Ph.D. in Environmental Health Engineering from the University of Texas at Austin in 1969.

During the period from September 1968 to March 1969, I was employed by the Environmental Health Engineering Department of the University of Texas as Research Engineer in Environmental Health. In this capacity I served as coordinator of research sponsored by the Federal Water Pollution Control Administration (now the Environmental Protection Agency). Tasks included administrative activity, direction of laboratory personnel, laboratory and literature research, and final report preparation. The research concerned surplus biological phosphorous removal by an activated sludge microflora similar to that

utilized in standard secondary waste treatment processes. This work resulted in a published governmental report and co-authorship of a scientific paper presented at the 1970 International Conference on Water Pollution Research, San Francisco, California.

I was employed by the New York office of Engineering-Science, Inc., in March 1969 as Environmental Engineer and Research Engineer-Scientist. With this consulting engineering firm, my primary responsibility was directed to a project entitled "Spring Creek Auxiliary Water Pollution Control Project," a comprehensive water quality and waste control management program conducted for the City of New York. Tasks included technical engineering and planning, data management and computer system responsibilities, administrative activities, laboratory and field research and development, and report preparation and presentation to City, State and Federal officials. The project dealt with development of parameters for controlling pollution from all input sources and for enhancing the aquatic ecology of Jamaica Bay, located just east of New York Harbor.

In April 1970, I joined the Mid-South Medical Center Council, Memphis, Tennessee, as Director of Environmental Health Planning. With this comprehensive health and environmental planning agency, my primary responsibility was for the Council's environmental health activity in its 14-county planning area. Tasks included development of planning methodology and procedures, analysis of data, formulation of planning studies and recommendations, coordination of environmental health services and plans of other agencies through project review and comment

procedures, grants preparation, and work with community organizations and government officials. I assisted in the physical and mental health planning activities of the Council as needed.

In September 1971, I accepted a position with TVA as Chief, Environmental Assessment Staff. In this role I serve as principal assistant to the Director of the Division of Environmental Research and Development in coordinating the division interests in environmental planning and assessment of TVA projects and activities. The primary responsibilities of the Environmental Assessment Staff include the overall review and evaluation of proposed new TVA projects or actions and the identification of potential environmental protection problems; coordination of the preparation of environmental statements, including overall ecological assessment, as required for proposed TVA projects; and coordination of environmental quality aspects of regional planning and development.

For the Watts Bar Nuclear Plant, I have been responsible for administering the general review and coordinative function of the Environmental Assessment Staff as relates to the preparation of the environmental impact statement. In addition, I served as a member of the 4-man Task Group which had specific responsibility for coordinating interdisciplinary preparation and review of the final environmental statement.

I am a member of the American Society of Civil Engineers, the National Environmental Health Association, and the American Society of Limnology and Oceanography.

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QUALIFICATIONS OF CHARLES A. MYERS
TENNESSEE VALLEY AUTHORITY

My name is Charles A. Myers. My business address is 303 Power Building, Chattanooga, Tennessee. I am employed by the Tennessee Valley Authority as a nuclear engineer in the Nuclear Engineering Branch of the Office of Power. In this position which I have held for the past year and a half, I serve as a specialist on plant safety and licensing, and have participated in the preparation of the Watts Bar Nuclear Plant environmental statement and Preliminary Safety Analysis Report (PSAR), and in the design and analysis of the containment systems. I have participated in meetings with the AEC Regulatory Staff on the Watts Bar application. I also perform similar tasks on other TVA nuclear projects.

During preparation of the supplements and additions to the Draft Environmental Statement and the Final Environmental Statement, I was responsible for performing the accident analyses and for estimating the annual release of radioactive material resulting from routine plant operation. With TVA's meteorologists, I evaluated meteorological data measured at the site to determine the relative atmospheric dispersion

values used in the calculation of doses due to radiological accidents for both the PSAR and the final environmental statement. I also assisted in determining the doses due to the design basis loss of coolant accident given in the PSAR and in evaluating alternate containment system designs.

I attended the University of Missouri at Rollo and graduated in 1965 with a Bachelor of Science degree and received my Master's degree in nuclear engineering from the same university in 1967. In 1966 and 1967 I served as a licensed reactor operator on the LIMR Training Reactor. Upon graduation, I worked for Oak Ridge National Laboratory in the Nuclear Safety Information Center for seven months before entering the United States Army. With the Army, I worked in the Nuclear Branch of the United States Army Engineer Reactor Group for 16 months where I was responsible for core physics and thermal hydraulic analyses for the Army's three operating pressurized water reactors.

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QUALIFICATIONS OF HUGH G. PARRIS
TENNESSEE VALLEY AUTHORITY

My name is Hugh G. Parris. My business address is Tennessee Valley Authority, 415 Power Building, Chattanooga, Tennessee.

As Chief of the Power Supply Planning Branch, Division of Power Resource Planning, I am responsible for the administrative and technical direction of the branch and for the development and execution of the branch work program. The functions of the Power Supply Planning Branch include implementing the provisions of the National Environmental Policy Act of 1969 for the Office of Power.

In this connection I have participated in and coordinated the plans, studies, and investigations to ensure appropriate consideration of environmental amenities and values along with the economic and technical considerations in the Office of Power's decision making as required by NEPA. In addition to directing the overall development and preparation of environmental statements for the Office of Power, I am responsible for determining the need for power, the most suitable locations of new facilities, and the extent to which total power capacity is adequate to meet load forecasts.

Since 1970 I have assisted and been directly responsible for the development, preparation, and content of environmental statements for new generating facilities. During this period I directed the scoping, organization, preparation, and coordination of several environmental statements, including the Watts Bar environmental statement.

I graduated from Clemson University in 1958 with a Bachelor of Science degree in Electrical Engineering; I received a Master of Science degree in Electrical Engineering from the University of Tennessee in 1966.

I have been employed with the Tennessee Valley Authority since 1958, performing progressively responsible duties in the branch as power supply engineer; Supervisor, System Development Section; and Assistant Branch Chief. I was selected for my present position in June 1971.

I am a member of Tau Beta Pi (honorary engineering society) and the IEEE.

