U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-334/80-28

Docket No. 50-334

License No. DPR 66 Priority -- Category C

Licensee: Duquesne Light Company

435 Sixth Avenue

Pittsburgh, Pennsylvania 15219

Facility Name: Beaver Valley Unit 1

Inspection at: Shippingport, Pennsylvania

Inspection conducted: October 14-17, 1980

Inspectors: L. H. Bettenhausen, Ph.D. — 11/24/80 date signed

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Approved by: D. L. Caphton, Chief, Nuclear Support Section #1, RO&NS Branch — 12/9/80 date signed

Inspection Summary:

Inspection on October 14-17, 1980 (Report 50-334/80-28)
Areas Inspected: Routine, unannounced inspection of refueling startup testing program, startup testing of new or modified systems, and review of procedures related to reactor engineering. The inspection involved 25 hours by one NRC region-based inspector.

Results: Of the three areas inspected, no items of noncompliance were identified in two. One item of noncompliance (deficiency; failure to note procedure revisions in accordance with administrative procedures) was identified in the area of startup testing of new/modified systems.

Region I Form 12
(Rev. April 77)

## DETAILS

1. Persons Contacted

Duquesne Light Company (DLC)

J. Carey, Chairman, Offsite Review Committee
*M. Coppula, Results Coordinator
*F. Lipchick, Compliance Engineer
J. Sieber, Superintendent, Licensing
*T. Stansberry, Audit and Compliance Coordinator
*J. Werling, Station Superintendent
H. Williams, Chief Engineer
R. Zabowski, Test Engineer Supervisor
*G. Zupsic, Reactor Engineer

Westinghouse Electric Co.

S. Prokopovich

USNRC

*D. Beckman, Senior Resident Inspector

*denotes those present at the exit interview conducted October 17, 1980.

The inspector also contacted test engineers, administrative personnel, foremen and repairmen in the course of this inspection.

2. Safety Analysis Review for Cycle 2 Fuel Loading and Operations

The inspector reviewed documents and interviewed licensee staff members regarding the development and review of the safety analysis for Cycle 2 operation. The reload safety analysis was conducted under contract by Westinghouse. The Reload Safety Evaluation (RSE) for Cycle 2 dated February, 1979, was transmitted to DLC by letter FP-DL-170 dated March 13, 1979. The analysis was conducted by the methods described in WCAP-9272, Westinghouse Reload Safety Evaluation Methodology, March, 1978. A supplement to the RSE was also issued with the date February, 1979; this supplement analyzed plant safety with two-loop operation. Westinghouse also prepared WCAP-9505, The Nuclear Design and Core Management of Beaver Valley Unit #1 Power Plant, Cycle 2, dated February, 1979, and Revision 1, dated May, 1980.

The analyses described above were made with three assumptions:

(1) Cycle 1 fuel burnup between 14,640 and 15,640 MWD/MTU

(2) Cycle 2 fuel burnup limited to end-of-full-power capability

(3) The plant is operated in accordance with plant operating limitations of Technical Specifications.

Assumption (1) was met in that core average burnup for Cycle 1 was 15,570 MWD/MTU. Assumptions (2) and (3) are dependent upon Cycle 2 operations. The analyses are also based upon changes in Technical Specifications for rod bow penalty, and peaking factor; these changes were made in Amendment 20 to the facility license dated November 3, 1979.

The inspector ascertained that DLC formed an engineering review team to review and evaluate the contractor's work on the safety evaluation. This review was conducted prior to completion of the safety evaluation. It consisted of discussions with and a visit to the contractor facilities to evaluate the methodology and conformance to WCAP-9272, to review preliminary results of the safety evaluation and to compare results to previous analyses and results in the Final Safety Analysis Report and Technical Specifications. The inspector interviewed two members of the review team to determine the purposes and scope of the review.

