U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

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LICENSEE:	Duquesne Light Company P.O. Box 4 Shippingport, Pennsylvania 15077
FACILITY NAME:	Beaver Valley Power Station, Units 1&2
INSPECTION AT:	Shippingport, Pennsylvania
INSPECTION DATES:	March 16-27, 1992

Inspector: C. H. Woodard — 6/5/92
C. H. Woodard, Reactor Engineer, Electrical Section, EB, DRS — Date

Approved by: W. H. Ruland — 6/3/92
W. Ruland, Acting Chief, Electrical Section, Engineering Branch, DRS — Date

Inspection Summary: Routine announced inspection of the engineering and technical support (E&TS) program activities in support of plant operations.

Areas Inspected: Corporate business and long range planning for E&TS organization, staffing, programs, procedures and E&TS output products to meet plant operations requirements.

Results: E&TS is adequate to support plant operations. However, there is a need to resolve an apparent disparity between engineering objectives and resources to accomplish these objectives.

EXECUTIVE SUMMARY

This was a routine periodic type of inspection which was made to assess the adequacy of the engineering and technical support provided to assure safe operation of the power station. Inspection observations and conclusions are as follows:

- Both the corporate business plan (1991-1995) and the corporate long range plan (1992-2002) address and provide support for safe and reliable operation. They included both short and long range capital commitments for station operation and modifications.

- Both the management and supporting engineering organizations are onsite. Scheduled and unscheduled plant meetings are well attended. Communications between the operations, engineering, maintenance, and corporate organizations is good.

- Although the engineering organizations are essentially staffed to their authorized levels with a skilled, trained group of professionals, there is a substantial amount of engineering backlog and a persistent large number of late high priority work items.

- Engineering output - design, design changes, modifications, procurement, and installation/construction monitoring are judged to be of good quality.

- Quality Services and the Offsite Review Committee demonstrated effective performance in their audits of engineering. Their audits were comprehensive with meaningful findings. Followup to assure the implementation of proper corrective actions was good.

1.0 INTRODUCTION

Periodic inspection assessments are made of the adequacy of the engineering and technical support provided to the operating plant to ensure plant safety. During this inspection, the assessment was made by conducting reviews of:

- corporate goals, commitments and plans for engineering.
- plant operations needs for engineering support and engineering's responsiveness in fulfilling those needs in a timely manner.
- engineering design, design change, modification and administrative procedures.
- a typical plant modification, including the program and procedural implementation.
- technical specification commitments and compliance.
- training and qualification of engineering personnel.
- licensee organization, structure and staffing for engineering.
- quality assurance and other self assessment audits and controls of engineering.
- communication/interfaces between the organizations.

Walkdowns, interviews and discussions with cognizant engineering, maintenance, QA and management personnel were conducted.

2.0 DETAILED INSPECTION

2.1 Corporate Management and Support

The Beaver Valley Nuclear Power Station's electrical generating capacity provides for a substantial portion of the Duquesne Light Company (DLCo) income. The financial performance of DLCo is then highly dependent upon the safe and reliable operation of the station at a high capacity factor. In the business plan for 1991-1995, the nuclear group management has provided a mission statement from which the long-term goals and objectives are derived. These include quality, public safety, personnel safety, regulation compliance, employee achievement, reliability, and economy. Key performance indicators are provided with specific performance goals established for seventeen criteria for each year. Performance in these key functional areas is measured monthly and reported to station and corporate management. The business plan also addresses the more significant station hardware and station support issues to be addressed during these planning years including their projected schedule and costs. The corporation long range plan for the station provides more detailed

schedules and breakdowns of proposed design changes and modifications for projected outage cycles. The Unit 1 long range plan (issued January 1992) was reviewed in detail. It projects design changes and modifications for outage cycles 9-11. It also provides a ten-year capital expenditures forecast (1992-2002) for the Beaver Valley Power Station.

The inspector concluded that these corporate business and planning documents provided for a comprehensive, mission-oriented system of goals with key performance indicators which provide for monthly feedback of performance for the effective management of the station including the engineering and technical support activities. Monthly reports provide upper management with feedback of current station performance in these key areas (including engineering and technical support) such that decisions can be made which affect the achievement of the goals.