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QUALIFICATIONS OF JOHN L. PARRIS
TENNESSEE VALLEY AUTHORITY

My name is John L. Parris. My business address is Tennessee Valley Authority, 223A Union Building, Knoxville, Tennessee 37902. I am employed by the Tennessee Valley Authority as a principal mechanical engineer in the Division of Engineering Design. In this capacity I am concerned with, among other things, heat dissipation aspects of the design of the Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants.

I received the degree of Bachelor of Science in Mechanical Engineering from the University of Tennessee in 1948 and the degree of Master of Science in Business Administration in 1960. I am a registered engineer in Tennessee and Ohio.

I was employed by the Tennessee Valley Authority in the Division of Engineering Design in 1940. I participated in the design of heavy equipment (gates, cranes, hoists, etc.) for hydro projects. I served in the U. S. Air Force from 1943 until 1945.

Following my undergraduate degree in 1948, I spent five and one-half years at the K-25 plant of Union Carbide Nuclear Company at Oak

Ridge, Tennessee, in plant process equipment development, research on classified equipment, and project administration of new plant compressor projects.

At the end of the gaseous diffusion plant expansion program, I left Oak Ridge to become product manager of the new centrifugal compressor product line of the Cooper-Bessemer Division of Cooper Industries, Inc., at Mt. Vernon, Ohio. During my nine years there compressor systems were developed for the petroleum, petrochemical, process air, pipeline transmission, and fertilizer industries.

I was then asked to take the position of director of engineering, later vice president, of the Rotor Tool Division of Cooper Industries at Cleveland, Ohio. For five years I directed the product design, research and development, and field services of this manufacturer of industrial air and high-cycle electric tools.

In 1968 I returned to Tennessee with the Tysaman Machine Division of the Carborundum Company as manager of engineering and, later, assistant to the general manager. Carborundum manufactures abrasives, organic and inorganic filter media, other associated products, and machinery to use these items. I was responsible for research and development, systems application, international operations, customer relations, and institutional matters (codes, standards, industrial organizations, etc.). Three patents are being processed in my name by Carborundum.

In 1970 I joined the TVA Division of Engineering Design in the Research and Development, Design and Testing Section of the Mechanical Design Branch. In this capacity I served as project administrator for the Colbert gas turbine contract, assisted in other gas turbine contracts, did

a feasibility study of the air storage gas turbine concept, and did the original investigation of the heat dissipation systems for the Browns Ferry and Sequoyah plants. Later, in the capacity of principal engineer of the Turbogenerator and Heat Cycle Design Section, I supervised the final studies of the aforementioned two plants and the Watts Bar Nuclear Plant. In addition I am responsible for the supervision of the cycle design and major turbine building equipment for all TVA power plants.

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QUALIFICATIONS OF MICHAEL J. RAY
TENNESSEE VALLEY AUTHORITY

My name is Michael J. Ray. My business address is Tennessee Valley Authority, 303 Power Building, Chattanooga, Tennessee. I am employed by the Tennessee Valley Authority as a Nuclear Engineer in the Nuclear Engineering Branch of the Office of Power. In this position which I have held for the past year, I serve as the licensing engineer for the Watts Bar Nuclear Plant. In this capacity, I have been directly responsible for coordinating the preparation of the amendments to the preliminary safety analysis report.

I am also responsible for liaison with the AEC Regulatory Staff and have participated in the licensing meetings with the regulatory staff and the ACRS for the Watts Bar Nuclear Plant.

I attended Purdue University and graduated in 1966 with a Bachelor of Science degree in mechanical engineering. Following graduation, I entered the United States Navy as an Ensign. During my enlistment, I completed the Basic Nuclear Power School at Bainbridge, Maryland, and the Advanced Nuclear Power School at the S3G prototype, West Milton, New York. Following this, I served for one year in the engineering department on a

destroyer until I was released from duty in November 1969. I returned to Purdue University and received a Master's degree in nuclear engineering in August 1971. In August 1971, I began my employment with TVA in the position I now hold.

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QUALIFICATIONS OF JOHN S. ROZEK
TENNESSEE VALLEY AUTHORITY

My name is John S. Rozek. My business address is Tennessee Valley Authority, 411 New Sprankle Building, Knoxville, Tennessee 37902. I am employed as Assistant to the General Manager of the Tennessee Valley Authority. In this capacity I am concerned with TVA's preparation of the environmental impact statements required by the National Environmental Policy Act of 1969 for TVA projects and programs.

I graduated with honors from the University of Wisconsin in 1952, receiving the degree of Bachelor of Science in Civil Engineering. I am a member of Tau Beta Pi and Chi Epsilon, which are honorary engineering societies. In 1965 I was named a Princeton Fellow in Public Affairs and studied in residence at the Woodrow Wilson School of Public and International Affairs at Princeton University during the academic year. I am a registered professional engineer in the State of Tennessee.

I was employed by TVA in the Division of Water Control Planning in 1952. After a one-year training program in the work of the several branches of the division, I was assigned to the Project Planning Branch. My work as a civil engineer involved the preliminary investigation and

evaluation of proposed dams and reservoirs and other water resource development projects, including the consideration of alternative sites and arrangement of project features, the computation of hydraulic and hydrologic capacities, and the preparation of comparative cost estimates.

In 1962 I became supervisor of the Navigation Planning Section of the Division of Navigation Development. In this capacity I prepared and directed studies dealing with immediate and long-range plans for the development of the Tennessee River navigation system, including both the provision of additional facilities and the use of shorelands for proposed industrial and other navigation program purposes.

After returning from a year's study at Princeton University in 1966, I was named Assistant to the General Manager with the primary assignment of coordinating TVA's activities for a major water resource development project. This assignment included providing the necessary liaison among the various TVA divisions and the coordination of TVA's plans and actions with the interests of State and local governments and other groups.

In 1968 I transferred to the Division of Reservoir Properties, where I served as Assistant to the Director and Assistant Manager of Properties. I became Manager of Properties for the Eastern District in November 1970. In this position I directed the maintenance activities for the dam reservations and other TVA-owned lands on eleven major reservoirs. In addition, I was responsible for handling inquiries and requests from organizations and individuals concerning the use of TVA lands, making proper referral within TVA, and securing coordinated solutions.

