

COMPARISON OF MANAGEMENT/TECHNICAL
RESOURCES TO REGULATORY GUIDANCE

SOUTH CAROLINA ELECTRIC AND GAS COMPANY

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1.0 SCOPE OF THE EVALUATION

The requirements imposed upon an applicant for an operating license for a nuclear power plant are stated in 10CFR Part 50. Among those requirements is submittal of information to support the NRC staff's finding of the applicant's technical and financial qualifications to engage in the operation of a nuclear power facility (See 10CFR Part 50.57(a)(4)). To provide background information for such a finding by the Commission, 10CFR Part 50.34 (b)(7) requires that a statement of technical qualifications of the applicant be included in the Final Safety Analysis Report (FSAR). The FSAR for the Virgil C. Summer Nuclear Station includes the required statements of qualification specified by the regulations for the key positions within South Carolina Electric and Gas Company's organization.

The post-Three Mile Island accident era has resulted in a much higher level of interest on the part of the Nuclear Regulatory Commission staff in the significance of the finding of technical qualification on the part of applicants. This heightened interest has led to the development of a set of revised guidelines considered by the NRC staff to be a means to demonstrate technical qualifications. The nuclear industry has also responded to TMI via a reassessment of what constitutes "qualified" personnel and is revising ANSI/ANS 3.1.

In the face of changing guidance as to what constitutes qualification, South Carolina Electric and Gas Company is in the process of acquiring an Operating License for the Virgil C. Summer Nuclear Station. SCE&G is a company with an established overall organizational structure and a relatively recently-formed nuclear operations staff comprised of long-term SCE&G employees augmented by a pool of recently-hired professionals, some of whom have had significant experience at other facilities.

The purpose of this document is to present an evaluation of the qualifications of senior technical and management personnel within South Carolina Electric and Gas Company's Nuclear Operations Organization.

This evaluation is based upon a composite of the following:

- The industry standards and regulatory guidance contained in Regulatory Guide 1.8, "Personnel Qualifications and Training" (Proposed Revision 2 - September, 1980), ANSI/ANS 3.1-1978, "American Power Plant Personnel," Draft Revision dated December 12, 1979 and NUREG 0731, "Guidelines for Utility Management Structure and Technical Resources" issued in October, 1980, were employed as guidance used to evaluate individuals.
- A review of resumes of individuals in supervisory or staff positions was conducted.
- Interviews with 42 members of the onsite and off-site organizations. The purpose of the interviews was to assure appropriate position-by-position correlation to the guidance. In addition, personal interviews provided an opportunity to more accurately assess the completeness of each resume and provide a common scale for assessment of technical strengths within the SCE&G organization.

This evaluation specifically excludes several areas discussed in NUREG 0731. First, the qualifications of shift supervisors and licensed operators are not addressed. In order to obtain and maintain an operator's or senior operator's license for a nuclear facility an individual's qualifications must be evaluated by the NRC for compliance with the provisions of 10CFR Part

55. Second, NUREG 0731 reiterates in Section II.A.2.C the requirements for shift technical advisors. The case of the shift technical advisor position is analagous to that for licensed personnel. SCE&G's candidates for these positions were not evaluated because the candidates would be qualified by specific training programs. Third, NUREG 0731 briefly addresses the onsite and offsite training programs (II.A.3 and II.B.2.d); these programs were not evaluated because they are primarily aimed at preparing license candidates and shift technical advisor candidates, providing general employee training in health physics and plant procedures, or providing training to specific categories of unlicensed personnel. These training programs are directed at enhancing the general technical awareness of the entire staff, rather than developing of specific expertise in any group or individual.

The remaining sections of this report describe the steps in the evaluation of the SCE&G organization and technical resources:

- Section 2.0 - NRC Guidance and Industry Standards
- Section 3.0 - Evaluation of Management and Technical Resources (Comparison of the organization and functional positions to the criteria in terms of direct fit (one-to-one correlation), equivalency or area requiring augmentation).
- Section 4.0 - Overall Assessment (Identification of conclusions and recommendations).

In 1971 the Reactor Operations Subcommittee ANS-3 of the American Nuclear Society Standards Committee developed a standard specifying criteria for qualifications and training of nuclear power plant personnel, ANSI N18.1-1971. The Standards Subcommittee was comprised of personnel who were experienced in the activities for which the standard was developed, namely, nuclear power plant operations. The Atomic Energy Commission Staff endorsed the guidance of ANSI N18.1-1971 by issuance of Regulatory Guide 1.8 "Personnel Selection and Training".

Following a number of years of use, the standard was revised to include greater clarification of desired qualifications of key nuclear power plant staff members. This revised standard was issued by ANSI in 1978 as ANSI/ANS 3.1-1978 "Selection and Training of Nuclear Power Plant Personnel." In February, 1979 the NRC staff issued a draft revision to Regulatory Guide 1.8 (Draft Revision 2). That draft revision was issued for public comment; it continued to endorse ANSI/ANS 3.1, but the 1978 revision was referenced.

The accident at Three Mile Island caused the Nuclear Regulatory Commission staff to reassess its position in regard to personnel qualifications. Following the accident, the nuclear power industry also reassessed its collective view of which factors actually constituted personnel qualifications. The industry has presented its current views in draft revisions to ANSI/ANS 3.1. A number of drafts have been processed but approval has not been obtained from the required number of industry representatives. The NRC staff has issued a revision of Regulatory Guide 1.8 for comment (second proposed Revision 2, dated September 1980).