2.2 Organization

Duquesne Light Company management, staff and personnel for all aspects of the operation of the Beaver Valley Nuclear Power Station are located entirely on the Beaver Valley site. Management is provided through a matrix type of organization with Nuclear Service Operations, Quality Services, Human Resources, and Planning. Each of these organizations report through their own senior management to the Vice President, Nuclear Group. Nuclear Engineering Department (NED) reports through its manager to the Corporate Nuclear Services Unit General Manager. NED is organized into five functional engineering sections: electrical and controls, general and plant, information services, nuclear and mechanical, materials and standards. A recent change made in the organization was the transfer of the construction (field) engineering section (located within the plant) from the nuclear construction organization into the NED general engineering group. The licensee expects that this change will enhance the engineering design and modification process. By providing direct field and operations input into the modification process, improved constructability and reduced design and field changes are anticipated. This change is considered to be a positive initiative. Engineering activities were further enhanced during the past year by an increased emphasis upon the project manager and system engineering concepts.

The inspector concluded that the licensee's organization of engineering and technical support personnel, their locations, and management structure are adequate to provide the support required for the nuclear operating units.

2.3 Training

Training of engineering and technical support personnel is accomplished through: initial indoctrination training; job specific training within the Nuclear Engineering Department; reading/signoff and classroom training in the procedures, codes and standards in use by NED; and augmented technical training provided for engineering personnel in accordance with the Nuclear Group Training Administrator Manual Volume 2, Chapter 5, Section 5.1. The program provides for comprehensive and extensive training depending upon the position

requirements and prior level of training and experience. NED personnel normally do not take the extensive training that is required for the onsite operations technical support staff. However, the training is available to the depth and breadth authorized for any of the technical staff. This training includes a program for training systems engineers to the standards established within the nuclear industry (INPO) including board examinations and qualification. Specialized training for NED engineering personnel is provided in such areas as root cause analysis, technical evaluation review, configuration control, project management, and 50.59 safety evaluations. A recent positive initiative in training is the acceptance and implementation of the National Academy for Nuclear Training Guidelines for Training and Qualification of Engineering Support Personnel; ACAD 91-017, dated December 1991. ACAD provides the framework for a unified, coordinated industry approach to achieving and maintaining effective training and qualification. During 1991, NED continued an established program (third year) which encourages engineering personnel to develop engineering papers and conduct a technical information presentation symposium (TIPS) to other engineering personnel and management. Historically, several of these papers have been accepted and published in technical journals. Topics presented during this year's symposium included the following:

- Station blackout
- Steam generator long range plans
- Thermal stratification
- Color separation
- Nuclear plant rerating/up rating
- Fluids systems engineering
- Pittsburgh Mid-field terminal project
- 23 kV line construction to Mid-field terminal
- Reduced inventory and mid-loop control
- In Plant Computers
- Office graphics/effective presentation

According to the licensee, management support of the TIPS program has encouraged the development of presentations which have provided recognition and a forum for training the overall staff in topics relevant to their work at the Beaver Valley Power Station. From a review of the TIPS papers included in the September 24, 1991, publication, the inspector concluded that the presentations were professional and of high quality.

Some of the positive initiatives noted in the licensee's training program include the following:

- Nuclear group employees visit top ranked utilities during 1991 for cross pollination to improve their skills, gain experience and bring back new ideas for improvement. Several engineering personnel visited Farley, Surrey, TVA, and CPL. Selected training personnel visited Susquehanna, Calvert Cliffs, Ginna, Peach Bottom, Palo Verde, and Oyster Creek.

- Nuclear group employees are encouraged to participate in various industry groups including: ANSI, NUMARC, INPO, EPRI, IEEE, and EEI. For example, there was participation in all INPO workshops, nine EPRI committees, and in eight Westinghouse owners group committees.

- During 1991, 59 NED employees participated in the full tuition reimbursement program to further their education

- During 1991, the Performance Appraisal/Development Program and Development Action Plan was implemented. In this program, each professional employee's needs for experience and training are reviewed with his supervisor and an action timetable is established to accomplish the development objectives. As part of this program, 241 nuclear group employees took self-improvement classes at the corporate Oxford Training Center during 1991.