In February 1972, I was again named Assistant to the General Manager with my primary assignment being the timely and adequate preparation of the environmental impact statements covering TVA's program and project activities. I am responsible for providing the necessary coordination and liaison, both within TVA and externally, to assure that the statements are prepared accurately, completely, and without bias. My participation in the preparation process is designed to insure balanced relationships, the identification of all relevant environmental considerations, and appropriate awareness of the process at the top management level.

I have participated in the environmental review of the Watts Bar Nuclear Plant since March of 1972 by assisting in preparation of the April 1972 supplement to the draft statement and by serving as a member of an interdisciplinary task force in preparing the final statement. In addition, I have assisted the TVA General Manager in conducting the overall weighing and balancing of environmental and other matters in the Watts Bar Nuclear Plant.

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QUALIFICATIONS OF DR. LEONARD A. SAGAN
TENNESSEE VALLEY AUTHORITY

SAGAN, LEONARD A.

Address: 177 Toyon Road, Atherton, California

Date of Birth: 18 February 1928

Married; three children

Education: A.B. Stanford University 1950

M.D. University of Chicago Medical School 1955

M.P.H. Harvard School of Public Health 1965

Experience: 1955-56 Internship, University of California Hospital, San Francisco

1956-57 Fellowship, Metabolic Unit, University of California Hospital, San Francisco

1957-59 Captain, U.S. Army Medical Corps, Fort Ord, California

1959-61 Residency (Internal Medicine), University of California Hospital, San Francisco

1961-64 Atomic Bomb Casualty Commission; Chief, Department of Medicine, Nagasaki, Japan

1964-65 Harvard School of Public Health (student)

1965-68 Physician (Nuclear Medicine), Medical Research Branch, Division of Biology and Medicine, U.S. Atomic Energy Commission

1968- Associate Director, Department of Environmental Health, Palo Alto Medical Clinic, Palo Alto, California

Licensure: California

Teaching: Visiting Lecturer, Department of Preventive Medicine, Howard University School of Medicine, 1966-68

Clincial Instructor, Departments of Medicine and Ambulatory Medicine, University of California

Awards: Elected to Fellowship, American College of Medicine, 1968

Consultant: Nevada Operations Office, U.S. Atomic Energy Commission

Memberships: Santa Clara County Medical Society

Industrial Medical Association

Committees: Environmental Pollution Committee of Santa Clara County Medical Society

Listing: American Men of Science

Certification: American Board of Internal Medicine 1963

Bibliography:

1. Sagan, L. A. and DiRaimondo, V., "Effects of Thyrotoxicosis on Adrenal Cortical Metabolism" (Abstract) presented at 39th Meeting of the Endocrine Society (page 101). New York, 1957.

2. Sagan, L. A., Perloff, P. and DiRaimondo, V., "Studies on the Fate of Adrenal Corticoids in Hyper- and Hypothyroidism" (Abstract) presented at 39th Meeting of the Endocrine Society (page 70). New York, 1957.

3. Sagan, L. A. and Seigel, D., "Analysis of Medical Examination Program, Nagasaki 1958-60," Technical Report 12-63, Atomic Bomb Casualty Commission, Hiroshima, Japan.

4. Sagan, L. A. and Ohki, K., "Serum B_{12} Levels in Iron Deficiency Anemia," Technical Report 08-64, Atomic Bomb Casualty Commission, Hiroshima, Japan.

5. Sagan, L. A. and Seigel, D., "Experiences with Stool Benzidine Tests in a Health Survey Program," Technical Report 19-64, Atomic Bomb Casualty Commission, Hiroshima, Japan.

6. Freedman, L. A., Blackard, W. F., Sagan, L. A., Ishida, M. and Hamilton, H. B., "The Epidemiology of Diabetes Mellitus in Hiroshima and Nagasaki," Yale J. Biol. and Med. 37 283, 1965.

7. Sagan, L. A., "Human Effects of Chronic, Low Dose Radiation," Arch. Envir. Health 13 345, 1966.

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9. Bruner, H. D., Burr, W. W., and Sagan, L. A., "Radioisotopic Power Source for an Artificial Heart," Proceedings of American Nuclear Society, 1968 (In Press).

10. Sagan, L. A., Radiobiological Problems Associated with the Adjudication of Workmen's Compensation Claims. J. Occup. Med. 11, 335, 1969.

11. Cole, D. W., Mott, W. E., Sagan, L. A., "Factors Relating to the Application of Radioisotopes to Circulatory Support Systems," IEE Trans. on Aerospace and Electronic Systems, Vol. AES-5, 134, 1969.

12. Sagan, L., A Reply to Sternglass, New Scientist 44, No. 669, pg. 14, 1969.

13. Sagan, L. A., Human Effects of Low Level Radiation: A Critique in Radiation Biology of the Fetal and Juvenile Mammal Sikov, M. R., and Mahlum, D. D., pg. 719, U.S.A.E.C., 1969.

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QUALIFICATIONS OF GERALD F. SCHROEDL
TENNESSEE VALLEY AUTHORITY

General Information

Current status:	Research Assistant Professor, Frank H. McClung Museum, University of Tennessee, Knoxville, Tennessee
Place of birth:	Portland, Oregon
Date of birth:	July 20, 1945
Marital status:	Single
Selective Service:	Classified I-Y

Education

High school training:	Hudson's Bay High School, Vancouver, Washington; graduated with honors 1963.
Undergraduate study:	Clark Junior College, Vancouver, Washington; 1963-1965, Associate in Arts degree granted with honors 1965; University of Washington, Seattle, Washington; 1965-1967, B.A. granted 1967.
Graduate study:	Washington State University, Pullman, Washington; 1967-1972, Ph.D. degree granted June 1972; special training in soil science and ecology.

Professional Experience

1967-1970:	NDEA Title IV Fellowship, Washington State University.
1970 (summer):	Instructor in Anthropology, Washington State University (taught Anthropology 360 and 500, Archaeological Field School).
1970-1971:	Teaching Assistant, Washington State University, Department of Anthropology.
1971 (summer):	Research Assistant, Washington State University, Department of Anthropology.
1971-present:	Research Assistant Professor, Frank H. McClung Musuem, University of Tennessee, Knoxville, Tennessee.