In addition, the NRC staff has developed NUREG 0731 "Guidelines for Utility Management Structure and Technical Resources," October, 1980, which provides the most recent view of the agency in regard to qualifications of individuals. The guidance of NUREG 0731 reinforces the positions of the previously-approved standard and Regulatory Guide and amplifies NRC's view of what constitutes appropriate shift staffing at an operating nuclear power plant.

The specific guidelines for personnel qualification have not changed significantly since issuance of the original version of ANSI/ANS 3.1 in 1971, although clarification has been provided for specific positions.

3.0 EVALUATION OF SCE&G MANAGEMENT AND TECHNICAL RESOURCES

This section contains the results of the evaluation of SCE&G's conformance to the NRC and nuclear industry objectives that are described in Section 2.0. It includes evaluations of both onsite and offsite organizations' management and technical resources. For evaluation of onsite and offsite resources, the criteria are classified into experience and certification criteria. Within each of these two classifications, the extent of SCE&G compliance is discussed. Three categories of compliance are identified: (1) direct compliance with the criteria; (2) compliance by a showing of equivalence with the criteria; and (3) augmentation or change is necessary to demonstrate either compliance or equivalence with the criteria.

3.1 Discussions of Conformance to Guidelines

The guidelines have developed over the years to provide a less ambiguous identification of intent upon the part of each organization issuing the guidance (either industry or AEC/NRC). During this process of revision and update, certain clarifications have been deleted in regard to specific considerations without substitution of revised guidance. In general the level of detail of guidance as to what constitutes qualifications has increased and, when coupled with the post-TMI accident guidance from the NRC staff, it is possible to directly relate the qualifications of members of the South Carolina Electric and Gas Company's staff to the composite industry/NRC guidance.

Each guidance document indicates that demonstrated performance is fundamentally important in each consideration associated with a judgment of personnel qualifications. This demonstration of

performance is presented by:

- Actual performance on a specific job directly related to the position under consideration.
- Certification of ability to perform, i.e.,
 - academic training and degree
 - professional certification (PE)
 - NRC Operator's or Senior Operator's License

The most recent NRC guidance on qualifications as presented in NUREG 0731 endorses the previous NRC staff guidance as included in Regulatory Guide 1.8, Draft Revision 2, dated June 19, 1980. The guidance recommends that a B.S. Degree in Engineering or scientific field associated with power plants be held by individuals occupying many specific staff positions. The most recent industry position on technical training in regard to a degree is presented in the proposed revision to ANSI/ANS 3.1.

The proposed revision to ANSI/ANS 3.1, while reinforcing the above noted key issues, provides guidance as to what parameters should be weighted in lieu of academic certification. Factors to be considered include:

- Actual academic education level
- Technical training classes at college level
- NRC Senior Operator's License
- Experience in the area of activity
- Supervisory or management experience
- Communication skills
- Professional Licensing (PE) or Certification of Training (EIT)

The guidance when distilled requires that each senior position associated with operation of a nuclear power plant be staffed with an individual who has demonstrated performance by adequate experience and certification that the individual is technically able to accomplish the task assigned.

For members of the South Carolina Electric and Gas Company's Nuclear Operations Organization, these two key elements were reviewed and compared to the standards and guidance.

3.2.1 Plant Manager

Guidance Positions:

- Six years of power plant experience, total
- Three years of nuclear plant experience including:
 - two months of power operation
 - a refueling outage
 - startup testing for either initial startup or refueling
- Four years of management experience
- Hold an NRC Senior Operator's License or have been certified at a plant or simulator as qualified to apply for a license
- Onsite presence through the preoperational testing program
- Bachelor's Degree in Engineering or related science

Comparison

Mr. O.S. Bradham is designated the Virgil C. Summer Nuclear Station Manager. Mr. Bradham was previously employed as the Superintendent of Maintenance at the Oconee Nuclear Station for four years, following a progression through staff positions at the Oconee Station. Prior to association with the Oconee Project, Mr. Bradham was employed at the Carolinas Virginia Tube Reactor at Parr South Carolina and Savannah River. Mr. Bradham has twenty-seven years of association with nuclear reactors. Included are numerous refueling outages, participation in the startup of three large commercial power reactors and responsibility for directing the startup of one of these reactors. Mr. Bradham has been associated with the Virgil C. Summer Nuclear Station since 1978 and has been responsible for the preoperational test program.

Mr. Bradham unquestionably satisfies the guidance positions relative to technical management experience within the industry, having been responsible for management of all maintenance activ-

ities at a three unit nuclear station for four years. Mr. Bradham has obviously demonstrated performance in a position comparable to his current assignment.

Relative to certification, Mr. Bradham has successfully participated in numerous technical training courses plus management training throughout his professional career. Mr. Bradham has successfully completed U.S. Army Officer Candidate School.

3.2.2 Assistant Plant Manager

Guidance Positions:

- Six years total power plant experience
- Three years nuclear power plant experience, including:
 - management activities during two months power operation
 - management activities during a routine refueling outage of 1-2 months duration
 - management activities during acceptance or post-refueling startup testing
- Four years of supervisory/management experience
- Hold an SRO for the Virgil C. Summer Station, or have held an SRO at a similar PWR facility or have been certified at a simulator as qualified to apply for an SRO.
- Bachelor's Degree in Engineering or related science
- Six months experience onsite prior to the start of the preoperational testing program

Comparison

Mr. J. Connelly is Assistant Plant Manager at the Virgil C. Summer Nuclear Station. Mr. Connelly has a total of fourteen years of power generation experience, of which seven are directly associated with commercial nuclear power plant operations or testing. Mr. Connelly has held an SRO on the H.B. Robinson Steam Electric Plant and has served in management capacity, as Shift Supervisor, at H.B. Robinson during initial facility power ascension. Mr. Connelly has more than four years of management experience, at both the H.B. Robinson facility and at the Virgil C. Summer Nuclear Station. He has been Assistant Plant Manager at the Summer Station since 1979. Mr. Connelly has a Bachelor's degree in Nuclear Engineering and was assigned

to the Summer Station prior to six months before the start of the hot functional test program.