The inspector concluded that the training program for engineering personnel was adequate and included many positive initiatives

2.4 Administrative Controls for Engineering Activities

The inspector reviewed selected administrative and engineering procedures to determine whether the engineering activities are specified and controlled by approved procedures which provide for meeting the licensee's objectives and commitments. Procedures reviewed included those for initiating engineering work; (engineering memoranda (EM) and station modification request SMR); those for performing engineering work; (design control and modification, safety evaluation, technical evaluation reviews); those for prioritizing engineering work, and those for self and independent assessment of the adequacy and quality of engineering work. The inspector found that the licensee's initiating and performance procedures for engineering activities provide adequate guidelines, controls and specific requirements to ensure that design, design changes and modifications are performed in accordance with current approved procedures that comply with accepted industry standards. These procedures provide appropriate requirements and guidelines for the 10 CFR 50.59 screening and safety evaluations; verifications of design input, calculations, and final design; and proper approvals (procedures reviewed are listed in paragraph 2.5).

The inspector reviewed the licensee's program, procedures and systems used for prioritizing, planning and scheduling engineering work activities. The licensee has several systems for prioritizing and tracking the engineering work including the Commitment Tracking System (CTS), the BVPS Workload Priority Systems manual and the Corrective Actions Backlog Report (CAR). The adequacy of these systems was evaluated by a review of their historical effectiveness in assuring that the high priority work is scheduled and completed in a timely manner. CTS is used to prioritize, initiate and track engineering work activities such as that required in response to NRC generic letters, inspection reports, information notices, etc., and in response to self assessment audit findings. CTS reports are issued on a monthly basis.

basis. According to the CTS Trend Report for the period from June 1990 to February 1992, the percentage of outstanding high priority late work items has increased from approximately 5% in 1990 to 12% in 1991 and 30% in 1992. The CAR backlog reports are issued monthly. They report monthly performance in seven key selected categories against the established schedules, objectives and goals. The licensee has established a goal that not more than 40% of the engineering work activities in these categories exceed 3 months overdue and that 0% shall not exceed 18 months overdue. Although the CAR backlog reports show some significant decreases in the engineering work backlog in most areas during the past 18 months, it continues to show a sizeable backlog both in the 3 to 18 months and greater than 18 months categories. The overdue backlog for some activities has remained essentially constant during the last year as reported in the December 1991 and March 1992 CARs. For example, the backlog of engineering memorandum requests for engineering work that have not been acted upon in a timely manner in the 3 to 18 months past due category has increased from 151 to 163 (46% to 50%) and in the greater than 18 months past due has decreased from 49 to 14 (15% to 4%) work requests. The number of technical evaluation reports more than 18 months past due has remained around 70 (42%). Both the CTS and CAR monthly reports provide management with the visibility of engineering work progress and current status as compared to the company objectives and goals.

The inspector observed that the licensee is developing a new workload priority system (NGAP 2.17) which will provide (through the BVPS mainframe computer) a unified system to identify the most important task at BVPS through the use of a common set of criteria. This system is projected for implementation by the end of June 1992. A unified common criteria prioritization system is considered to be positive factor toward improvement of the engineering scheduling system.

2.5 Design Changes and Modifications Program

To assess the adequacy of the licensee's program and procedures for performing design changes and implementing plant modifications, the inspector reviewed the program and procedures in use and a typical modification which was implemented by following these procedures. The following pertinent procedures were reviewed:

- NEAP 2.1, Station Modification Request, Rev. 4, 7/25/91
- NGAP 2.4, Engineering Memoranda, Rev. 1, 8/30/91
- NGAM 7.2, Design Change Control, Rev. 1, 3/25/91
- NGAP 10.1, Definitions, Rev. 2, 4/26/91
- NEAP 2.2, Design Change Control, Rev. 4, 8/12/91
- NEAP 2.19, Minor Design Change Control, Rev. 1, 11/4/91
- NGAM 8.18, 10 CFR 50.59 Safety Evaluation, Rev. 0, 5/7/90
- NGAM 8.6, Configuration Management, Rev. 0, 3/25/91
- NGAP 8.10, Onsite Safety Committee, Rev. 0, 11/30/91
- BVS-441, Specification for HVAC Systems Seismic Requirements

The inspector reviewed DCP 1482 which covered the replacement of seventeen Unit 1 HVAC fire dampers to meet the UL Standard 555-1968 closure criteria which is needed to comply with the 10 CFR 50, Appendix R, paragraph IIIG.2(a) three-hour fire barrier requirements. This modification was assigned to an NED lead/project engineer who followed it from its inception to final acceptance and turn over to operations. The review of this DCP with the project engineer covered the following areas:

- Field work to perform the detailed damper design to assure operability, constructability and fit up during installations.
- Preparation of the design, procurement and installation documents.
- Performing both engineering and quality verifications at the manufacturers plant.
- Verifying the seismic tests and analysis.
- Receipt inspections to verify acceptability of purchased parts and materials.
- Performance of the 50.59 safety evaluations.
- Release of the construction package to the construction contractor (S&W) for installation.
- Engineering inspections and quality verifications during and following installation.
- Design and field change notices required to complete the installation.
- Conducting acceptance tests to verify damper performance.
- Acceptance, signoff and turnover of the completed modification to operations.
- Updating all documentation for the replacement dampers.

The inspector concluded that the licensee had performed this modification in accordance with established, adequate and current procedures. The number of field changes and design changes required during installation was considered high. However, an evaluation of each of the changes showed that most of the changes were required as a consequence of things that could not be foreseen until the installation was in progress (such as anchor bolts hitting rebar in the concrete and requiring relocation).

The inspector concluded that the licensee's DCP modification program and procedures were adequate with proper controls to ensure that the completed modification complies with plant performance and safety requirements. The assignment of a project engineer (manager) with direct responsibility for the modification from inception to completion and turnover to operations was viewed as a positive factor in the process.

2.6 Quality Services and Other Self Assessment Audits

The inspector reviewed selected portions of the licensee's self assessment programs and procedures to assess their adequacy. Two audits conducted during 1991 in the engineering and technical support areas were reviewed to assess their effectiveness in identifying any weaknesses in engineering and to assure that corrective actions were taken.

2.6.1 Quality Service Audits

Quality assurance audits are made of the Nuclear Engineering Department on an annual basis to assess the conduct of their activities in compliance with Technical Specification 6.5. The inspector reviewed Quality Services (QS) Audit BV-C-91-04, which was conducted from April 24 to October 8, 1991, and involved the direct efforts and assistance of more than 100 QS, technical support and management personnel. This extensive audit was made to evaluate the effectiveness of the BVPS Design Control Program. The audit team evaluated specific design change packages utilizing their QS Vertical Slice Program. In utilizing this process, the team evaluated the design changes in minute detail from initial development to installation, final testing and turnover to operations. Areas reviewed included:

- 10 CFR 50.59 safety evaluations
- Technical evaluation reports
- Minor design change packages
- Setpoint change control
- Environmental qualification
- Overview of installation of DCPs
- Exposure control for modifications (ALARA)
- Computer administration and assurance program
- Corrective actions for prior audit deficiencies

The QS audit also included evaluation of associated programs to assess the adequacy of interfaces and the effectiveness of the DCP program support. Evaluations were made for:

- Configuration management
- Document control
- Engineering memoranda
- Stock items requests
- Offsite Review Committee
- Training

The QS auditors interviewed personnel involved in the design change control process concerning their knowledge of the program, their specific job functions, and their effectiveness in implementing the design control program. The licensee's QS audit observations, findings and recommendations are summarized as follows:

- Certain 10 CFR 50.59 safety evaluations were found lacking in bases either because of deficiencies in technical justification or documentation.

- The interrelationships of elements of the Beaver Valley Power Station Design Control Program were not clearly defined in a single overall procedure. As a consequence of the fragmentation, they were not completely understood by all involved parties.

- There were examples where the administrative controls associated with the protective device setpoint control program were not being properly implemented.

- There is a need to enhance the program for the control of documentation associated with design equivalent replacement parts.

- Design control procedures should be enhanced and strengthened by providing clarifications and more specific directions, especially in the area of design input requirements.

The licensee's audit conclusions were that in the Design Control Program there is general fulfillment of quality-related responsibilities and effective implementation of Quality Assurance Program elements in the areas of DCP installation, Minor DCP, Environmental Qualification and ALARA Exposure Control. Improvements are required, however, in the areas of Protective Device Setpoint Control, 10 CFR 50.59 Safety Evaluations, Computer Administration and Assurance Program and procedure adherence. Enhancements are needed including the development of an upper tier document which clearly defines the relationships of all elements of the Design Control Program. The audit report was submitted to the General Manager of Corporate Nuclear Services and to affected engineering, quality, and management personnel. It included a specific request for written responses within 30 days for all items in which corrective actions were required and/or improvements needed. The responses were to include any corrective actions taken, actions taken to prevent recurrence, and a schedule for actions to be taken to implement corrective actions or improvements. Prior to this inspection, QS had evaluated the replies and had found that the actions taken or planned in some cases were not sufficient to address the programmatic aspects. Therefore, further actions were requested. Prior to the conclusion of the inspection, corrective actions and improvements which were acceptable to QS were defined.

