

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

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JUN 23 1987

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Gentlemen:

In the Matter of the)	Docket Nos. 50-327, 50-328
Tennessee Valley Authority)	50-390, 50-391
		50-259, 50-260
		50-296, 50-438
		50-439

REVIEW OF MARCH 28, 1987 LETTER FROM DALLAS HICKS

Reference: TVA letter to S. Ebnetter dated March 30, 1987

As discussed in the April 20, 1987 meeting between TVA and NRC, the Employee Concern Task Group (ECTG) has reviewed the March 28, 1987 letter from Dallas Hicks against the existing data base of employee concerns in the Employee Concern Special Program (ECSP). Enclosure 1 is a matrix that identifies the issues contained in that letter and the employee concerns within the ECTG data base that address these issues. Each issue has been or will be addressed in the routine evaluation of employee concerns and results documented in the ECSP report referenced. This new matrix (enclosure 1) supplements our previous submittal of similar allegation matrices for Mr. Hicks' letter dated November 27, 1985 and the transcript of his meeting with NRC on February 21, 1986 (see reference above).

In addition to the review by the ECTG, the allegations raised by Mr. Hicks' letter dated March 28, 1987 were evaluated independently by the Manager's Review Group (MRG), a special panel of four senior individuals. During the May 21, 1987 meeting between TVA and NRC, TVA committed to providing a copy of the report documenting the results of the MRG review, which was being drafted at that time. Enclosure 2 fulfills that commitment. Enclosure 3 provides the resumes for the members of the panel that performed the review.

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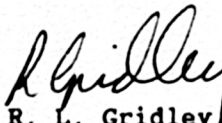
U.S. Nuclear Regulatory Commission

JUN 23 1987

If you should have any questions, please telephone Martha Martin at (615) 365-3587.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


R. L. Gridley, Director
Nuclear Safety and Licensing

Enclosures

cc (Enclosures):