Membership in Professional Societies and Honoraries

Society for American Archaeology

Great Basin Anthropological Association

Northwestern Anthropological Conference

Alpha Kappa Delta National Sociology Honorary

Research Interests

North American Archaeology, Columbia Plateau and Plains prehistory and ethnography; Archaeological method and theory; Paleoecology, faunal identification.

Reports

1968	Excavations in the Little Goose Dam Reservoir, 1966. Mimeographed report submitted to the National Park Service. Pullman. (With Roderick Sprague and Frank C. Leonhardy)
1970	The Archaeology of Site 45GA17, Little Goose Dam Reservoir, Southeastern Washington. MS, on file Laboratory of Anthropology, Washington State University, Pullman.

Reports (continued)

1972	The Association of Bison Remains with Cultural Assemblages of Post-Altithermal Age in the Columbia Plateau of Washington. MS, doctoral dissertation, Washington State University, Pullman.
1971	Wexpusnime (45GA61): Preliminary Report. Laboratory of Anthropology, Washington State University, Report of Investigations, No. 49. Pullman. (With Frank Leonhardy, Judith Bense and Seth Beckerman)

Research and Field Experience

1966 (summer):	University of Washington Archaeological Field School, Wells Reservoir, Washington.
1967 (spring):	Archaeological survey of the Green River, Washington, conducted with William Dancey, University of Washington.
1967 (spring):	Archaeological survey of the Mosseyrock Dam Reservoir, Washington, conducted with William Dancey, University of Washington.
1967 (summer):	Field Foreman, Washington State University Archaeological Field School, Roderick Sprague Director.
1967 (fall):	Highway Archaeological Survey, Washington, conducted with William Dancey, University of Washington.
1968 (summer):	Field Foreman, Washington State University Archaeological Field School, Frank C. Leonhardy Director.
1968 (summer):	Directed archaeological excavations at site 45GA17, Little Goose Dam Reservoir, Washington, under overall supervision of Frank C. Leonhardy.

Research and Field Experience (continued)

1969 (summer):	Assistant Field Director, Washington State University Archaeological Field School, Frank C. Leonhardy Director.
1970 (summer):	Field Director, Washington State University Archaeological Field School.
1971 (summer-fall):	Field Director, University of Washington, Highway Archaeological Salvage Project, Site 45CL21.
1972 (summer):	Field Director, University of Tennessee, Archaeological excavations at site 40MR40 Tellico Dam Reservoir, Tennessee.

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QUALIFICATIONS OF LEWIS E. STANFORD
TENNESSEE VALLEY AUTHORITY

My name is Lewis E. Stanford. My business address is 305 Union Building Annex, Knoxville, Tennessee 37902.

Since June 1970 I have been employed as a nuclear engineer assigned to the Nuclear Design Staff, Mechanical Branch, in the Tennessee Valley Authority's Office of Engineering Design and Construction. In this capacity I am responsible for performing nuclear engineering work in the analysis of mechanical and control aspects of nuclear power plant systems. This involves investigation and engineering analysis of systems and subsystems to assure adequacy and reliability of the integrated complex; studies of engineered safety features systems, auxiliary support systems and environmental control; consideration of power supplies, control logic, separations requirements, materials applications; and preparation and review of safety analysis report material, technical specifications, and other documentation necessary to the design, construction, licensing, and operation of Sequoyah and Watts Bar Nuclear Plants.

I received a Bachelor of Science degree in physics from Tennessee Technological University in 1949. I have completed most of the requirements for a Master of Science degree in physics at the University of Kentucky. I am a graduate of the Oak Ridge School of Reactor Technology. In addition I have completed one year of work toward the PhD in physics at the University of Tennessee.

I served in the United States Army Air Force from 1943 to 1946.

I was employed by the Union Carbide Corporation in the Instrument Division at the AEC K-25 plant at Oak Ridge, Tennessee, during 1950-51.

From 1950 to 1955 I was employed by the General Electric Corporation on the Aircraft Nuclear Propulsion Program at Oak Ridge. During this time I was a group leader and resident engineer at the Oak Ridge National Laboratory responsible for General Electric's research and development program for testing of systems, components and materials in the laboratory's research reactors. This included design, fabrication, installation, and operation of facilities for both in-reactor and laboratory testing of the effects of radiation on materials, systems, and components needed for use in an aircraft nuclear power plant.

From 1955 to 1970 I was employed by Union Carbide Corporation in the Technical Assistance Department of the Operations Division of the Oak Ridge National Laboratory. My primary responsibility included performing and/or assisting in the design review and safety analysis of experiments performed in the research reactors, and serving as a consultant to the Division Director and research groups, and as a

member and secretary of the Laboratory's Experiment Review Committee. I also performed development work in special areas and served as project engineer on special projects.

After completing the ORSORT course in 1958, I served as a reactor shift engineer for several months with the Oak Ridge Research Reactor to train new personnel as shift engineers. I then assumed full responsibility for design review, safety analysis and Operations Division approval for all in-reactor experiments. The Operations Division had custody of the ORNL Graphite Reactor, Low Intensity Test Reactor, the Oak Ridge Research Reactor, and later the Swimming Pool Reactor.

I served as project engineer primarily responsible for anealing of the ORNL Graphite Reactor, and as project engineer for conversion of the ORNL Swimming Pool Natural Convection Cooled Reactor to a forced cooled mobile, research reactor.

During 1968 to 1970, I performed a continued series of basic energy suppression experiments and developed theory and evaluation satisfactorily explaining the results. This work was sponsored by the AEC under the auspices of the Nuclear Safety Programs of the ORNL Reactor Division.

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QUALIFICATIONS OF GILBERT F. STONE
TENNESSEE VALLEY AUTHORITY

My name is Gilbert F. Stone. I reside at 7004 Palermo Drive, Chattanooga, Tennessee.