The contractor presented the results of the safety evaluation and the methods used to members of the Beaver Valley Onsite Safety Committee (OSC) on October 11, 1979. The OSC then considered the RSE; at OSC meeting 89-79 held December 18, 1979, the committee concluded: "The core can be operated within the present Technical Specification limiting condition for operation. No unreviewed safety questions are involved nor are any changes to procedures described in the SAR required."

The Off-Site Review Committee considered the Cycle 2 Reload Safety Evaluation at its meeting #78, held March 17, 1980. The committee determined that no unreviewed safety questions were involved and that operation would be within present Technical Specification limiting conditions for operation.

No items of noncompliance or deviations were identified.

3. Startup Physics Test Program for Verification of Nuclear Design

The inspector reviewed the licensee's startup test program and draft test procedures to ascertain that the following tests and checks are to be conducted:

a. Control rod drive and drop time tests,

b. Critical boron concentrations for various control rod configurations,

c. Control rod bank reactivity worths,

d. Moderator temperature coefficient,

e. Power reactivity coefficient,

f. Power distribution measurements using incore detectors at various power levels.

The draft test procedures were reviewed for the following:

a. test objectives clearly stated,

b. pertinent prerequisites identified,

c. initial test conditions identified,

d. appropriate references to documents, drawings, technical specifications, and other requirements,

e. acceptance criteria clearly identified and sources of criteria referenced,

f. step-by-step instructions for conduct of the test,

g. space provided for test engineer initials for all prerequisites, initial conditions for test and test procedure steps,

h. data sheets provided for recording appropriate test information.

Draft test procedures reviewed were BVT 1.2 - 2.2.1, Initial Approach to Criticality, draft issue 1, 9/24/80, and BVT 1.2 - 2.2.2, Core Design Check Test, draft issue 1, 9/30/80. The test procedures were discussed with cognizant station staff and test engineers.

The core design checks include rod worth measurements for the following conditions:

a. Control Bank D at ~160 steps,

b. All rods out,

c. Control Bank D inserted,

d. Control Banks C and D inserted,

e. Control Banks B, C and D inserted,

f. Control Banks A, B, C and D inserted,

g. Shutdown Bank B inserted,

h. All rods inserted, except D-12 (analytically strongest worth rod),

i. Rod worths by bank interchange.

Isothermal temperature coefficient is to be measured at zero power to determine moderator temperature coefficient. Flux maps for the examination of core symmetry, comparison to computed power distributions and nuclear instrument intercalibration are to be obtained at the following conditions:

a. hot zero power all rods out,

b. hot zero power, control Bank D inserted,

c. ~ 50% power,

d. ~ 100% power.

The power coefficient of reactivity is to be measured by inducing a load change from ~100% power to ~90% power and again from ~90% power to ~100% power.

Control rod drop times are measured through conduct of BVT 1.1 - 1.1.1, Control Rod Drop Time Measurement, issue 1, 9/3/77 and Revision 1, 4/16/79.

The inspector reviewed this procedure and the results of the cold, no flow rod drops performed 10/7 and 10/10/80 with the cognizant test engineer. The cold, no flow control rod drop times ranged from 1.51 to 1.70 seconds. The inspector selected and reviewed the recorder trace for one of the two slowest rods, K-14. The hot, full flow rod drop time tests are to be conducted in accordance with BVT 1.1 - 1.1.1 when plant conditions permit as part of the prerequisites to initial criticality.

The inspector was informed that DLC has contracted with Westinghouse for the services of a Startup Test Director to assist with the plant startup and test program.

No items of noncompliance or deviations were identified.