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ENCLOSURE 1

Allegations - Group 9

Subject: Dallas Hicks Letter 03/28/87

Source Document: J. Dingell and M. Udall
to L. Zech 04/09/87

Revision 0
06/04/87

5374T

SUBJECT	SOURCE : DOCUMENT	DOCUMENT : NUMBER	ECSP CONCERN : NUMBER	CATEGORY	SUBCATEGORY	PERTINENT TVA : CORRESPONDENCE	COMMENTS
Hicks Letter 3/28/87	: J. Dingell : and M. Udall	: Enclosure : Page 1 : Item 1	: WI-85-100-026	: QA	: 80103	: None	:
	: to	: Quality of work	:	:	:	:	:
	: L. Zech	:	:	:	:	:	:
	: 04/09/87	: Item 2	: BFNIESC-85-03	: OP	: 30713	:	:
	:	: Line 1	: IN-85-984-001	: OP	: 30713	:	:
	:	: Configuration Control	: WI-85-100-025	: QA	: 80103	:	:
	:	:	: XX-85-062-003	: OP	: 30713	:	:
	:	:	: XX-85-071-N05	: OP	: 30713	:	:
	:	:	:	:	:	:	:
	:	: Item 2	: WI-85-100-037	: EN	: 20106	:	:
	:	: Line 2	: WI-85-100-043	: EN	: 20502	:	:
	:	: Design bases	:	:	:	:	:
	:	:	:	:	:	:	:
	:	: Item 3	: WI-85-100-042	: MP	: 71012	:	:
	:	: C/A Implementation	: XX-85-122-048	: MP	: 71012	:	:
	:	:	: XX-85-122-049	: MP	: 71012	:	:
	:	:	: XX-85-122-050	: MP	: 71012	:	:
	:	:	:	:	:	:	:
	:	: Page 2	: ECTG Program (2)	:	:	:	: (2) Should be
	:	: Item 4	:	:	:	:	: bounded by
	:	: WBN applicability to SQN	:	:	:	:	: program.
	:	:	:	:	:	:	:
	:	: Item 5	: WBM-86-004-002	: QA	: 80101	:	:
	:	: Appendix B	:	: QA	: 80109	:	:
	:	:	:	:	:	:	:
	:	: Item 6	: XX-85-116-005	: QA	: 80000	:	:
	:	: QA attitude	: XX-85-116-008	: QA	: 80101	:	:
	:	:	:	:	:	:	:
	:	: Item 7	: WI-85-100-043	: EN	: 20106	:	:
	:	: Calculation	:	: EN	: 20501	:	:
	:	:	:	: EN	: 20502	:	:
	:	:	:	: EN	: 20503	:	:
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SUBJECT	SOURCE : DOCUMENT :	DOCUMENT : NUMBER :	ECSP CONCERN : NUMBER :	CATEGORY :	SUBCATEGORY :	PERTINENT TVA : CORRESPONDENCE :	COMMENTS :
Hicks	:J. Dingell:	Page 3	:WI-85-100-019	:EN	:20103	:None	:
Letter	:and	:Item 8	:	:EN	:20104	:	:
3/28/87	:M. Udall	:Line 1-11	:	:EN	:21303	:	:
	:to	: Downgraded electrical	:	:	:	:	:
	:L. Zech	: standards and guides	:	:	:	:	:
	:04/09/87	:	:	:	:	:	:
	:	:Item 8	:WI-85-100-043	:EN	:20106	:	:
	:	:Line 12-18	:	:EN	:20501	:	:
	:	: Electrical design	:	:EN	:20502	:	:
	:	: criteria	:	:EN	:20503	:	:
	:	:	:	:	:	:	:
	:	:Item 9	:WI-85-100-046	:EN	:20405	:	:
	:	:Line 1-5	:	:	:	:	:
	:	: Vendor calculations	:	:	:	:	:
	:	:	:	:	:	:	:
	:	:Item 9	:WI-85-100-047	:EN	:20405	:	:
	:	:Line 6-8	:	:	:	:	:
	:	: Mechanical calculations	:	:	:	:	:
	:	:	:	:	:	:	:
	:	:Item 9	:WI-85-100-043	:EN	:20106	:	:
	:	:Line 9-13	:	:EN	:20501	:	:
	:	: Mechanical calculations	:	:EN	:20502	:	:
	:	:	:	:EN	:20503	:	:
	:	:	:	:	:	:	:
	:	:Item 9	:WI-85-100-001	:EN	:20101	:	:
	:	:Line 14-19	:XX-85-122-003	:EN	:20101	:	:
	:	: Downgrading mechanical	:WI-85-100-019	:EN	:20103	:	:
	:	: standards and guides	:	:EN	:20104	:	:
	:	:	:	:EN	:21303	:	:
	:	:	:	:	:	:	:
	:	:Item 9	:WI-85-100-043	:EN	:20106	:	:
	:	:Line 19-25	:	:EN	:20501	:	:
	:	: Mechanical design	:	:EN	:20502	:	:
	:	: criteria	:	:EN	:20503	:	:
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SUBJECT	SOURCE : DOCUMENT :	DOCUMENT NUMBER	ECSP CONCERN NUMBER	CATEGORY	SUBCATEGORY	PERTINENT TVA CORRESPONDENCE	COMMENTS
Hicks	:J. Dingell:	Page 9	:BFN-85-008-002	:MC	:40513	:None	:
Letter	:and	:Item 26	:IN-86-282-N06	:MC	:40514	:	:
3/28/87	:M. Udall	:Line 1-3	:TAK-86-005	:OP	:30401	:	:
	:to	: Inventory control	:	:	:	:	:
	:L. Zech	:	:	:	:	:	:
	:04/09/87	:Page 9	:WI-85-100-040	:MC	:40401	:	:
	:	:Item 26	:	:MC	:40410	:	:
	:	:Line 4-10	:XX-85-122-045	:MC	:40401	:	:
	:	: Improper storage	:	:MC	:40410	:	:
	:	:	:XX-85-122-046	:MC	:40401	:	:
	:	:	:	:MC	:40410	:	:
	:	:	:XX-85-122-047	:MC	:40401	:	:
	:	:	:	:MC	:40410	:	:
	:	:	:WI-85-100-005	:EN	:21002	:	:
	:	:	:	:	:	:	:
	:	:Item 27	:WI-85-100-017	:EN	:20404	:	:
	:	: G-Specs	:IN-85-112-001	:OP	:30401	:	:
	:	:	:IN-86-221-002	:OP	:31306	:	:
	:	:	:IN-86-221-003	:OP	:31306	:	:
	:	:	:IN-85-341-001	:CO	:19200	:	:
	:	:	:	:	:	:	:
	:	:Item 28	:IN-85-848-001	:	:71708	:	:
	:	:Line 1-4	:IN-85-933-006	:	:70601	:	:
	:	: Personnel	:	:	:	:	:
	:	:	:	:	:	:	:
	:	:Item 28	:Several concerns:	:	:	:	:
	:	:Line 5-8	:transmitted to	:	:	:	:
	:	: NRC personnel	:NRC OIA to	:	:	:	:
	:	:	:investigate	:	:	:	:
	:	:	:	:	:	:	:
	:	:Summary	:N/A (1)	:N/A	:	:	:(1) (General
	:	:Line 1-4	:	:	:	:	statement of
	:	: Scope of work at SQN	:	:	:	:	opinion.)
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SUBJECT	SOURCE : DOCUMENT	DOCUMENT : NUMBER	ECSP CONCERN : NUMBER	CATEGORY	SUBCATEGORY	PERTINENT TVA : CORRESPONDENCE	COMMENTS
Hicks Letter 3/28/87	:J. Dingell :and :M. Udall :to :L. Zech :04/09/87	:Pages 9, 10 :Summary :Line 16-20 : Licensing bases	:N/A (1)	:N/A	:N/A	:None	:(1) Comments as to why NRC should void TVA's initial licensing bases and require TVA to relicense SQN as if it were a new plant. (No concerns are raised.)
		:Page 11 : Introduction	:N/A (2)	:N/A	:N/A		:(2) Introduction to letter attachments. No concerns raised.