Mr. Connelly's experience and education directly comply with requirements specified in the guidance.

3.2.3 Operations Supervisor

Guidance Positions:

- Four years of power plant experience
- Three years of nuclear power plant experience including:
 - two months of power operation
 - a refueling outage
 - startup testing for either initial startup or refueling
- Participation in operational activities during nuclear power experience
- Hold an NRC Senior Operator's License
- Onsite presence during preoperational testing
- B.S. Degree in Engineering or related science or equivalent

Comparison

Mr. L.F. Storz is the Operations Supervisor for the Virgil C. Summer Nuclear Station. Mr. Storz was previously employed by Wisconsin Electric Power Company where he progressed through operations staff positions to the position of Operations Superintendent for the Point Beach Nuclear Power Plant. Mr. Storz has participated in operational activities of 12 refueling outages. Mr. Storz has 19 years of applicable experience in nuclear power including his navy experience, education and employment in the commercial nuclear power industry. Mr. Storz has been involved with testing of systems backfitted into the Point Beach Nuclear Power Plant and has been onsite at Virgil C. Summer Nuclear Station since prior to hot functional preoperational testing. He has held an NRC Senior Operator's License on the two units at Point Beach which, like Virgil C.

Summer Nuclear Station, are Westinghouse PWR's, and he is in the process of cold licensing for an SRO for the Virgil C. Summer facility. At the time of fuel loading Mr. Storz will have more than eight months of experience at the Virgil C. Summer station. Mr. Storz's experience exceeds the positions stated in the guidance.

Mr. Storz holds a B.S. Degree in Mechanical Engineering and has held an SRO License on two large power reactors. Mr. Storz conforms to the certification objectives of the guidance.

3.2.4 Maintenance Supervisor

Guidance Positions:

- Four years of power plant experience
- Two years of nuclear power plant experience including:
 - one month of power operation
 - one refueling outage
- Onsite presence during preoperational testing
- B.S. Degree in Engineering or related science or equivalent
- Familiarity with non-destructive testing, craft knowledge, and an understanding of codes and standards for vessels, piping and electrical equipment should be maintained

Comparison

Mr. S.J. Smith, Maintenance Supervisor for SCE&G, has approximately thirteen years of power plant experience, all of which is nuclear. He has nuclear Navy experience in power operation and both Navy and commercial nuclear power experience during routine refueling outages. He has been assigned to the Virgil C. Summer Station since 1978.

Mr. Smith's experience in nuclear power is predominantly a result of his service in the Navy nuclear power program. His responsibilities included operation and maintenance of mechanical systems on submarines. In addition, he is experienced in health physics and chemistry control of shipboard reactor and steam plant systems. During a three year period Mr. Smith was assigned to a submarine tender where he was responsible for planning and supervision of Navy personnel in maintenance of ten submarines. During an additional three year period Mr. Smith served as the Engineer-

ing Watch Supervisor and was thereby responsible to ship management for direct supervision of the machinery division of a nuclear submarine. Mr. Smith was certified to stand Engineering Officer of the Watch.

Following his Navy experience, Mr. Smith was employed by a nuclear steam supply system vendor as an Associate Engineer. He assisted at five different nuclear power stations during refueling periods and major planned shutdowns in the area of coordination and supervision of major maintenance activities on mechanical, electrical and instrumentation systems.

Mr. Smith has a total of thirteen years of applicable nuclear power experience which is directly related to his current assignment. Throughout this period he has been directly involved in craft work, code requirements and acceptance testing in both Navy and commercial power plants.

In regard to certification, Mr. Smith has completed the Navy nuclear power training program, 14 specific correspondence courses and was certified to stand Engineering Officer of the Watch stations. This experience is the direct equivalent of the commercial nuclear plant's Senior Operator's License. As such, Mr. Smith has been certified by a responsible organization to be qualified to make technical decisions as to the safe operation of a nuclear power reactor.

Based upon his extensive experience combined with his technical training plus certification during his Navy career, Mr. Smith exceeds the guidance objectives.

3.2.5 Technical Support Supervisor

Guidance Positions:

- Four years of power plant experience
- Three years of nuclear power plant experience including:
 - one month of power operation
 - one refueling outage of 1-2 months duration
 - participation in startup testing (either acceptance testing or startup following refueling)
- Bachelor's Degree in Engineering or related science
- Hold an SRO or have held an SRO on a similar PWR facility, or hold certification at the facility or appropriate simulator
- Assignment to the facility six months prior to the start of preoperational testing

Comparison

Mr. B.G. Croley, Technical Support Supervisor, has a total of thirteen years of nuclear industry experience. Mr. Croley has both Bachelor's and Master's Degrees in Nuclear Engineering. Mr. Croley has been assigned to the Virgil C. Summer Nuclear Station since 1979, more than six months prior to the start of the hot functional testing program.