4. Review of Reactor Engineering Procedures Related to Plant Startup

Chapter 49, Reactor Engineering Procedures, BVPS Operating Manual, Section 4, Operating Procedures, Revision 11 effective 12/19/79, was selectively reviewed to assure that technically adequate procedures with necessary precautions and limitations were approved and available to be used in the plant startup. The following procedures were reviewed:

a. Heat Flux Hot Channel Factor Determinations

A computer method is outlined whereby the incore movable detectors flux data is obtained on the plant P-250 process computer, the data transmitted to the DLC corporate computer as input to the INCORE 2 analysis code and a short form summary result transmitted back to BVPS. The computer results are analyzed both by the station reactor engineer and corporate nuclear engineers for compliance with operating parameters and technical specifications. A hand calculational method is available, although analysts present said they did not recall using it, since the computer had been available when needed.

b. Nuclear Power Range f(ΔI) Function Calibration

This procedure describes the calibration methodology for calibrating incore flux detectors and excore flux detectors. Precautions and limitations are set forth. Reference was made to another reactor engineering procedure, Dampening Axial Xenon oscillation, should it be necessary to do so.

c. Reactor Engineering Surveillance Procedures

Procedures in this section determine compliance with surveillance technical specifications for incore-excore axial imbalance, power distribution limits, target axial flux difference, and reactivity follow with core burnup.

No items of noncompliance or deviations were identified in this review of reactor engineering procedures.

5. Startup Testing - Engineered Safety Features (ESF) Time Response Test

The inspector selected BVT 1.1 - 1.1.2, ESF Time Response Test, issue 1, Revision 1 dated 3/26/80 in the process of reviewing startup testing of modified systems. This test procedure has as its purpose the demonstration that ESF response times are within technical specifications once per 18 months. The procedure is one which serves to collect response time data for the test engineer's review and analysis. Therefore, it incorporates by reference other surveillance and test procedures. The inspector reviewed the procedure, the working notes, information, and some of the referenced procedures and held discussions with the cognizant test engineer on this series of tests and data-gathering in progress at the time of the inspection.

Two of the surveillance tests for which data-gathering appeared complete were done in accordance with MSP 1.15A, Reactor Trip and ESF Logic Time Response, Revision 0, effective 8/6/80. This one-time procedure was written to measure response times of equipment affected by Design Change Packages 094, 156, 189, 190, 191 and 205. Field work under the procedure was performed 9/17 - 9/28/80 for Train A and 9/29 - 9/30/80 for Train B. The tests were not completed in that data reduction was still taking place and no completion signatures had been placed at the end of the procedures.

The inspector also noted that no removal date for test jumpers was noted on Data Sheet 1 (the jumper inventory) for Train B, although the procedure was initialed for jumper removal. The inspector also noted that the initials for closing the RPS states links for Train A performance were missing. When these questions were raised, the foreman and a Meter and Control Repairman (MCR) who worked on the procedure were located. The detailed performance of the test was discussed. The MCR accompanied the inspector to the instrument cabinets. Visual examination of the SSPS cabinets showed that all test jumpers were removed. Discussion and examination of other Reactor Protection System cabinets demonstrated that all test equipment had been removed and restoration to non-test configuration was complete. The MCR annotated the procedures in the presence of the inspector to reflect what was actually done in completing the field work and removing jumpers and test equipment.

In the review and discussion, it was stated that many changes had to be made to the procedure to obtain the desired test data. It was said that the instrumentation engineer spent several days and evenings on the task. The procedure has many changes, lineouts and additions which had been initialed by the instrumentation engineer and the Chief Engineer. This process appears to satisfy TS 6.8.3.b and Paragraph D.1 of BVPS Administrative Procedures, Chapter 11, Procedure Preparation, Review and Approval for on-the-spot revisions. However, Paragraph D.2 requires on-the-spot revisions to be made on a Manual Change Notice form, which indicates the date, time and Change Number of the change. Contrary to this, the working copies of MSP 1.15A for Train A and Train B had been changed extensively as evidenced by the markups and changes on the procedure and discussions with personnel involved, but had no documented change notice. This is an item of noncompliance (334/80-28-01).

6. Exit Interview

The inspector met with licensee representatives (as denoted in Paragraph 1) on October 17, 1980. The purpose, scope and findings of the inspection were presented.