ENCLOSURE 2

C. H. Fox, Jr.
LP 6N 38A-C

Subject: REVIEW OF THE APRIL 9, 1987, DINGELL/UDALL LETTER TO US NRC

Per your request of May 14, 1987, Mike Bender, Jim Huston, Henry Stone, and I reviewed the subject letter. In that review, we took the following steps:

1. We reviewed the 28 items in the attachment to the letter to identify what we interpreted to be the critical issues raised therein.
2. We considered these critical issues in light of the ONP Nuclear Performance Plan (NPP) including the Employee Concerns Task Group (ECTG), Special Programs, and other committed and completed actions. This consideration was primarily based upon the experience of the reviewers (both overall experience, and specific involvement with TVA's nuclear recovery efforts.)
3. We reformatted and commented on the summary answers to the 28 items which had been drafted by DNE and others to address the critical issues. These reformatted and condensed summary answers were finalized and concurred in by DNE and others (Attachment).

4. ECTG had reviewed the subject letter and its attachments and had drawn summary conclusions. We considered the ECTG assessments and conclusions regarding the 28 items.
5. We sampled a number of the ECTG reports related to one or more of the 28 items, to achieve an overview as to whether the reports addressed the associated summary answer.

Based upon our limited review, we provided you with the following overall judgment on May 19, 1987 for your use in the May 21, 1987 briefing to the NRC OSP staff.

1. The issues identified by Mr. Hicks did not appear to be new issues, nor are they necessarily unique to Mr. Hicks; i.e. many have been identified by others (including the TVA system).
2. There is some validity to many of the technical issues in the 28 items, and in our opinion, those valid points identified are being addressed programmatically through the commitments and actions underway in accordance with TVA's NPP.
3. We agree with the ECTG summary assessment regarding the bounding of valid technical issues by the ECTG investigations for Sequoyah. It is noted that the ECTG itself is one of the programmatic commitments of the NPP.

Finally, it should be noted that although our overall judgments were based upon the review, as stated above, the final resolution of the issues must be judged based upon the execution of corrective and preventative actions by the responsible TVA ONP organizational elements.