Mr. Croley has obtained 21 months of nuclear power plant experience at the Virgil C. Summer Nuclear Station. He has taught at Westinghouse Electric Corporation's simulator facility in Zion, Illinois. The balance of Mr. Croley's technical experience consists of design evaluation, licensing, contractual/financial and general project management responsibilities related to commercial nuclear plant construction and operation.

Mr. Croley was involved in the Virgil C. Summer Nuclear Station Project from 1972-1977 as a Project Engineer for Westinghouse Electric Corporation.

The combination of Mr. Croley's experience in performance of design calculations, instructor at the Westinghouse Electric Corporation's Training Center for nuclear power plant operators and his experience as a member of the Virgil C. Summer Nuclear Station staff exceeds the required three years of power plant experience specified in the guidance.

The objectives of the guidance for Supervisor of the Technical Support staff will be satisfied with the acquisition of Senior Operator's License by Mr. Croley for which he is presently training. Mr. Croley received his SRO Cold License Certification at the Westinghouse Nuclear Training Facility in June, 1980.

3.2.6 Training Manager

Guidance Position:

- Four years of professional experience
- Two years of nuclear power plant experience including:
 - requalification testing of operators
 - one month of power operation
- Hold an SRO License or have an SRO on staff responsible for license training
- Educational technique training
- B.S. Degree in educational or technical subjects

Comparison

The training department for the Virgil C. Summer Nuclear Station is managed by Mr. B.T. Estes, Jr. who is assisted by Mr. A. Sanders. Mr. Estes has nine years of power plant-related experience which includes both fossil and nuclear plants. Mr. Estes has been associated with the Virgil C. Summer Nuclear Station for six years. During that period he was designated as the Nuclear Operations Engineer and, most recently, as Nuclear Training Coordinator responsible for all operator training activities and general employee training.

Mr. Estes has participated in the cold license training activities in addition to managing training efforts. He attended the Zion training course offered by Westinghouse Electric Corporation, which is NRC accredited. He has been certified by the Westinghouse Training Center as successfully completing their SRO training program and holds a Senior Reactor Operators Certificate from Zion. Mr. Estes has been assisted in the specific training

efforts to prepare SCE&G personnel for the NRC licensing examinations by contracted personnel who have specific expertise in specialized areas related to nuclear power plant operation and design.

The preparation of a staff for both cold and hot licensing of a new plant is a more significant effort than requalification of a licensed staff. Mr. Estes has managed this more difficult task for nearly three years while personally participating in the program to acquire a license himself.

Mr. Estes has a B.S. in Mechanical Engineering and is a Registered Professional Engineer in the state of South Carolina.

Mr. Sanders reports to Mr. Estes and is responsible for operator training. Mr. Sanders has in excess of four years of experience as an educator in both high school and college systems. Mr. Sanders has participated in the operator training program and like Mr. Estes has been certified at the Westinghouse Electric Corporation's Nuclear Training Center with a Senior Reactor Operator's Certificate. Mr. Sanders has been associated with the Virgil C. Summer Nuclear Station for six years. Mr. Sanders augments Mr. Estes' professional background as an engineer with significant experience as an educator.

The combination of Mr. Estes and Mr. Sanders significantly exceeds the guidance and provides depth to the SCE&G Nuclear Training area.

3.2.7 Station Reactor Engineer

Guidance Positions:

- Four years of professional experience
- Two years of nuclear power plant experience including:
 - significant experience in reactor physics, physics testing, and heat transfer
 - participation in a routine refueling outage
 - participation in a post-refueling startup test program (including power ascension from 10-100%)
 - onsite presence for two weeks at $\geq 20\%$ power
- Bachelor's Degree in Engineering or related science
- Six months experience onsite at a commercial nuclear power plant

Comparison

Mr. S. Fipps has six years of professional technical experience. He has a Bachelor's degree in Nuclear Engineering, has received Westinghouse SRO certification, and holds professional engineering registration. Mr. Fipps has four years experience at the Virgil C. Summer Nuclear Station. Mr. Fipps is training for a cold SRO license on the Virgil C. Summer Nuclear Station.

Mr. Fipps' nuclear power plant experience includes three months participation in post-refueling power ascension testing at a commercial PWR facility similar to the Virgil C. Summer Nuclear Station.

Mr. Fipps' qualifications and experience are compatible with requirements specified by the guidance.

3.2.8 Radiation Protection

Guidance Positions:

- Four years of experience in applied radiation protection
- Three years of radiation protection experience at a nuclear power plant or similar facility including:
 - a routine refueling outage
 - two months of power operation
- Six months of onsite presence
- B.S. Degree in Science or Engineering (including radiation protection)
- Supervisory experience in health physics practices

Comparison

Mr. L.A. Blue is designated as the Health Physics Supervisor at the Virgil C. Summer Nuclear Station. Mr. Blue has four years of professional experience in health physics acquired as a member of the technical health physics staff of the Oconee Nuclear Station owned by Duke Power Company. Mr. Blue progressed through the organizational structure of the Oconee Station from the position of Junior Health Physicist to Health Physics Supervisor. During this progression, he held supervisory positions for more than three years and participated in several refuelings at the Oconee Station.

Mr. Blue will have approximately eight months of experience at the Virgil C. Summer Nuclear Station at the time of issuance of an Operating License.

Mr. Blue has a B.S. Degree in Radiation and Nuclear Engineering Technology, based on a curriculum which is oriented toward radiation health physics.

Mr. Blue exceeds the requirements detailed in the various guidance documents for his assigned position.