After receiving the bachelor of science degree in chemistry and education from Austin Peay State College in 1952, I served as a commissioned officer with the U. S. Navy for 3-1/2 years. During that period, I completed the Navy's Rad-Defense School and later served as Atomic Defense Officer on board the U.S.S. Princeton, CVS-37. From August 1956 through March 1961, I was employed as a health physicist by Union Carbide Nuclear Company at Oak Ridge National Laboratory, Oak Ridge, Tennessee. My principal duties there were providing health physics monitoring and surveillance for research and test reactors, reactor fuel reprocessing plants, and research laboratories. I participated in plantwide training programs for the indoctrination of radiation workers in the principles of radiation safety and control. During this period I was training officer for the Naval Reserve Surface Division 6-81, Knoxville, Tennessee.

I was employed in the Division of Health and Safety with the Tennessee Valley Authority in April 1961 to plan, develop, and direct the health physics program at the Experimental Gas-Cooled Reactor, Oak Ridge, Tennessee. In this capacity I had major responsibility for the preparation of various plant documents, the selection and training of health physics staff members, and participated in the overall operator training program by providing instruction and indoctrination in radiation protection. I participated in review of plant design, collaborating closely with technical and operating personnel in the review of plant safety and protection measures.

I took special courses in meteorology and reactor hazards evaluation at the Oak Ridge School of Reactor Technology in 1962 and graduate courses at the University of Tennessee from 1962 until August 1966 when I was awarded the degree of master of science in physics.

I was transferred by TVA to Muscle Shoals, Alabama, in August 1966, where I had major responsibility for health physics planning for the Browns Ferry Nuclear Plant. I had the principal responsibility for preparation of certain sections of the Preliminary Safety Analysis Report and reviewed all other sections of the report.

From September 1967 to June 1968 I attended Harvard University School of Public Health and received the degree of master of science in hygiene with specialties in industrial hygiene, radiological health, and air pollution. Upon my return to TVA in the summer of 1968 I was promoted to Chief of the Industrial and Radiological Hygiene Staff and subsequently to Chief of the Industrial and Radiological Hygiene Branch in July 1969. In this capacity I was responsible for organizing, planning, and carrying out industrial and radiological hygiene programs TVA-wide. With branch health physics staff, I was responsible for reviewing the

design of Sequoyah Nuclear Plant radiation protection features such as location of fixed inplant radiation monitoring instruments and zoning for contamination control; for assisting in the design, selection, and installation and operation of environmental monitoring networks; for selection of laboratory and portable health physics instruments; for collaborating with the Division of Engineering Design and Division of Power Production in the establishment of shielding and access control criteria and radiological hazards and safety assessment; for participation in operator training programs; and for assistance in the preparation of plant documents, including radiation standards and operating and emergency procedures.

In June 1970 I was transferred to Chattanooga as Assistant to the Director, Division of Environmental Research and Development and promoted to Assistant Director, Division of Environmental Research and Development in July 1971. In my present capacity I am responsible to the Director of Environmental Research and Development for supervision and overall program coordination of the division's five branches, the Research and Analysis Staff, and the Management Services Staff. For the Watts Bar Nuclear Plant I was responsible for coordinating the work of technical staff in the division in regard to environmental evaluation of the plant site, alternatives for radioactive waste treatment, analysis of auxiliary cooling alternatives, waste disposal, accident analysis and other environmental interests. I participated in review and preparation of the Watts Bar Nuclear Plant environmental monitoring plan, the radiological emergency plan, the draft and final environmental statements and applicable sections of the Preliminary Safety Analysis Report.

I am a member of the Health Physics Society and am certified by the American Board of Health Physics.

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QUALIFICATIONS OF FELIX A. SZCZEPANSKI
TENNESSEE VALLEY AUTHORITY

My name is Felix A. Szczepanski. My business address is Tennessee Valley Authority, 303 Power Building, Chattanooga, Tennessee. I am employed by the Tennessee Valley Authority as a nuclear engineer in the Nuclear Engineering Branch of the Office of Power. In this position which I have held for the past six years, I serve as a specialist on nuclear plant safety and licensing and direct supervision of those individuals responsible for coordinating the preparation of the license application for the Watts Bar Nuclear Plant, including the preparation of the preliminary safety analysis report and amendments. I am also responsible for liaison with the AEC Regulatory Staff and have participated in the licensing meetings with the regulatory staff and the ACRS. I also have similar responsibilities for the Browns Ferry and Sequoyah Nuclear Plants.

I attended the University of Villanova and graduated in 1956 with a Bachelor of Science degree in science from the United States Merchant Marine Academy. Upon graduation from the Academy, I worked as a licensed

engineer for American Export Lines, Inc., for approximately one and a half years. Following this period, I was employed in 1957 by the Naval Reactors Division of Combusion Engineering, Inc., which at that time was engaged in the design and construction of the land based SIC prototype submarine propulsion reactor located at Windsor, Connecticut. The positions I held at this facility in successive order were: training instructor, in which capacity I assisted in the initial formulation of the program for training and qualifying United States Navy personnel; assistant shift supervisor during the SIC precritical, startup and acceptance test programs, during which time I was certified as a Chief Reactor Operator for the facility; and finally as shift supervisor, with overall responsibility on shift for the safe and efficient operation of the facility.

In 1961 I began my employment with TVA as a shift operations supervisor at the Experimental Gas-Cooled Reactor (EGCR), Oak Ridge, Tennessee. My responsibilities at this facility included providing technical direction and supervision of plant operators during the various phases of reactor prestartup operations, testing and operator training. I also assisted in coordinating the training program to achieve operator certification, preparation of the plant operating manual and simulator training manual, coordination of plant operations with maintenance and construction contractor activities, review of plant design and assistance to technical staff and AEC personnel with studies and evaluations.

Part of my training for operation of the EGCR included a six-month assignment in 1961 to the Berkeley Nuclear Power Station, Berkeley,

England, during the initial plant startup. Before termination of the EGCR project, I was certified as a Senior Reactor Operator for that facility.

I have attended the MIT special summer program on Water-Cooled Nuclear Power Reactor Safety and I am a member of the American Nuclear Society.