Ben Charlson

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1. TVA provided detailed information in many forms, as required, to NRC in support of the licensing process over many years. This was supplemented by special low power testing and additional hydrogen control features. Sequoyah received the first operating license after Three Mile Island (TMI) signifying that the plant meet all applicable requirements at that time.
2. Answer to question 1 addressed the initial design and licensing review. The Design Base Line and Verification Program (DB&VP) together with the many special programs described in Volume 2 of the Nuclear Performance Plan (NPP) will ensure that the present plant configuration meets FSAR commitments.
3. Due to the large number of issues addressed in great detail, it was decided to assign priority to systems and components required to mitigate accidents and for safe shutdown. Specific and detailed restart requirements were developed (Table 7, page IV - 4 Volume 2, NPP) to identify work which must be completed prior to restart. Remaining work is scheduled after restart and the scheduling and management programs in place will track those items.
4. Extensive efforts have been underway to identify and understand all issues at Watts Bar, including several thousand raised by the Employee Concern Program (ECP). Each of those issues has been or is being investigated also for potential application to Sequoyah and appropriate corrective actions are included in the restart program.

5. Consistent with the commitments of the NPP, Volumes 1, 2, & 3, TVA has made substantial efforts to upgrade and improve its implementation of its approved 10 CFR 50, Appendix B program. These changes include consolidation and standardization of the QA organization, revision of its QA Topical Report, improved corrective action program, strengthened QA oversight, establishment of Engineering Assurance, and increased emphasis on accountability of the line organization for the quality of their work.

6. The upgrading of audit findings from non-significant to significant conditions adverse to quality is a routine process. When analysis of possible extent of condition, based upon limited findings, determine that there is a possibility of generic implication, such upgrading may be done. This is not necessarily indicative of an unacceptable QA attitude, but it should be pointed out that if such an attitude is found it is the proper role of QA audit to point this out to management.

7. An extensive program is underway in all Engineering Branches to (a) verify existence of essential calculations (b) test for retrievability (c) determine technical adequacy (d) evaluate integration and (e) identify corrective action. "Essential" is defined as "Those calculations which address systems or features whose failure could result in (a) loss of reactor coolant system integrity (b) loss of ability for shutdown or (c) release of radioactivity to offsite a significant fraction of 10 CFR 100 guidelines." A large number of calculations have been and are being regenerated using up-to-date plant conditions and industry practices.

While some errors have been found, hardware was not affected in most cases, because of large design margins due to conservatism in original designs. Where changes are required these will be implemented in accordance with Volume 2, NPP criteria.

8. All electrical calculations required to support the design bases of the Sequoyah Nuclear Plant Class 1E electrical power systems will be complete prior to unit 2 restart. These calculations have been regenerated or revised as applicable. In no instances were design guides or standards accepted in lieu of calculations. The results of these restart calculations have been integrated into design and construction documents and criteria as applicable.

Post restart calculations are those for balance of plant systems, i.e., those systems not required for accident prevention/mitigation. This two phase calculations approach is documented in TVA Policy Memorandum PM 86-02 (EEB). This program has been extensively reviewed by the NRC, and is described in the NPP, Volume 2, Chapter III-4.

9. The program described in answer to question 7 also applies to the mechanical calculations. Vendor calculations are reviewed by TVA on a selected basis for input to engineering calculations. Vendors are frequently required to verify their designs by test. Vendors are responsible through their own QA programs to verify their design calculations. The only potential hardware changes that may be required as a result of the calculations program (see answer to #7) may be in portions of the heating, ventilating and air condition (HVAC) system for design basis accidents.

10. These issues are covered by answers to questions 7, 8, and 9.
11. This issue is addressed in answer to question 7 and 8. In addition, it should be noted that an extensive restart test program is underway to ensure that safety-related functions for mitigation of accidents and safe shutdown have been or will be proven by testing prior to or during restart. Diesel generators, vital AC and DC power services are included in this program. (Chapter 11.0, Volume 2, NPP)
12. These issues were covered in part in answers to questions 1, 7, 8, 9, and 10. The DB&VP was developed to address identified problems with the design change process after operating license (OL) issuance. However, to accomplish its purpose, it covers a much broader program including (a) verification and establishment of plant functional configuration (b) reconstruction of design basis (c) review and evaluation of modifications since OL against design basis and (d) identification of required tests or modifications. Thus the DB&VP covered a number of activities that occurred prior to OL including review of (a) certain calculations (b) as-built configuration and (c) pre-operational test results.
13. Sequoyah's design requirements have been documented in the FSAR, design standards and guides, and individual system design criteria. They were utilized and implemented where appropriate in the design and are consistent with the industry standards applicable for a plant of Sequoyah's vintage. During the restart effort, two areas have been

identified regarding use of industry standards. In the electrical discipline, the application of industry standards for cable design and installation was questionable; however, an evaluation of the Sequoyah design utilizing the most current standards, has been performed and corrective actions taken as required. In the civil discipline, original design criteria concerning cable tray supports and small bore piping have been updated to present day requirements for the purpose of restart evaluation. In both cases, TVA has submitted these items to NRC for review.