3.2.9 Instrumentation and Control

Guidance Positions:

- Two years power plant instrumentation and control experience
- One year of nuclear power plant instrumentation and control experience including:
 - surveillance testing and instrument calibration during a routine refueling outage
 - startup testing following a refueling outage
 - one month of operation at $\geq 20\%$ power
- Bachelor's degree in Engineering or related science
- Six months experience onsite at a commercial nuclear power facility

Comparison

At the Virgil C. Summer Nuclear Station the I&C function is located within the Maintenance group. Mr. R. Hinson is the I&C Maintenance Supervisor.

Mr. Hinson has over eleven years of power plant instrumentation and control experience, three of which have been onsite at the Virgil C. Summer Nuclear Station. Mr. Hinson has been responsible for surveillance testing, calibration and repair of instrumentation at an operating commercial power plant. He has prepared maintenance and testing procedures to support preoperational and startup testing programs at the Virgil C. Summer Nuclear Station. Mr. Hinson has completed Westinghouse Electric Corporation's training program in nuclear instrumentation and nuclear radiation monitoring.

In addition, Mr. Hinson has successfully completed a wide variety of technical training courses in instrumentation and control and electrical systems design and maintenance, including several U.S. Air Force courses.

Although Mr. Hinson has not participated in a refueling outage, his technical responsibilities relative to outage support and subsequent startup will not differ significantly from his previous I&C surveillance, maintenance, and calibration activities at a non-nuclear facility, except for NI calibration, for which he has received specific training. In addition, Mr. Hinson has been responsible for preparation of surveillance testing and calibration procedures to support preoperational and startup testing; these direct responsibilities are at least equivalent to, if not more difficult than similar responsibilities performed in support of a routine refueling outage and normal plant operation.

Consequently, Mr. Hinson's commercial power plant I&C experience, tenure at the Summer Station and extensive technical training in areas related to his principal responsibilities at the Summer Station meet the intent of the guidance relative to qualifications for the I&C group leader.

3.2.10 Chemistry and Radiochemistry

Guidance Positions:

- Two years experience in chemistry
- One year of experience in nuclear power plant radiochemistry including:
 - three months experience in the chemistry section at an operating nuclear power plant, two months of which the plant is at $\geq 20\%$ power
- Six months experience onsite at a nuclear power facility
- Bachelor's degree in Engineering or related science

Comparison

Mr. F. Leach is Chemistry Supervisor at the Virgil C. Summer Nuclear Station. Mr. Leach has nine years of nuclear power plant operations experience. Mr. Leach has completed nuclear power school and qualified as Engineering Officer of the Watch in the U.S. Navy's nuclear power program, and has served as EOW, Reactor Controls Officer and Main Propulsion Assistant aboard nuclear submarines. Mr. Leach has served as Chemistry Supervisor at the Summer Station for four years.

While involved in the Navy nuclear program, Mr. Leach participated in the overhaul/refueling, precritical and startup testing of two nuclear submarines. Mr. Leach has a Bachelor's degree and additional training at the Navy's Nuclear Power Schools at Mare Island, Idaho Falls, Groton and Norfolk. In addition, Mr. Leach has successfully completed Westinghouse Electric Corporation's PWR water chemistry course.

To date, Mr. Leach has been responsible for the preparation of chemistry/radiochemistry, preoperational and startup test procedures and for monitoring of water systems during testing.

Mr. Leach's extensive nuclear Navy operating and refueling experience, coupled with his four years at the Summer Station, satisfy the intent of the criteria. He has prepared chemistry/radiochemistry, preoperational and startup test procedures; these are equivalent to post-refueling procedures. Therefore, Mr. Leach has experience at least equivalent to that stated in the guidance for his position.

3.3 Augmentation of Station Staff

The standards provide guidance relative to qualifications for particular positions within a typical organizational structure; however, few if any operating companies are structured as typified in the standards or contain only those positions discussed in the standards within their organization. Although only general guidance exists, within the SCE&G organization significant additional resources are available beyond those discussed herein. Below are discussed some of the individuals who provide such augmentation.

Qualifications of individuals who supplement SCE&G's Nuclear Operations staff by adding specific technical strength in selected disciplinary areas are compared to the following general qualifications:

- Five years of professional experience in the individual's field of specialty
- Bachelor's degree in Engineering or related science

3.3.1 Assistant Operations Supervisor

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. K.W. Woodward is designated as the Assistant Operations Supervisor. He has twelve years of nuclear experience which is predominantly comprised of military experience on U.S. Army PWR plants. Mr. Woodward progressed within the Army nuclear program from the position of an operator/instrument technician to Plant Supervisor of a MH-1A power plant. His duties included operations training, maintenance and health physics. Although military reactors with which Mr. Woodward has experience are much smaller than a commercial plant such as the Virgil C. Summer Nuclear Station, similar problems are encountered on such facilities and experience so gained is directly applicable to commercial plants.

Mr. Woodward has been associated with the Virgil C. Summer Nuclear Station for more than three years and directly augments the Operations group by supporting Mr. Storz. He is cold license certified and is presently participating in the SRO training program.

3.3.2 General Manager, Nuclear Operations

Guidance Positions

As stated in Section 3.3.