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QUALIFICATIONS OF JOHN R. THURMAN
TENNESSEE VALLEY AUTHORITY

My name is John R. Thurman. My business address is Tennessee Valley Authority, Forestry Building, Norris, Tennessee. I am employed as a biologist by the Tennessee Valley Authority in its Division of Forestry, Fisheries and Wildlife Development.

I received a Bachelor of Science degree in Forestry from Iowa State University in 1964. I received a Master of Science degree from Purdue University in 1966, based on research in seasonal habitat preferences of the ruffed grouse.

After serving in the U. S. Air Force from 1966 to 1970, I became a biologist in the Waterfowl Development Section of the Fisheries and Waterfowl Resources Branch of TVA's Division of Forestry, Fisheries, and Wildlife Development. During the 18 months I served in this section, I was in charge of the resident Canada goose program, a cooperative venture between TVA and the Tennessee Game and Fish Commission. I supervised work at Buffalo Springs Game Research Farm, which serves as the goose propagation center, and developed propagation techniques. I was charged with the

responsibility for developing techniques for the release and establishment of Canada geese on TVA reservoirs throughout the Valley. Another project under my supervision was the Nolichucky Project which involved the conversion of an aged, silt-laden reservoir to a waterfowl sanctuary environmental education center. I developed the preliminary plan for the development of the area and was responsible for coordinating our Division's work with other TVA offices, as well as those outside TVA.

I am currently in the Terrestrial Ecology Section of the Forest Utilization Branch. As part of my duties in the gathering of data environmental impacts of TVA projects, I participated in the preparation of terrestrial ecological information regarding the Watts Bar site. My work included participation in an on-site survey of flora and fauna.

I am a member of the Society of American Foresters.

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QUALIFICATIONS OF CLYDE W. VOIGTLANDER
TENNESSEE VALLEY AUTHORITY

My name is Clyde W. Voigtlander. My business address is Forestry Building, Norris, Tennessee.

I received a Bachelor of Science degree in Biology and Chemistry-Physics from Wisconsin State University - Eau Claire in 1960. After spending one year as a graduate student and teaching assistant in Zoology at the University of Nebraska, I enrolled at the University of Wisconsin, Madison, where I was awarded the Master of Science degree in Zoology in 1963 and the Doctor of Philosophy degree in Zoology in 1971. My graduate research for both degrees was performed under the supervision of Professor Arthur D. Hasler; my area of specialization was, and is, aquatic ecology with primary reference to freshwater fishes.

After completing essentially all requirements for the Ph.D., I was employed by TVA in June 1969, as an aquatic biologist in the Fisheries and Waterfowl Resources Branch, Division of Forestry, Fisheries, and

Wildlife Development. My primary area of responsibility was the operation and further development of the fisheries monitoring program for Browns Ferry Nuclear Plant. In July 1970, I was appointed as a Fisheries Research Specialist in the same Division and Branch and was transferred to Norris, Tennessee. I now hold the position of Supervisor, Fisheries Research. My primary responsibility is the development and operation of a Valley-wide fisheries research program. I have served as Division representative in aquatic ecology on task forces and working groups involved in writing environmental statements and site evaluations for Browns Ferry, Watts Bar, and Sequoyah Nuclear Plants. Specifically, I have collected and analyzed fisheries data, performed literature reviews and have collaborated on writing the ecology and biological impact sections for draft, supplementary, and final environmental statements for the above plants. I have participated in all inter-disciplinary review sessions pertaining to TVA's nuclear plants.

I have served as co-chairman of a symposium session, "Ecological Effects of Steam Plants," held as part of the A.I.B.S. annual meeting, Fort Collins, Colorado, in August, 1971. I am listed in the FAO(UN) registry of experts and in the FAO(UN) list of fishery limnologists. I have recently accepted a position on the Task Force for the Conservation of Aquatic Ecosystems (USIBP-CE) as the representative from Tennessee. I am a member of the American Fisheries Society.

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QUALIFICATIONS OF C. S. WALKER
TENNESSEE VALLEY AUTHORITY

My name is Clinton S. Walker. My business address is Tennessee Valley Authority, 302A Union Building, Knoxville, Tennessee 37902.

I am employed by the Tennessee Valley Authority as a nuclear engineer in the Nuclear Design Staff of the Mechanical Design Branch of the Division of Engineering Design. In this capacity, I have the general supervisory responsibility for the preparation of material for licensing documents within the TVA Office of Engineering Design and Construction. This material includes those portions of the Preliminary Safety Analysis Reports, Final Safety Analysis Reports, their amendments, and related nuclear licensing documents that incorporate information prepared within the Division of Engineering Design and the Division of Construction. In addition, I provide advice and technical guidance in licensing matters to other staff specialists and to those engaged in detail design and procurement. I have been employed in this position for approximately two and one-half years.

I have been associated with the effort on the Watts Bar Nuclear Plant in the preparation of its Preliminary Safety Analysis Report and other licensing matters as described above.

I received the degree of Bachelor of Science in Electrical Engineering from the Texas Technological College in 1939 and a Master of Science degree in Electrical Engineering from the Ohio State University in 1948.

I taught electrical engineering at the University of Alabama in Tuscaloosa, Alabama, for seven years during the period 1939 to 1949. I worked in the Construction Plant Division of the Tennessee Valley Authority in Knoxville, Tennessee, in 1941 to 1942, and in the Torpedo Division of the Naval Ordinance Laboratory in Washington, D. C., in 1944 to 1945. I was a part-time teacher in the Department of Electrical Engineering in the Ohio State University in Columbus, Ohio, during 1947 to 1948, and an Associate Professor in the Department of Electrical Engineering at the Agricultural and Mechanical College of Texas in College Station, Texas, during 1949 to 1954, with a leave-of-absence to join the Reactor Controls Department of the Oak Ridge National Laboratory as a Development Engineer from 1954 to 1970. While there, I was responsible for the design and installation of the reactor controls for the first Tower Shielding Facility, as well as for design of the reactor controls for the Aircraft Reactor Test. I was responsible for the technical review of the reactor controls for the Experimental Gas-Cooled Reactor.

I attended the Oak Ridge School of Reactor Technology in 1954 to 1955, and was an instructor there in reactor instrumentation and controls from 1955 to 1959.