14. The Nuclear Safety Review Boards (NSRBs) replace in part the functions previously performed by the Nuclear Safety Review Staff (NSRS). These Boards are advisory to the manager of Nuclear Power on all matters dealing with nuclear safety. The NSRBs, as the NSRS, have considerable latitude in areas they choose to consider. Each NSRB has a standing group (5) of non-TVA senior advisors, which gives it a broad perspective. The NSRBs also fulfill the requirement of TVA's technical specifications as the offsite safety review function.

The NSRB Chairman, recently employed by TVA, has excellent credentials, including 28 years in the nuclear field; has been responsible for several aspects of the U.S. Reactor Safety Research Program; holds a PH.D. in nuclear physics; and is a fellow of the American Nuclear Society. He sets very high standards and the board is made up of senior, professional personnel.

The NSRB advice to the Manager is consensus advice of the entire Board including the non-TVA advisors to the Board. All dissenting advice is presented to the Manager of Nuclear Power. Thus, this advice can be considered to be free from any particular narrowness of view. Copies of all NSRB reports, including any dissenting opinions, are sent to the TVA General Manager and the TVA Board of Directors.

15. TVA has performed extensive voltage calculations for all Class 1E auxiliary and control power distribution systems. These calculations identified several deficiencies which were documented and resolved in accordance with applicable Nuclear Engineering Procedures. Both the calculations and the corrective actions have been reviewed by the NRC.

16. TVA has actively pursued the assessment and resolution of all concerns associated with electrical cables. The program for electrical cable ampacity involved the individual review of over 2500 cables. Sampling techniques resulted in a 100 percent review of 4 of the 6 sample lots for power cables at the 480V and 6.9kV levels. This approach was reviewed with the NRC prior to implementation and the entire program and results have been submitted to the NRC for their review and concurrence.

Cable installation has been reviewed extensively. As part of the ECTG, Bechtel electrical engineers reviewed numerous potential concerns for validity. In addition, the NRC and their consultants investigated the cable installation practices and procedures on Sequoyah. An extensive inspection and test program is underway to provide further assurance that as installed cabling is acceptable.

17. Sampling has never been the basis for initially accepting or rejecting any design work in and of itself. TVA has used sampling primarily in two areas: construction QC of repetitive well defined tasks, and in the evaluation of potential or known problems. The results of these samples have been used to determine the scope of application of planned corrective actions and to affirm adequate confidence (where appropriate) in the approved/inspected product. Recent engineering evaluations of cable issues at SQN utilized sampling techniques based on published standards/reports (Military Standard 105D; NUREG/CR-0063). Any evaluation of completed/approved work which elects to use a sampling approach must defend the selection criteria and acceptance criteria as well as the outcome of the evaluation, and this is being done. TVA, however, does not always base its samples solely on statistical methods, since TVA is sometimes interested in worst case or typical conditions.
18. Control of interfaces between plant systems has been implemented by formal processes.
19. TVA has established and substantially completed a program to evaluate and document the environmental qualification of all equipment in the scope of 10 CFR 50.49. The 10 CFR 50.49 program was not performed on a sample basis. The program includes approximately 2,800 items or devices and approximately 6,300 cables and each was assessed. The demonstration of qualification for 10 CFR 50.49 in the TVA program complies with the standards and regulations established including any testing required.

20. The issue of separations has been evaluated through the ECTG and a process for evaluating every commitment relating to separations to ensure that each has been properly addressed has been established. This is a restart commitment for Sequoyah.

