TENNESSEE VALLEY AUTHORITY

5N 157B Lookout Place

May 7, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

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

Enclosed is our response to the February 13, 1986 letter from B. J. Youngblood to S. A. White and the February 28, 1986 letter from you to S. A. White concerning the Employee Concern Program (ECP). We have already submitted a revised ECP activities volume from S. A. White to V. Stello dated May 2, 1986. The revised ECP volume and our response to the above two letters should inform you of the present direction of our program.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. L. Gridley, Director
Nuclear Safety and Licensing

Enclosure
cc (Enclosure):
U.S. Nuclear Regulatory Commission
Region II
Attention: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. James M. Taylor, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Director of Nuclear Reactor Regulation
Attn: Mr. B. J. Youngblood, Project Director
PWR Project Directorate No. 4
Division of PWR Licensing-A
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

D025
1/1

RESPONSE TO FEBRUARY 13, 1986 NRC LETTER
FROM B. J. YOUNGBLOOD TO S. A. WHITE

Response To February 13, 1986 NRC Letter From
B. J. Youngblood to S. A. White

Question 1

The screening process for categorizing nuclear safety-related concerns used by NSRS was not broad enough to encompass security, fire protection, emergency planning, and radiological control issues. The NSRS procedures were for the Watts Bar program and had not been broadened to reflect operating site concerns. During our exit interview on January 24, 1986, TVA agreed to correct these deficiencies and conduct a re-review of K-forms previously classified as nonsafety-related.

Response

TVA reviewed the K-forms not previously classified as safety-related using a broadened definition which included security, fire protection, emergency planning, and radiological control issues. This broadened definition resulted in the identification of 33 additional safety-related concerns. These 33 safety-related concerns are being evaluated by the Watts Bar Employee Concerns Task Group (ECTG).

The current Watts Bar program, which has the responsibility to resolve employee concerns at Sequoyah Nuclear Plant, includes provisions for the evaluation of issues relative to operating sites. An Operations Concern Evaluation Group has been established within the Watts Bar ECTG with specific responsibility for the evaluation and resolution of these concerns.

Question 2

The generic review effort at Watts Bar appears to have inconsistent documentation of review findings. During the exit interview on January 24, 1986, TVA agreed to clarify the generic review guidance and to re-review the Watts Bar safety-related K-forms.

TVA should evaluate if it would be beneficial to forward all K-forms to all TVA nuclear plants for evaluation of generic applicability at each plant. This would reduce the probability of failure to recognize a generic issue or delay the initiation of corrective action.

Response

The generic review guidance has been clarified, and the Watts Bar safety-related K-forms which were not previously determined to be potentially generic to all plants have been re-reviewed. This second review was completed to criteria that were broader in nature, and resulted in the identification of additional concerns as being generic to other plants.

TVA does not believe that there is a significant benefit to be gained by sending all K-forms to all the plants for review because the review was performed to an explicit procedure with decision rationale recorded, was performed by qualified and experienced personnel, and included verification of the evaluation by a second review. This provides confidence that there were no significant matters generic to a plant which were not identified during the review.

Question 3

NSRS and Sequoyah site personnel need to be more consistent and integrate their approach to reviewing, classifying, investigating, and resolving employee concerns. For example, there should be agreement on key definitions such as safety-related and safety-significant.

When applied in a conservative manner, the criteria that employee concerns which impact a technical specification operability or involve an unreviewed safety question will be completed prior to plant startup is acceptable. TVA should ensure that the application of the above program will preclude incomplete items from impacting plant safety.

Response

The Watts Bar Employee Concerns Special Program (ECSP) now includes the responsibility to process employee concerns identified prior to February 1, 1986, for all sites and from all sources. This should ensure a consistent integrated approach for evaluation and resolution of these concerns. In addition this should preclude incomplete items from impacting plant safety.

Key definitions are included in the Watts Bar ECSP Procedures.

Question 4

The site procedures were weak in the areas of control and tracking of site-generated employee concerns and determining safety significance. Additionally, these procedures did not require that these concerns be reviewed for generic applicability. During our exit interview on January 24, 1986, TVA agreed to revise the procedures for the site-generated employee concerns program.