I was an assistant editor of Nuclear Safety, at the Oak Ridge National Laboratory, from 1959 to 1970, and was on the staff of the Nuclear Safety Information Center from 1963 to 1970.

I am a member of Eta Kappa Nu, Pi Mu Epsilon, Tau Beta Pi, the Institute of Electrical and Electronics Engineers, and the American Nuclear Society.

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QUALIFICATIONS OF W. JOE WARREN
TENNESSEE VALLEY AUTHORITY

My name is W. Joe Warren. My business address is Tennessee Valley Authority, 415 Power Building, Chattanooga, Tennessee. I am employed by the Tennessee Valley Authority as a power supply engineer in the Power Supply Planning Branch, Division of Power Resource Planning.

Since 1970 I have been assigned to the unit responsible for preparing and coordinating environmental statements related to new generating facilities. In this position I assisted in organizing and outlining the scope and content of environmental statements for the Office of Power. I participated in the preparation of various sections and coordinated the development of the Watts Bar draft environmental statement. I also prepared various sections of the supplement and final statement for Watts Bar. In addition, I participated in the preparation of various sections and coordinated the development of the Browns Ferry draft, supplement, and final environmental statement, as well as the Sequoyah draft environmental statement.

I graduated from the University of Chattanooga in 1952 with a Bachelor of Science degree in Physics. Upon graduation, I was employed as an instrument engineer with E. I. DuPont from 1952 until I came to TVA in 1955. With DuPont I worked as both a field engineer and design engineer on the AEC Savannah River project. I was responsible for the field installation, test, and run-in of instrumentation for reactor-protection and safety-related systems.

My duties as a mechanical engineer in the TVA Division of Power Production included conducting technical engineering tests on new equipment; serving as staff specialist in matters related to the operation, performance, and maintenance of steam-electric power plant instrument and control equipment; and organizing, planning, and supervising the work of the Instruments and Controls Unit. My duties also included participation in the TVA system-wide automation study which led to inplant computer control of startup, shutdown, and emergency functions.

In 1968 I transferred to the Nuclear Power Staff as a nuclear engineer to work on the application of protection and control instrumentation systems and equipment to nuclear power reactors. My duties with the Nuclear Power Staff included the assessment of the Sequoyah Nuclear Plant Instrumentation and Control Systems relative to the safety margins during normal operation and transient conditions included in the PSAR. I evaluated the use of probabilistic and statistical techniques to quantify the reliability of safety functions and a classification system

of analysis for determining the essentiality of safety actions leading to the development of technical specifications.

I have participated in advanced study of Nuclear Plant Protection Systems at the University of Tennessee. I am a member of Sigma Pi Sigma (honorary physics society).

I served in the U. S. Navy from 1940 to 1945.

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QUALIFICATIONS OF JAMES E. WATSON, JR.
TENNESSEE VALLEY AUTHORITY

My name is James E. Watson, Jr. My business address is Tennessee Valley Authority, River Oaks Building, Muscle Shoals, Alabama. I am employed as a Health Physicist in the Division of Environmental Research and Development.

After receiving a Bachelor of Science degree in Nuclear Engineering in 1960 and a Master of Science degree in Physics in 1962 from North Carolina State University, I served with the U. S. Army for two years. During this period, I was assigned to the U. S. Army Ballistic Research Laboratories at Aberdeen Proving Ground, Maryland. My principal duties were performing studies of the effects of nuclear weapons. Studies included the investigation of the production, transport, and effects of radiation from a nuclear weapon.

Following my military service I remained at the U. S. Army Ballistic Research Laboratories from 1964 to 1967 as a civilian employee of the U. S. Army and worked on the establishment of a research reactor facility. My duties included reviewing the reactor facility design,

environmental statement I supervised the performance of analyses of the predicted radiological impact resulting from routine releases of radioactivity in effluents and of the radiological impact of postulated accidental releases of radioactivity. I also supervised the analyses of the radiological impact of the transportation of radioactive materials from this plant.

I am a member of the Health Physics Society and the American Nuclear Society. I am also a member of the following scientific and honorary societies: Sigma Xi, Tau Beta Pi, Phi Kappa Phi, and Sigma Pi Sigma.

UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of the	)	
	)	
TENNESSEE VALLEY AUTHORITY	)	Docket Nos. 50-390
	)	50-391
(Watts Bar Nuclear Plant Units 1 and 2)	)	

QUALIFICATIONS OF ROBERT A. WIESEMANN
WESTINGHOUSE ELECTRIC CORPORATION

My name is Robert A. Wiesemann. My business address is P.O. Box 355, Pittsburgh, Pennsylvania 15230. I am employed by Westinghouse Electric Corporation as Manager, Special Licensing Projects, in the Nuclear Safety Department, Pressurized Water Reactor Systems Division (PWRSD), Westinghouse Nuclear Energy Systems, Westinghouse Power Systems Company, and have served in this capacity since June, 1971. I am one of the individuals responsible for reviewing the safety of design, construction and operation in connection with licensing nuclear power generating plants being designed and built by Westinghouse; and responsible for directing the Westinghouse participation in public hearings.

I was graduated from Case Institute of Technology in 1949 with a BS degree in Mechanical Engineering majoring in Heat-Power. From 1951 to 1954, I attended Towne Scientific School of the University of Pennsylvania where I studied Advanced Engineering Mathematics, Advanced Gas Dynamics, and Advanced Heat Transfer on the graduate level.

From 1957 to 1959, I attended the University of Missouri Graduate Extension School of Business Administration in Kansas City, Missouri. In 1964, I attended a course on Reactor Safety sponsored by the Health and Safety Branch of the United Kingdom Atomic Energy Authority at the Harwell Reactor School in England.

From February 1, 1949, to July 25, 1949, I was employed by the Westinghouse Electric Corporation in Pittsburgh, Pennsylvania, as a graduate student. During this time I was given assignments in quality control including testing and inspection in the Precision Castings Laboratory at East Pittsburgh, the Railway Laboratory at East Pittsburgh, the Quality Control Department of the Aviation Gas Turbine Division in Lester, Pennsylvania, and performance evaluation in the Aerodynamic Design Section in the Engineering Department of the Aviation Gas Turbine Division.