Comparison

Mr. W.A. Williams is General Manager, Nuclear Operations. Mr. Williams has thirty years of professional experience of which approximately twenty-four years constitute nuclear-related experience. Mr. Williams has served as a Technical Manager with the U.S. Atomic Energy Commission, and, before joining SCE&G, Vice President of the South Carolina Public Service Authority, where his responsibilities have included administration and technical direction of the Authority's nuclear activities. Mr. Williams has been associated with the Virgil C. Summer Station through his position with the Authority, a partner in the project since 1973. Mr. Williams has also been an officer in the U.S. Air Force. Mr. Williams has a B.S. from the U.S. Naval Academy and B.S. and M.S. degrees in Nuclear Engineering.

Mr. Williams' many years of technical and managerial experience, the major portion of which is nuclear related, exceeds the intent of the guidance relative to a Senior Technical Manager's position and adds significant depth to SCE&G's Nuclear Operations Group.

3.3.3 Manager, Nuclear Engineering

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. C. Price is Manager, Nuclear Engineering. Mr. Price has twenty-six years of professional experience subsequent to serving four years in the U.S. Air Force. The last eighteen of these years have been in areas related to nuclear power generation. Mr. Price has served as SCE&G's Manager, Nuclear Engineering for the past two years; for the preceeding two years he was a senior engineer primarily responsible for electrical, instrumentation and control systems design. His responsibilities have included technical supervision of electrical, I&C, mechanical and structural engineers and overview of architect-engineer design activities. Mr. Price is a registered professional engineer in the state of South Carolina. Mr. Price has served on the IEEE's Joint Committee on Nuclear Power Plant Standards. Mr. Price attended Clemson University and has taken several additional technical courses related to his area of expertise. He has additional nuclear plant design experience at Duke Power Company, where he was responsible for seven years for design of electrical, instrumentation and control systems for the Oconee, McGuire and Catawba facilities.

Mr. Price's extensive nuclear-related experience, coupled with his professional engineering registration and professional recognition exceeds qualifications/objectives delineated in the guidance. His many years of specific experience in electrical, instrumentation and control systems design provides significant depth in this technical area and substantially augments overall SCE&G competence in this discipline.

3.3.4 Senior Mechanical Engineer

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. A.G. Alvarez is the senior mechanical engineer in the Nuclear Engineering group of South Carolina Electric and Gas Company. He has twenty years of professional experience, the majority of which has been in the area of power plant engineering support. Mr. Alvarez has held positions of results engineer, assistant superintendent of a coal fired power plant and numerous staff engineer positions in the corporate office. Included in his experience have been seven years of association with the Virgil C. Summer Nuclear Station during which he was responsible for design review of the mechanical systems and equipment specifications. Mr. Alvarez has been responsible for all mechanical support systems, balance of plant mechanical systems and environmental treatment systems.

Mr. Alvarez has a B.S. in Mechanical Engineering and is a registered professional engineer. His education and experience directly satisfy the guidance position relative to staff specialist in mechanical engineering.

3.3.5 Group Manager, Nuclear Engineering and Licensing

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. M.B. Whitaker, Jr., Group Manager, Nuclear Engineering and Licensing, has eighteen years of professional experience. Subsequent to receipt of his Bachelor's degree in electrical engineering, Mr. Whitaker served for two years with the U.S. Army as an electronics engineer. Mr. Whitaker has nuclear-related experience dating from 1971 when he served as Executive Assistant to the Senior Vice President, Operations, and he was assigned as the Manager, Nuclear Licensing, in 1976. Mr. Whitaker has additional academic experience and degrees, specifically, an M.B.A. and J.D. awarded by the University of South Carolina, and is a member of the South Carolina Bar. While at SCE&G, Mr. Whitaker has either worked with or managed electrical distribution, operations, budgets and accounting, legal, production operations, electric sales, customer service activities, and nuclear licensing.

He has the requisite Bachelor's degree in Electrical Engineering and, as noted above, has significant managerial experience in many diverse areas within an operating utility.

Mr. Whitaker's diverse experience and tenure with SCE&G provides him with unique ability to act as senior manager responsible for a team of technical specialists.

3.3.6 Mechanical Engineer

Guidance Positions:

As stated in Section 4.3.

Comparison

Mr. M.D. Quinton is a Mechanical Engineer whose background includes seven years of nuclear-related professional experience after receipt of his Bachelor's degree in Mechanical Engineering, and five years of U.S. Navy nuclear experience aboard the USS Enterprise, where he served as a reactor operator. Mr. Quinton has worked as a design and test engineer at Newport News Shipbuilding, and has participated in the overhaul and startup testing of nuclear submarines. For the past 1.5 years he has worked for SCE&G, reviewing the design of NSSS and balance-of-plant systems for the Virgil C. Summer Nuclear Station. Mr. Quinton has passed the EIT exam in the state of South Carolina.

Mr. Quinton's education and experience exceeds the general requirements for staff specialist delineated in the guidance.

3.3.7 Group Manager, Nuclear Services

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. D.A. Nauman is Group Manager, Nuclear Services. Mr. Nauman has thirteen years of nuclear-related experience following military steam, diesel and gas turbine propulsion plant experience. Mr. Nauman has nine years of quality assurance program development and implementation experience; his additional nuclear-related experience is in refueling systems design for U.S. Navy nuclear power plants. Mr. Nauman's inspection experience includes inspection and certification activities related to commercial marine vessel design, construction and testing.

For the past eight years, Mr. Nauman has managed quality assurance programs associated with the Virgil C. Summer Nuclear Station, first for the architect-engineer, then for SCE&G. Mr. Nauman has a Bachelor's degree in Naval Engineering and is a registered professional engineer in the state of California.