Response

The Sequoyah procedures were revised to correct the problems identified by this observation. As noted in the response to question number 3 above, the Watts Bar program for resolution of employee concerns now encompasses all TVA locations. The Watts Bar procedures will be used at these locations and will ensure the control and tracking of employee concerns to resolution, determination of safety-significance and evaluation for potential generic applicability.

Question 5

The output from the three employee concerns sources should be consolidated by technical discipline and dispositioned. During our exit interview on January 24, 1986, TVA agreed to evaluate this observation in terms of a programmatic enhancement.

Response

TVA has evaluated this observation and has concluded that in some cases the consolidation and resolution of concerns are effective and should be used. In other cases, the individual resolution of concerns has been an effective approach. This has been the case at Sequoyah and is proving to be effective for the Watts Bar ECSP.

Question 6

Trending should be kept updated. TVA management did not appear to be using the trending information to make decisions relative to the direction of the employee concern program. During our exit interview on January 24, 1986, TVA agreed to implement an effective trending program.

Response

The new TVA Employee Concern Program (ECP) will establish a structured data base that will provide a basis for developing meaningful data to be used for trend analysis of employee concerns. The results of such analyses will be used as necessary to redirect the new ECP.

DEM:KEH
5/6/86
0725h

RESPONSE TO FEBRUARY 28, 1986 NRC LETTER
FROM H. R. DENTON TO S. A. WHITE

Enclosure 1 to the February 28, 1986 NRC Letter From
H. R. Denton to S. A. White

Question 1

How has the ECP changed? Are the criteria and procedures previously reviewed by the staff to remain the same? If not, identify the changes to the staff.

Response

The "new" Employee Concern Program (ECP) was put into effect on February 1, 1986. It was described in our submittal of November 20, 1985 and is updated in our submittal of May 2, 1986.

The procedures previously reviewed by the staff were provided to NRC on August 1, 1985, and pertained to the "old" ECP. This program was superseded on February 1, 1986 by the "new" program as described in our submittal of November 20, 1985 and as updated by our submittal of May 2, 1986.

The "new" Employee Concern Program includes several new features. These include: (1) a full-time program manager reporting to the Manager of Nuclear Power, (2) full-time site representatives at each nuclear plant site and corporate location, (3) standardized procedures for receipt and handling of employee concerns by site representatives, and (4) use of a computerized data base to assist in management of historical concern information. The "new" program also encourages resolution of concerns within the line organization through site representative interaction with concerned employees and through information programs outlined in our submittal of May 2, 1986.

Question 2

Are new procedures in place, personnel trained, and the program fully functional? If not, describe how the employee concern activities are being controlled.

Response

As described in TVA's submittal of May 2, 1986, the new procedures are in place, personnel are trained, and the program is fully functional.

Question 3

How have the concerns identified in the NRC letter of February 13, 1986 been factored into the criteria and procedures identified in Item 1 above?

Response

The procedures for the new TVA Employee Concern Program are currently under review and in the process of revision. These revisions will address:

- The concerns identified in the NRC letter of February 13, 1986.
- NRC's comments on the Program received during the April 17, 1986 meeting in Bethesda.

These revised procedures are expected to be issued by June 1, 1986.

Question 4

What criteria will the "review groups" use to categorize and analyze the concerns?

Response

To facilitate evaluation, the documented Watts Bar employee concerns being resolved by the Watts Bar Employee Concern Task Group (ECTG) have been classified into nine categories. These categories were assigned based upon similarity of content and/or affected activities and resulted in nine topical groups of concerns as described below. Similarly, in evaluating and resolving concerns, the issues involved have been grouped into subcategories and elements based upon commonality of prospective solutions and upon similarity of content.

Some concerns were placed in more than one category to ensure that the potential for both programmatic and hardware conditions adverse to quality could be addressed (e.g., weld-related problems may appear under both QA/QC and Welding headings). Intimidation and harassment concerns were placed in a standalone category as separate and distinct concerns. Whenever an intimidation and harassment concern involved a technical issue, a separate "K-form" was produced for the technical issue, thus ensuring that the technical issue is also addressed.