From July 1949 through 1951, I was assigned to the Aerodynamic Design Section of the Westinghouse Aviation Gas Turbine Division. In my work I made design and performance calculations on the aerodynamic characteristics of turbojet engines and major components and took part in the design and development of test cells, test cell instrumentation and testing techniques for turbojet engine and components evaluation. From December 1951 to March 1953, I was a Group Leader in the Westinghouse Aviation Gas Turbine Division Aerodynamic Design Section.

From March 1953 to January 1954, I was assigned to the High Power Laboratory Planning Section, with responsibility for specifying facility and instrumentation requirements for a new engine and components development test laboratory.

From February 1954 to July 1959, I was assigned to the Westinghouse Aviation Gas Turbine Division, Flight Test Facility, first at Grand Prairie, Texas, and later at Olathe, Kansas. In succession, I was responsible for the analysis and reporting of flight test results, by directing an additional six-man drafting group, and then for additional administrative and budgetary functions as Supervisory Engineer in charge of the Data Analysis and Reporting Section, in charge of all test data acquisition. Finally, I was assigned as Chief Engineer for the Flight Test Division.

From July 1959 to December 1959, I was Supervisory Engineer in charge of Instrumentation in the Development Test Section of the Westinghouse Aviation Gas Turbine Division Engineering Department in Kansas City, Missouri.

From January 1960 to March 1961, I was assigned to the Westinghouse Atomic Power Division in Forest Hills, Pennsylvania, as Fellow Engineer in the Instrumentation Group. In this position, I was responsible for the development of instrumentation systems for the Carolinas Virginia Tube Reactor at Parr, South Carolina, and for preparation of systems descriptions and equipment specification for reactor control and experimental instrumentation.

From March 1961 to August 1961, I was assigned to the System Transient Analysis Group to define and study the control requirements, operational limits, hazards and safety actions associated with the Saxton Reactor and the Carolinas Virginia Tube Reactor.

From September 1961 to December 1964, I was assigned as Group Leader for the Safeguards Group of the Westinghouse Atomic Power Division. I was responsible for establishing and evaluating safety requirements and for planning the content, coordinating studies and scheduling the preparation of material required for Safety Analysis Reports required to obtain construction permits and operating licenses from the Atomic Energy Commission for power reactors. I advised project managers concerning key technical issues important to safety.

From December 1964 to November 1970, I was Manager of Licensing Engineering at the Westinghouse PWR Systems Division. I was responsible for establishing safety criteria and standards; for directing the safety assessment of design, construction and operation, including the safety assessment of the performance of emergency core cooling systems; and for preparation of Facility Description and Safety Analysis Reports for PWR plants and in-reactor tests.

From November 1970 to June 1971, I was Manager of Licensing Engineering for WEDCO Corporation, a wholly-owned subsidiary of Westinghouse. I was responsible for establishing safety criteria and standards; for directing the safety assessment of design, construction and operation; and for the preparation of Facility Description and Safety Analysis Reports for the two nuclear power plants being built for Consolidated Edison of New York, Inc., at Indian Point.

I am a registered Professional Engineer in the Commonwealth of Pennsylvania. Also, I am a member of the American Nuclear Society, the Atomic Industrial Forum Safety Committee and the Society for Sigma

Xi. I am actively participating in the ANS and ANSI subcommittees on nuclear safety standards.

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QUALIFICATIONS OF THOMAS A. WOJTALIK
TENNESSEE VALLEY AUTHORITY

My name is Thomas A. Wojtalik. My business address is Tennessee Valley Authority, E&D Building, Muscle Shoals, Alabama. I am a Biologist on the Environmental Assessment Staff.

While an undergraduate at Michigan State University, I worked as a student biological aide in field and laboratory investigations of radiophosphorus translocation in a Michigan trout stream and its organisms. This involved collecting and preparing samples for radiological counting, training new aides, and assisting in training graduate students in sample collection, preparation, and analysis. I also planned, conducted, and analyzed a special field investigation of upstream rheotactic movement by benthic macroinvertebrates, which resulted in the first published report of upstream migration by immature stream macroinvertebrates with the rate of movement documented.

I received a Bachelor of Science degree in fisheries and limnology from Michigan State University in 1962. I received a Master of Science degree in 1963, based on research in radioisotope translocation in trout streams.

After graduation I was employed by Michigan State University's Fisheries and Wildlife Department as a special consultant in radioisotope investigations dealing with the distribution and translocation of radioactive arsenic in farm ponds, aquarium microcosms, and small experimental pools.

From the fall of 1963 until April 1968 I did postgraduate work at the University of Minnesota in the Fisheries Research group. This work involved sampling and processing limnological and biological samples in DDT-treated vernal ponds, and original research on the effects of additions of specified amounts of heat on stream invertebrates in situ. This resulted in the first experimental report of the effect of heat on diurnal and seasonal behavioral drift patterns of two stream macroinvertebrates.

I was employed by the Tennessee Valley Authority in April 1968, in the Division of Health and Safety, as a Limnologist-Biologist. I planned, directed, and participated in part of the sampling program associated with a steam plant biological survey of thermal effects. I was responsible for equipment development and planning of some thermal tolerance work with fish and some macroinvertebrates, and I have directed biological investigations of a major fish kill. I have held various supervisory positions in biological studies on existing and changing water quality on aquatic life, and have planned programs to monitor the application of herbicides to watermilfoil.

I participated in the review of Browns Ferry Nuclear Plant monitoring program for radiation and thermal effects, and wrote the reservoir aquatic life monitoring section for the Sequoyah Nuclear Plant PSAR.

In September 1971 I was assigned the position of Staff Biologist, Environmental Biology Branch. In this capacity I was responsible for liaison, coordination, and writing the basic input of biological portions of TVA's environmental statements. I was also responsible for planning, writing, and reviewing TVA's limnological site statements and monitoring programs incorporated into PSAR's and FSAR's.

In October 1972 I transferred to the Environmental Assessment Staff.

I am a member of the American Microscopic Society, the American Phycological Society, the Midwest Benthological Society, the British Ecological Society, and the American Fisheries Society.