21. TVA has performed a fire hazards analysis in accordance with NRC requirements, and the results are documented. Fire protection features are provided commensurate with the fire load analysis. Design Criteria have been issued to provide guidance to ensure that all proposed modifications, meet the requirement to maintain Sequoyah in compliance with 10 CFR 50, Appendix R.

22. The meaning of NRC "Regulations" has always required interpretation. TVA has conscientiously in the past and in current work complied with regulatory intent, based on precedent when it existed, discussions with NRC representatives, and on the basis of engineering judgment when appropriate. The time period when Sequoyah was engineered was a transitional era - changes in interpretation of Standards, Codes, and NRC guides frequently occurred many times after TVA Sequoyah engineering work was implemented. Many backfits resulted. Nevertheless, TVA is committed in its NPP to make appropriate changes to conform to regulatory interpretations.

23. Test criteria are prepared as part of test planning. In the past, it was customary, in some cases, to plan the tests of much equipment by informal discussion. In recent years planning of tests has been formalized.

The development of the Restart Test Program for Sequoyah is indicative of this test planning/documentation process. All testing required by NRC regulations is documented.

24. Seismic hold-down forces are defined either by the vendor of the equipment as contractually required for the equipment's seismic qualification or TVA develops these forces based on our own civil engineering calculations.

The adequacy of this process has been verified by NRC's Seismic Qualification Review Team (SQRT) audit, a 1982 NRC seismic margin review, and by the response to NRC-OIE Information Notice 80-21. Ongoing technical reviews of civil anchorage calculations have identified isolated cases in which vendor loads were not properly interfaced with TVA designs. Also, electrical device mounting concerns have been identified. These conditions are addressed as part of the corrective action process.

25. There were some deficiencies in "as constructed" records. Those records needed by operating personnel are being updated to reflect "as built" conditions and are stored in the files needed by operations, maintenance and engineering personnel. Vendor files of this type are also being examined to assure that current needs are served.
26. Although some inventory control problems have arisen in the past, these have been recognized and new policies and practices are being put in place to correct deficiencies.

27. TVA G Specs have some known deficiencies, mostly in field interpretation of requirements and insufficient design backup. TVA is taking action to eliminate problems with "G Specs" by reviewing each against applicable site procedures to assure that their use meets licensing and design basis commitments. Design requirements are then communicated for field use through appropriate design details, instructions, and procedures.
28. Many of the problems now being corrected were due to systems and practices in place for many years. TVA has made extensive organizational and personnel changes clearly defining responsibilities and accountability. The upgrading of management is an ongoing process and is being supplemented by extensive training.

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ENCLOSURE 3

MYER BENDER
RESUME SUMMARY
JUNE 1987

Mr. Bender is an engineering and safety technology consultant to industry and government. Previously, he served as Director of Engineering for the Oak Ridge National Laboratory (ORNL) from 1966 to 1980. Prior to 1966, he was responsible for design and project engineering activities for the ORNL Reactor Division and was directly involved in the design and construction of water-cooled, gas-cooled, liquid metal-cooled and molten salt reactor systems. Earlier, he was associated with the design and construction of gaseous diffusion equipment for separation of Uranium 235 and was responsible for Union Carbide's process installation and construction work at the Portsmouth, Ohio, gaseous diffusion plant during the early 1950s.

He has been active in nuclear safety assessment work for more than two decades and has authored a number of technical papers in this area with particular emphasis on failure analysis and its correlation with process conditions and engineering design practices. He was an early pioneer in the application of prestressed concrete for reactor vessels and water-cooled reactor containments. He has also maintained an active interest in fire protection practices for hazardous processes, including nuclear fuel reprocessing, toxic chemical handling, liquid metals and nuclear power generation. He was an early participant in the preparation of NEPA-required Environmental Impact Statements and helped in developing the assessment methodology now in use for energy production systems, including nuclear power plants.

In his capacity as Director of ORNL Engineering, he organized engineering work associated with magnetic confinement equipment for fusion energy, remote handling of equipment in radioactive environments, radioactive materials transport and radioactive waste handling. He was responsible for technical review activities concerning the SRC I and SRC II coal conversion processes for the U.S. Department of Energy and for technical coordination work pertaining to Atmospheric Fluidized Bed combustion of coal.