These categories are as follows:

QA/QC - Concerns related to the adequacy of QA/QC programs and procedures (e.g., document control, records, deficiency reporting and corrective action, inspection except NDE and weld inspection, auditing, etc.), and the training, qualification and certification of QA/QC personnel.

Material Control - Concerns related to the adequacy of materials including their procurement, receiving, handling, storage, and the controlling procedures. Concerns related to the adequacy of a specific material used shall be evaluated in the category containing the affected structure, system, or component.

Management and Personnel - Concerns related to the adequacy of policies, management attitude and effectiveness, organization structures, personnel management, and personnel training and qualification, except those covered by the QA/QC category and where formal training and qualification programs do not exist.

Intimidation, Harassment, and Wrongdoing - Concerns related to personnel conduct which interferes with an employee's ability to fulfill their assigned responsibility, unauthorized actions taken against an employee for fulfilling their assigned responsibility, and illegal activities or violations of TVA policies and regulations.

Operations - Concerns related to operational events including operator qualifications, maintenance or equipment maintenance needs, security, health physics and ALARA implementation, and preoperational and surveillance testing.

Welding - Concerns related to any aspect of welding including welder or weld procedure qualification, weld inspection/nondestructive examination (NDE), heat treatment, weld quality, filler material quality, and weld documentation. Welding QA/QC programmatic concerns shall be addressed in the QA/QC category.

Construction - Concerns related to the adequacy of construction practices, the quality of as-constructed facilities (excluding welding and as-designed features), in storage and installed maintenance prior to turnover to operations, measuring test and handling equipment used during construction, and construction testing activities.

Industrial Safety - Concerns related to the working environment and controls which protect the health and safety of employees in the workplace (excluding health physics and ALARA).

Engineering - Concerns related to the adequacy of the design process and the as-designed plant features. The design process is the technical and management processes which commence with the identification of design inputs and lead to and include the issuance of all design output documents.

Question 5

Will the ECP Manager have direct access to the TVA Board of Directors, as discussed in the TVA November 20, 1985 letter?

Response

The ECP Manager reports directly to the Manager of Nuclear Power. He does not have direct access to the TVA Board of Directors; however, ECP routine reports will be forwarded to the Board for its information.

Question 6

What concerns identified by the ECP will be handled by the Inspector General (IG)? How will they be handled?

Response

It is generally intended that concerns involving intimidation and harassment or wrongdoing are the type to be referred to the TVA Inspector General.

The actual cases referred to the IG will depend upon the nature of the concern, the complexity of the issue, the requirements for trained investigators, the involvement of the Office of Nuclear Power (ONP) management in the case, and other factors.

The ECP Manager and the Manager of Nuclear Power will review the general nature of each intimidation, harassment, or wrongdoing concern (as summarized by the appropriate ECP site representative) against the above-mentioned issues. They will agree upon whether or not the concern is referred to the IG. Once referred to the IG, the concern will be handled in accordance with the IG procedures.

Question 7

What plans are there for handling differing professional opinions?

Response

Differing professional opinions are covered in the ECP. They are handled in the same manner as other employee concerns with the exception that the person expressing the differing professional opinion has the right to make his/her views known formally to his/her division director and the Manager of Nuclear Power.

Question 8

What organization will perform the functions of the NSRS in the Watts Bar Employee Concern Special Program (ECSP), if the NSRS responsibility in this area has been changed?

Response

The investigations performed by the NSRS in the Watts Bar ECSP are now performed by the Watts Bar Employee Concerns Task Group (ECTG).

Question 9

Fully describe the new role of QTC. How many technical concerns are to be investigated by QTC as a part of the Watts Bar ECSP?

Response

QTC is no longer involved in the TVA ECP.

Question 10

Is the Watts Bar ECSP the same as what was called the Employee Response Team (ERT) program?

Response

The ERT was the name of the QTC team established to identify employee concerns under the Watts Bar ECSP.

Question 11

How will commitments to NRC et al., relating to Watts Bar ECSP be tracked?