The inspector concluded that this in-depth QS audit of the Design Control Program with the many meaningful observations, findings and recommendations was a positive factor in th improvement of the program. The audit was enhanced by the corrective actions responses required, followup tracking by QS and upper management involvement. The audit was considered to have accomplished the Technical Specification objectives.

2.6.2 **Offsite Review Committee (ORC) Audits**

In addition to the QS audits and reviews of the engineering and technical support activities, ORC provides for additional independent safety reviews and evaluations required by Technical Specification 6.5.2. Staffing includes senior management personnel from other divisions of the company who are not directly involved with the day-to-day activities of the power station. ORC reports directly to the Vice President of the Nuclear Group.

The inspector reviewed the ORC charter which is described in the Nuclear Safety Administration Manual (NSAM), Volume 3, Chapter 1. ORC has established four subcommittees (teams) to provide expertise to the committee in the following areas.

- Audits and inspections
- Engineering and construction
- Maintenance and operations
- Radiological and environmental

ORC audit report AIS 92-01, dated February 2, 1992, was reviewed. It included followup of 12 previous audits including the findings made in QS Design Control audit BV-C-91-04. The inspector reviewed the ORC minutes of meetings held March 12-13, 1992. Subject topics from the engineering and technical support area included:

- Discussions of temporary modifications (TMod). Specific subcommittee instructions and assignments were provided to conduct an evaluation of the cumulative effects of Tmods on the station.

- Overdue responses on some NRC information notices. Specific instructions were provided to the sub-committee to properly evaluate and address the notices.

- Actions taken to address BV-2 instrument air system problems.

- QS audit findings and the status of their resolution.

- Engineering backlog. Specific management guidance, directions and goals for the reduction of key area backlogs were provided.

Overall, the inspector found that the OSC provided effective top level overview and direction in areas including engineering and technical support. Although the OSC charter requires meeting semi-annually, the OSC was conducting reviews on a quarterly basis and is considering meeting on a bi-monthly basis to more effectively address plant issues.

2.7 Conclusion

The engineering and technical support provided for the operation of the Beaver Valley Power Station is adequate. Numerous improvements have been made during the past year. However, there are significant areas for additional improvement, particularly in the area of planning and scheduling of resources to be more responsive to requests for engineering services.

2.8 Exit Meeting

The inspector met with licensee personnel denoted in Attachment 1 at the conclusion of the inspection on March 27, 1992, and discussed the inspection scope, observations and findings.

ATTACHMENT 1

Persons Contacted

Duquesne Light Company

R. F. Balcerck, Manager, Management Services
* F. Cavalier, Director, Project Management
P. W. Dearborn, Supervisor, Engineering
A. J. Fenwick, Director, Nuclear Records
R. Ferrie, Senior Engineer, Engineering Management Services
* K. E. Halliday, Nuclear Engineering Department
* R. Hansen, Director, General Engineering
* F. J. Kipchick, Senior Supervisor, Licensing
D. G. McLain, Manager, Technical Services
* S. Nass, Director, Nuclear Engineering Department
* T. P. Noonan, General Manager, Nuclear Operations
* M. Pavlick, Director, Quality Services
* D. Schmidt, Director, Electrical Engineering
J. D. Sieber, Vice President, Nuclear Group
* D. E. Spoerry, General Manager, Nuclear Operations Services
* J. E. Starr, Supervisor, Engineering Management Services
* D. Szucz, Senior Engineer, Licensing
* G. S. Thomas, General Manager, Corporate Nuclear Services
* N. Tonet, Manager, Nuclear Safety
K. E. Woesser, Project Manager, SSFE
* T. Zyra, Director, Plant Performance
* J. Vassello, Director, Licensing
G. Kammerdeiner, Director, Materials and Standards Engineering

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L. Rossbach, Resident Inspector
* P. Sena, Resident Inspector

* Attended exit meeting.