Mr. Nauman's education and experience satisfy the requirements stated in the guidance for staff specialist in his area of Quality Assurance responsibility.

3.3.8 Manager, Nuclear Fuel Management

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. D.C. Warner is Manager, Nuclear Fuel Management. He has four years of professional technical experience relevant to his area of specialty. Mr. Warner has one additional year of experience as a graduate assistant in nuclear engineering at the University of Tennessee, from which he holds both Bachelors and Masters degrees in Nuclear Engineering. Mr. Warner has passed the EIT examination in the state of South Carolina.

Mr. Warner has worked as Nuclear Engineer in the Production Engineering Department and as Administrative Assistant in Nuclear Operations and System Planning Departments. His responsibilities have included preliminary fuel management studies, review of NSSS and balance-of-plant systems designs, accident analysis review and licensing assistance.

Mr. Warner's technical responsibilities and interests have been concentrated in the area of fuel management; currently, he is the senior SCE&G technical specialist in the fuel/physics area. Prior to facility commercial operation, Mr. Warner will have achieved the five year minimum and have qualified, under the guidance, as SCE&G's staff specialist in the area of nuclear fuels/physics. Mr. Warner's advanced degree in nuclear engineering exceeds the educational requirements stated in the guidance for his specialist position.

3.3.9 Electrical Engineer

Guidance Positions:

As stated in Section 3.3.

Comparison

Ms. N.L. Demian is an Electrical Engineer with fifteen years of professional experience. She has worked for SCE&G since 1969, and has spent the past eight years in the Production and Nuclear Engineering Departments associated with the Summer project. Her technical assignments have included review of the design of electrical systems, preparation/review of specifications, and review of qualification of class IE electrical equipment for the Summer Station. Ms. Demian is a registered professional engineer in the state of South Carolina. Ms. Demian holds both a Bachelor's and Master's degree in Electrical Engineering.

Ms. Demian's education and experience more than satisfy the positions stated in the guidance for senior staff specialist in electrical engineering.

3.3.10 Assistant to the Plant Manager

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. A.B. Harrison is assigned as Assistant to the Plant Manager, Virgil C. Summer Nuclear Station. Mr. Harrison has twenty years of nuclear experience of which fourteen years were in the Navy nuclear power program. His experience was mainly with aircraft carrier prototypes on which he was qualified to stand watch as Engineer Officer of the Watch.

Mr. Harrison has been associated with the Virgil C. Summer Station for six years during which time he has been involved in Operator training programs, development of operating procedures, and review of support program documents such as the emergency plan and health physics program. He was previously assigned as the Operations Supervisor.

Mr. Harrison's experience in the Navy program, which includes certification as Engineering Officer of the Watch, when combined with his commercial plant training at the Westinghouse Electric Corporation's training facility at Zion, where he was certified by attainment of a Senior Reactor Operator's Certificate, provides assurance of capability to advise other members of the SCE&G organization. This background of significant practical experience, coupled with training by means of recognized certification programs, conforms to the objectives of the guidance for management personnel.

3.3.11 Emergency Coordinator

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. K.E. Beale, Emergency Coordinator, has sixteen years of professional experience in health physics. Mr. Beale has worked as radiation protection engineer at the Saxton Experimental Reactor for six years and has an additional three years of operating nuclear plant experience at the Three Mile Island Nuclear Station, where he was Health Physics Supervisor. Mr. Beale participated in startup testing at Three Mile Island, Unit 1. Mr. Beale has been with SCE&G at the Summer Station for the past four years. He was the Summer Station Health Physics Supervisor for four years, during which time he was responsible for development of the health physics program, including training and implementation. In 1980, he was re-assigned to his current position of Emergency Coordinator. Mr. Beale has an Associates Degree in Nuclear Electronics Engineering, and has completed a number of additional courses in radiation protection.

Mr. Beale's extensive operating plant health physics experience (nine years total), coupled with additional prior work experience in health physics, and responsibilities at the Summer Station, which have included development of the entire health physics program, fully satisfy the intent of the guidance for the position of senior staff specialist in health physics. Mr. Beale's education and experience augment SCE&G's overall health physics capabilities, by providing depth and experience in his area of specialty. Mr. Beale brings to SCE&G operating nuclear plant

experience, including facility startup experience, necessary to provide technical support, guidance and perspective to members of Summer Station health physics staff.

3.3.12 Manager, Quality Assurance

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. D.R. Moore is Manager, Quality Assurance. Mr. Moore has fifteen years of experience in quality control and quality assurance, including ten years of nuclear-related quality assurance experience. Mr. Moore has been associated with the Summer Station since 1975, while working at Gilbert Associates, and was Gilbert's QA Program Manager for the Summer Station and the Erie Nuclear Plant Project. He has been with SCE&G since 1978, when he took over the responsibility for surveillance programs, and in 1980 was made Manager, Quality Assurance. Mr. Moore has a Bachelor's degree in Mechanical Engineering, and is a registered professional engineer in the states of South Carolina, California and Pennsylvania.

Mr. Moore's experience in management of nuclear quality assurance programs, surveillance of manufacturing and construction operations, and inspection techniques, coupled with his formal education and professional registration, more than satisfy the requirements stated in the guidance relative to senior staff specialist in quality assurance.

3.3.13 Senior Licensing Engineer

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. R.B. Clary is designated as the Senior Licensing Engineer. Mr. Clary is a trained Mechanical Engineer with both B.S. and M.S. degrees from the University of South Carolina. He is a registered professional engineer in the state of South Carolina. Mr. Clary has four years of Navy nuclear power program experience during which time he qualified to serve as Engineering Officer of the Watch.