Response

Commitments relating to the Watts Bar ECSP made to NRC will be tracked by TVA's Safety and Licensing Corporate Commitment Tracking System. A review of past commitments to NRC is in progress and is expected to be completed by May 19, 1986.

Question 12

Who are the members of the Senior Review Board and what are their qualifications?

Response

Myer Bender, Daniel L. Garland, Joseph C. LaVallee, Jr., and James M. Dunford are serving on the Senior Review Panel. See the attached resumes.

Question 13

Describe what you mean by the statement: "This program is subject to Quality Assurance overview." (See page 3 of Enclosure 2 of your February 11, 1986 letter.)

Response

Nuclear Quality Assurance will overview the conduct of the program by performing audits to determine whether the program is being conducted in accordance with established procedures.

Verification will be provided that the program as it is being implemented provides among other things:

1. Procedures to govern activities,

2. Trained and qualified personnel,

3. Security to ensure confidentiality,

4. Documentation of evaluations and conclusions,

5. Corrective actions are properly documented and dispositioned in accordance with the program requirements.

Question 14

Describe the relationship between efforts to close out NSRS issues and similar employee concerns issues.

Response

Incomplete NSRS evaluations which resulted from the Watts Bar ECSP will be factored into evaluations performed by the Watts Bar ECTG. Procedures will describe this function. For NSRS issues which did not result from employee concerns, a decision has not yet been reached on the method or responsibility for completion and closure.

Question 15

Will each concern still be individually closed out, even if by reference in the resolution to a "category" of concerns?

Response

Yes. ECTG Reports will reference the concerns which are being responded to and closed by the report.

Question 16

How will the response to the concerned employees be forwarded individually to the employees?

Response

TVA plans to make available to all TVA nuclear employees and former nuclear employees (those who terminated after March 31, 1985 and prior to release of the reports to the employees) copies of the Watts Bar ECTG reports. The information in these reports will enable a concerned employee to determine the action taken by TVA on matters relating to his concern.

DEM:KEH
5/6/86
0725h

Enclosure 2 to February 28, 1986 NRC Letter
from H. R. Denton to S. A. White

Issues Related To Intimidation and Harassment

Question 1

What is the status of TVA investigations of intimidation and harassment?

Response

The Watts Bar Employee Concern Special Program (ECSP) has identified 109 employee concerns classified as intimidation and harassment. At the direction of TVA's Office of General Council (OGC), QTC completed its investigation and reported to the OGC on 70 of these allegations. OGC has reviewed and issued its final report on 28 of those concerns. The OGC is completing its review of the other 42 completed investigations.

Of those 28, three concerns, all involving the same incident of intimidation and harassment against an individual, have been substantiated and disciplinary action has been taken. The Office of the Inspector General has assumed responsibility for investigating the remaining 39 allegations.

The "new" Employee Concern Program (ECP) has received a total 24 intimidation and harassment concerns as of April 25, 1986. Six investigations have been completed and 13 are under investigation and are awaiting investigation. Of the six completed investigations, three concerns have been substantiated or partially substantiated. Disciplinary action has been taken in one case. The other two cases are pending.

Question 2

Describe corrective actions taken or planned (such as changes in management, procedures, training, or hardware) that ensue from your perception of issues related to misconduct.

Response

The evaluation of this subject has not been completed.

Question 3

What steps have you taken to ensure the TVA middle and first-line management clearly understand your position that intimidation and harassment will not be tolerated?

Response

In those cases where intimidation and harassment have been confirmed, the Manager of Nuclear Power has personally ensured that appropriate disciplinary action has been taken. The message that intimidation and harassment will not be tolerated has been given on several occasions to all levels of management.

Question 4

How successful do you believe your efforts have been to date?

Response

It is too early to evaluate the results of these efforts.

Question 5

Please describe the circumstances surrounding the actions taken by TVA with respect to reassignment of those NSRS individuals who were involved in briefing Commissioner Asselstine on the status of Watts Bar construction on December 19, 1985.

Response

TVA has reached a settlement with one of the employees who, based on his involvement with the briefing for Commissioner Asselstine, filed a complaint with the Department of Labor.