Also, in his capacity as Director of ORNL Engineering and as head of the ORNL Reactor Design Department, he was responsible for design of experiments for testing coated particle fuels for gas-cooled reactors developed at General Atomic, metallic and cermet fuels for the water-cooled High Flux Intensity Reactor (HFIR) at ORNL, and metal clad oxide fuels for both liquid metal and gas-cooled reactor systems. In addition, he personally led the conceptual design program on fast and thermal gas-cooled nuclear reactor systems and participated in reviews of metallic fueled LMFBRs during their early conceptual stages.

While a Member of the Advisory Committee on Reactor Safeguards, he Chaired the ACRS subcommittee responsible for initial review of the Clinch River Breeder and was a member of the Subcommittee for the entire period of ACRS review. He also Chaired and was a member of ACRS Subcommittees reviewing the Del-Mar-VA and Peach Bottom gas-cooled reactors when they were being considered for Construction permits.

During the past two years as a Consultant to the ACRS Severe (Class 9) Accident Subcommittee, he actively participated in the review of the Severe Accident Research Program (SARP) and the related NUREG 0696 report on Source Term Technology. His comments on behavior of radionuclides during severe accidents and on containment have been instrumental in bringing the relevant safety issues into focus for regulatory purposes.

PROFESSIONAL QUALIFICATIONS

Member of the American Society of Mechanical Engineers (Fellow Grade), Tau Beta Pi (Distinguished Engineer), American Concrete Institute, National Society for Professional Engineers (PE), Sigma Xi, Society for Engineering Management.

Author of more than 20 papers on engineering practices, quality assurance, nuclear reactor safety, and plant design.

Member of the Advisory Committee on Reactor Safeguards from 1972 to 1982; Vice Chairman in 1976 and Chairman in 1977.

Education: BChE, 1943 University of Virginia.

BEN CHARLSON
RESUME SUMMARY
JUNE 1987

Mr. Charlson is a Vice President of Stone and Webster and a Manager of Projects, and is assigned in an advisory role to the Office of Nuclear Power, Tennessee Valley Authority.

He has 30 years of extensive experience in the design and implementation of management systems, including manpower utilization, cost, budgeting, and network-based scheduling. He has demonstrated these abilities in managing complex, multimillion-dollar engineering projects. His experience also includes all facets of engineering design, engineering management, nuclear plant operation, and nuclear site management. He has broad experience in many phases of power plant work including plant arrangements, equipment design and procurement, control systems engineering, plant construction, initial startup, plant operations, plant operational support, maintenance and operational training, initial nuclear plant fueling, decontamination, and refueling.

As Nine Mile Point Nuclear Station - Unit 2 Project Manager, Mr. Charlson was responsible for the successful completion of the engineering, design, and construction management effort on this BWR facility. Other responsibilities included cost and schedule control, quality assurance, licensing, and procurement.

Mr. Charlson has held a number of senior management positions. As President and Chief Operating Officer of Dynawest Projects Ltd., a subsidiary of Stone & Webster located in Calgary, Alberta, Canada, he established a completely new organization, developed a full engineering-procurement-construction organization, and was responsible for all management aspects of the organization.

Previously, as Manager of Naval Reactors Facility - Bettis for Westinghouse Electric Corporation, he was responsible for operation and training, three prototype plants, and the expended core facility at Naval Reactors Facility, Idaho, including direction of the operation, testing, planning, maintenance, manpower, and funding. He also was responsible for the engineering and reactor safety support as well as refueling support from the Bettis Atomic Power Laboratory.

University of Pittsburgh - B.S. in Electrical Engineering

JAMES E. HUSTON
RESUME SUMMARY
JUNE 1987

EDUCATION

Northeastern University - Management Development Program - 1980
University of New Mexico - Bachelor of University Studies - 1972
U. S. Naval Nuclear Power School - 1965
George Washington University - Undergraduate Studies in Physics and Liberal Arts - 1961-1963

EXPERIENCE SUMMARY

Mr. Huston rejoined Stone & Webster in January 1984 as Manager, Quality Assurance Department. As Manager, Quality Assurance Department, he is responsible for the Field Quality Control (FQC) Division, consisting of approximately 100 supervisory personnel and in excess of 600 inspectors at 3 near-term operating license nuclear plants and several operating plants. He is also responsible for the Procurement Quality Assurance (PQA) Division consisting of 20 supervisory personnel and 60 inspectors with district offices and operations in 6 locations throughout the United States.