Mr. Clary has been involved with the Virgil C. Summer Nuclear Station for eight years. His responsibilities have included coordination of Safety Analysis Reports for filing with the Nuclear Regulatory Commission, development of administrative procedures for the corporate office, and assorted administrative duties associated with organization of the project staff.

Presently he is responsible for resolving all issues which are outstanding in regard to issuance of an Operating License for the facility. He is responsible for coordination of SCE&G's technical, vendor, and consultant support to close all unresolved matters. This level of activity includes coordination of SCE&G responses to NRC questions to operating licensees as well as near-term licensees. This activity is more demanding than duties which will exist following commencement of facility operation. Mr. Clary's present activities directly relate to his future duties.

3.3.14 Manager, Health Physics and Environmental Monitoring

Guidance Positions:

As stated in Section 3.3.

Comparison

Mr. W.R. Baehr is designated the Manager, Health Physics and Environmental Monitoring. Mr. Baehr has nine years of experience in environmental monitoring, and has been responsible for development of the environmental monitoring program for the Virgil C. Summer Nuclear Station since 1973. He has a M.S. degree in Nuclear Engineering, Radiological Science Option.

Mr. Baehr's educational background combined with his experience in the area of environmental monitoring programs conforms to the guidance for technical support staff specialist.

3.3.15 Engineer, Nuclear Fuel Management

Guidance Positions

As stated in Section 3.3.

Comparison

Mr. J.W. Haltiwanger is an Engineer working in the Nuclear Fuel Management area. Mr. Haltiwanger has a total of nine years of nuclear industry experience, all of it with SCE&G and directly associated with the Virgil C. Summer Nuclear Station. Mr. Haltiwanger has worked in his specialty area dealing with all aspects of nuclear fuel supply for the Summer Station for approximately five of his nine years with SCE&G. His other technical efforts have involved licensing assistance and construction support activities. Mr. Haltiwanger has a B.S. in Nuclear Engineering and is a registered professional engineer in the state of South Carolina.

Mr. Haltiwanger's technical experience and educational background directly qualify him, in accordance with the guidance, for his position as staff specialist in nuclear fuels.

3.3.16 Senior Engineer, Operations

Guidance Positions

As stated in Section 3.3.

Comparison

Mr. L.D. Shealy is a Senior Engineer, Operations with SCE&G. His background includes seventeen years of power plant experience of which approximately half are nuclear-related. Mr. Shealy's technical activities have included plant performance evaluation, system design and specification review, and engineering and construction project management. Mr. Shealy has had technical support responsibilities at CVTR, completed special Westinghouse SRO training and received Westinghouse SRO certification, and served as the first Plant Manager, Virgil C. Summer Nuclear Station. Mr. Shealy currently serves as Assistant to the General Manager, Nuclear Operations. Mr. Shealy holds both B.S. and M.S. degrees in Mechanical Engineering, and has completed a number of additional technical courses related to nuclear power plant technology.

Mr. Shealy's onsite power plant experience, coupled with his educational background, exceed the guidance positions relative to qualifications of a senior staff engineer.

The technical staff of the Virgil C. Summer Nuclear Station conforms to the guidance of ANSI/ANS 3.1-1978, as modified by draft revisions not yet approved by ANS-3, and Regulatory Guide 1.8, Second Proposed Revision 2, which has been issued for comment. For each area of responsibility within SCE&G's plant operating staff and key technical support personnel located offsite the two fundamental requirements of applicable experience and certification of qualification are satisfied.

It should be noted that significant additional resources are available within the South Carolina Electric and Gas Company's Operations Group beyond the specific individuals discussed herein. The shift supervisors who will be individually examined by Nuclear Regulatory Commission personnel during the operator licensing process have not been evaluated but do provide the first level of supervision of safety-related activities at the facility. SCE&G has committed to the NRC to provide Shift Technical Advisors and Onsite Independent Safety Engineering Group; SCE&G has further committed, for these positions, to conform to qualification and training guidelines detailed by the NRC staff in NUREG 0731. Since a specific commitment was made in regard to the STA's and the Onsite Independent Safety Engineering staff, individual qualifications were not specifically reviewed. Members of these groups have B.S. degrees in Engineering or related science and at least two years of applicable experience.

Additional support personnel are available both onsite and in the corporate office to assist specific engineers and managers. Those individuals are, in most cases, qualified to the levels specified in the guidance for engineering support personnel.

For example, the Technical Support Supervisor onsite has a staff of eight engineers who have not been addressed within the evaluation, yet who are degreed engineers available to support the operational needs of the plant. The Maintenance Supervisor has a staff of two degreed engineers to support his area of responsibility; these individuals were not addressed in this evaluation of conformance to the guidelines.

Offsite, similar depth of support exists. The offsite engineering staff numbers more than ten professionals, each of whom were not specifically addressed within this document. These individuals augment the resources evaluated in the classical engineering disciplines of structural, mechanical, electrical, and nuclear engineering. The average experience of the engineering pool of the Nuclear Operations Group exceeds the guidance of ANSI/ANS 3.1, Draft Revision 2 that technical support personnel have a B.S. degree and five years of experience.

Overall, the technical resources available to upper management of SCE&G exceed the objectives of the guidance documents and provide a sufficient technical base to permit an effective system of technical review of each area of operation associated with licensed activity of an operating nuclear power station.