The Manager of Nuclear Power had extensive discussions with the Department of Labor investigators. They informed him that there did not appear to be any individual guilty of intimidation and harassment. If there was a problem, it was the result of the "system," i.e., the organization and management. The Manager of Nuclear Power confirmed this in his own review of the facts. Changes were already underway to improve the system--change management, move the organization closer to the Manager of Nuclear Power, and restructure the organization. The Manager of Nuclear Power considered it possible that these "system" problems could have been viewed by the individual as causing difficulties in his performance of his work assignments and as contrary to his job status. Hence, a settlement was reached between TVA and the employee.

The Manager of Nuclear Power continues his efforts to settle these matters with the other individual involved while the Office of the General Council (OGC) continues the appeal process with the Department of Labor. The Office of the Inspector General is holding in abeyance its investigation of these matters pending the efforts of the Nuclear Power Manager and the appeal process.

DEM:KEH
5/6/86
0725h

MYER BENDER

MR. BENDER IS AN ENGINEERING AND SAFETY TECHNOLOGY CONSULTANT TO INDUSTRY AND GOVERNMENT. 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 1950'S.

FROM 1972 TO 1982, HE SERVED AS A MEMBER AND CHAIRMAN (1977) OF THE U.S. NUCLEAR REGULATORY COMMISSION'S ADVISORY COMMITTEE ON REACTOR SAFEGUARDS, A FIFTEEN MEMBER BODY OF TECHNICAL EXPERTS ESTABLISHED BY FEDERAL STATUTE TO REVIEW ALL SIGNIFICANT NUCLEAR POWER INSTALLATIONS IN THE UNITED STATES.

DANIEL L. GARLAND

EXPERIENCE

1981-PRESENT	QUALITY ASSURANCE CONSULTANT, SELF-EMPLOYED
1958-1981	WESTINGHOUSE ELECTRIC CORPORATION
1978-1981	MANAGER, NUCLEAR QUALITY ASSURANCE PROGRAM OFFICE WESTINGHOUSE HANFORD COMPANY, RICHLAND, WA
1971-1978	MANAGER, QUALITY ASSURANCE WESTINGHOUSE HANFORD COMPANY, RICHLAND, WA
1960-1971	MANAGER, QUALITY CONTROL PLANT APPARATUS DIVISION, PITTSBURGH, PA
1958-1960	SUCCESSIVELY: TECHNICAL ASSISTANT TO MANAGER, NUCLEAR CORE DEPARTMENT, QUALITY CONTROL SUPERVISOR, AND MANAGER, QUALITY CONTROL BETTIS ATOMIC POWER LABORATORY, PITTSBURGH, PA

THE RESPONSIBILITIES IN 1958-1978 INCLUDE ESTABLISHING AND IMPROVING QUALITY ASSURANCE STANDARDS FOR APPROVAL BY UNITED STATES GOVERNMENT PERSONNEL; PREPARATION OF QUALITY ASSURANCE/QUALITY CONTROL PLANS, PROCEDURES, AND MANUALS; INDOCTRINATION AND TRAINING OF PERSONNEL; AND PARTICIPATION IN MORE THAN 400 QUALITY ASSURANCE AUDITS, FREQUENTLY AS AUDIT TEAM LEADER.

JOSEPH C. LAVALLEE JR.

Twenty-three years of experience in project management, construction, design and operations related to the nuclear power industry. Experience includes siting, system design, project control, cost estimating, equipment specification and procurement, licensing, startup testing and operations.

EDUCATION

B.S. Electrical Engineering-University of Cincinnati

Graduate Courses: Advanced Mathematics
Radiological Physics and Engineering
Business Management

PROFESSIONAL EXPERIENCE

General consultant to the nuclear power industry. Areas of participation include PSAR and FSAR reviews, licensing support for construction permits and operating licenses, preparing testimony for ACRS and ASLB hearings, investigative work for construction, operating and design problems and consultation for pre-operational/startup testing.

Overall management responsibility for the design of four 1175 MW nuclear power plants. Responsible for the development of all design documents as well as the planning, coordination and performance monitoring of all the architect-engineering work on the project.

Responsible for the modification and backfit work at an operating nuclear power plant. Assisted the client in diagnosing operating problems, responding to information requests and directives from the NRC and providing general consultation services.