He has been responsible for numerous special assignments, including the confidential investigation of employee concerns and special assessments of utility QA programs. He was Stone & Webster's senior QA representative participating in the development of a Quality Performance Management Program for the Nine Mile Point 2 Project and was responsible for instituting a similar program on a second major nuclear construction project.

He left Stone & Webster from February 1982 to January 1984 and was Corporate Vice President for Energy Incorporated. At Energy Incorporated, he directed management for the Engineering Consulting, Fluidized Bed Systems, Security and Safeguards, and Computer Systems Operations. The Computer Systems Operations provided seismically and environmentally qualified systems and components for use in commercial nuclear plant facilities. He was responsible for the promulgation of policies and procedures which implemented Energy Incorporated's Corporate Quality Assurance Program.

Mr. Huston initially joined Stone & Webster in October 1980 as a Project Manager and directed the reorganization of the Nine Mile Point 2 Nuclear Power Plant project. He was responsible for Design, Engineering, Advisory Operations, Licensing, Construction and Procurement. He was responsible for managing, directing, and controlling, the accomplishment of all associated work in accordance with the approved Project Quality, Technical, Cost, and Schedule Objectives. He executed these responsibilities in accordance with the requirements of the Stone & Webster Quality Assurance Program. This execution required constant interaction with Project and Corporate Quality Assurance Management in all phases of his work. The interaction included development, issuance, and implementation of project unique procedural requirements, response to audit and inspection findings, root cause analysis and the formulation and direction of immediate and permanent corrective action.

Prior to joining Stone & Webster, Mr. Huston held a number of key positions in several firms which included Environmental Research and Technology, Concord Massachusetts; Kellex Power Services, a Division of Pullman-Kellogg, San Diego, California; General Atomic Company, San Diego, California and Washington, D. C.; and Sandia Laboratories, Albuquerque, New Mexico. These positions afforded Mr. Huston the opportunity to obtain broad experience in all aspects of management and quality assurance roles.

Mr. Huston also served in the U.S. Navy Nuclear Program as a staff instructor at a Naval Reactors Prototype facility and aboard a Polaris Submarine.

HENRY E. STONE
RESUME SUMMARY
JUNE 1987

Mr. Stone served three years during World War II with the Army Engineers. He graduated with a BS degree in Mechanical Engineering (summa cum laude) from the University of Buffalo. He also obtained an MS degree in Engineering from Union College.

He joined GE in 1948 on the Engineering Test Program and held several training assignments in Aircraft Gas Turbines and High Speed Bearing Testing. He joined the Knolls Atomic Power Laboratory in fluid flow and reactor shielding. He held several supervisory positions in reactor safeguards and shielding of nuclear submarines. In 1958 he was appointed to a managerial position related to Power Plant Engineering and held this and similar positions until 1960. From 1960 to 1962 he was Manager of Plant Analysis and Mechanical Systems on an advanced submarine plant. In 1962 he became Project Manager in charge of design, construction, and testing of a land-based prototype and nuclear submarine of an advanced design. In 1968 he became General Manager of the Knolls Atomic Power Laboratory, responsible for the design, construction, and testing of several naval submarine and surface ship projects, including operation of full scale prototype nuclear plants and training of Naval personnel. After six years he was appointed Manager, Nuclear Energy Operational Planning at the Nuclear Energy Division. In May 1975 he was appointed General Manager, Boiling Water Reactor Systems Department, responsible for design and development engineering activities. He held this position until October 1977 when he was appointed General Manager, Nuclear Energy Engineering Division, with responsibility for boiling water reactor engineering, engineered equipment procurement and operation of the Vallacitos Nuclear Center. He was elected President effective April 1, 1978.

In October 1984 he became Vice President and Chief Engineer, Office of Chief Engineer.

Mr. Stone is a Fellow of ASME and a member of ANS. He is also a member of Tau Beta Pi Honorary Society. He is a licensed professional engineer in New York State and California, and in March 1981 was elected a Member of the National Academy of Engineering.