Responsible for the mechanical design of two 1085 MW nuclear power plants. Areas of responsibility included system design, equipment specification and procurement, licensing, startup testing and operations. Coordinated the liaison work between the NSSS vendor and the client, as well as with vendor representatives and the NRC.

Responsible for the maintenance, modification and troubleshooting of all aspects of a nuclear power facility. Areas of responsibility also included radiological control, safety, refueling operations, material procurement and diagnostic testing of plant equipment.

Technical and administrative supervisor for engineers and technicians engaged in testing and operating a nuclear power facility. Also responsible for troubleshooting electrical, instrumentation and reactor control systems associated with the facility. Prepared lectures and participated in the training of operating personnel.

Acted as electrical systems advisor for prime contractor during the initial construction phases of a nuclear power facility. Responsible for the development, analysis, and reporting the results of electrical, instrumentation and reactor control system tests performed from the initial construction phase through startup and full power testing. Appointed test director during initial powerrange testing; responsible for the direction and coordination of all plant testing activities.

Responsible for the design of instrumentation and control systems for nuclear power plant applications. Recommended and conducted such developmental and experimental programs as required to substantiate the designs. Conducted reactor protective and safeguard analyses related to nuclear plant control systems using analog and digital techniques.

PROFESSIONAL REGISTRATIONS

Registered Professional Engineer
- Illinois
- Ohio
- Wyoming

PROFESSIONAL ASSOCIATIONS

American Nuclear Society

JAMES M. DUNFORD

EXPERIENCE

NOV. 1980 TO PRESENT	CONSULTANT - ENGINEERING MANAGEMENT. MEMBER OF A TEAM HEADED BY ADMIRAL H. G. RICKOVER USN (RET.) TO INVESTIGATE THE MANAGEMENT OF GPU NUCLEAR COMPANY.
DEC. 1973 TO OCT. 1980	CDI MARINE CO., JACKSONVILLE, FL. EXECUTIVE VICE-PRESIDENT. NAVAL ARCHITECTURE AND MARINE ENGINEERING DESIGN SERVICES.
JULY 1979 TO DEC. 1973	U.S. NAVAL AIR ENGINEERING CENTER, PHILADELPHIA, PA TECHNICAL DIRECTOR.
JULY 1965 TO JUNE 1967	UNIVERSITY OF PENNSYLVANIA, PHILDELPHIA, PA VISITING PROFESSOR OF MECHANICAL ENGINEERING
FEB. 1961 TO JUNE 1965	NEW YORK SHIPBUILDING, CO., CAMDEN, NJ VICE-PRESIDENT, NAVAL-NUCLEAR
1935 TO JAN 1961	U.S. NAVY INCLUDING:
NOV 1955 TO JAN 1961	NAVAL REACTORS (A) RESPONSIBLE FOR PLANNING AND DIRECTION OF TRAINING PROGRAMS FOR NUCLEAR SHIP PROPULSION CREW MEMBERS. (B) RESPONSIBLE FOR ALL PERSONNEL SELECTION AND TRAINING OF CIVILIAN ENGINEERS AND NAVAL OFFICERS TO WORK IN THE NAVAL REACTORS BRANCH.
AUG. 1954 TO OCT. 1955	NORFOLK NAVAL SHIPYARD, PORTSMOUTH, VA DESIGN SUPERINTENDENT.
SEPT. 1952 TO JULY 1954	U.S. ATOMIC ENERGY COMMISION, WASHINGTON, D.C. SPECIAL ASSISTANT TO AEC COMMISSIONER T. E. MURRAY.
JUNE 1951 TO AUG. 1952	U.S. ATOMIC ENERGY COMMISION, NATIONAL REACTOR TESTING STATION, IDAHO FALLS, ID. TECHNICAL REPRESENTATIVE OF THE CHIEF, NAVAL REACTORS, USAEC, WASHINGTON, D.C.
FEB. 1949 TO JULY 1951	U.S. ATOMIC ENERGY COMMISSION, WASHINGTON, D.C. SECTION HEAD, NAVAL REACTORS BRANCH.