

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

Region I

Report No. 50-412/80-01

Docket No. 50-412

License No. CPPR-105 Priority -- Category A

Licensee: Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

Facility Name: Beaver Valley Power Station, Unit 2

Investigation at: Shippingport, Pennsylvania

Investigation conducted: January 15, 1980

Investigators: Lewis Narrow
L. Narrow, Reactor Inspector

1/30/80
date signed

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_____ date signed

2/1/80
date signed

Approved by: R. W. McGaughy
R. W. McGaughy, Chief, Projects Section
RC&ES Branch

Investigation Summary:

Investigation on January 15, 1980 (Report No. 50-412/80-01)

Areas Investigated: Unannounced investigation of an allegation of improper installation of waterstop in concrete walls of the Safeguards Building. The investigation involved 8 inspector-hours on site by one regional based inspector.

Results: The allegation was not substantiated; the condition of some joints observed is questionable and requires further evaluation.

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A. Introduction

Region I received an allegation that installation of waterstops at Beaver Valley Unit 2 was improperly performed.

An investigation of this allegation was conducted at the Beaver Valley Unit 2 site on January 15, 1980.

B. Allegation

It was alleged that splicing of waterstops for the vertical walls of the Safeguards Building (SGB) did not comply with the manufacturers instructions. The instructions on the cans containing liquid adhesive allegedly required that it be applied at temperatures of approximately 50°F to 70°F, but the work was being performed at subfreezing temperatures. It was also alleged that the spliced joints were clamped together in an effort to obtain adhesion and that these efforts appeared successful, but that the joints generally were not clamped.

C. Summary of Findings

The allegation could not be substantiated and the one splice within the wall form available for observation by the inspector was considered to be acceptable.

The inspector also observed the appearance and adhesion of splices previously made and installed in the Safeguards Building foundation. Approximately 50% of those observed showed separation and a visible gap between the sleeve and the waterstop. Joints with questionable strength of bond also were observed.

This item is unresolved pending review by the licensee of the conditions observed.

D. Details of Investigation

1. Persons Contacted

Duquesne Light Company (DLC)

*H. N. Crooks, Jr., Assistant Director, SQC
*D. W. Denning, Assistant Director, SQC

J. Long, Supervisor, SQC
P. Sokalski, QC Inspector, Structural
*R. J. Swiderski, Superintendent of Construction
*R. Washabaugh, Manager, QA Department
D. Wright, QC Inspector, Structural

Stone and Webster (S&W)

*S. M. Dew, Head SEO
*C. R. Bishop, Superintendent of Construction
*R. J. Faust, Structural Engineer

Dick Corporation

W. Burow, Carpenter
M. Rojas, Superintendent
R. Sarraco, General Carpenter Foreman
J. Stamm, Carpenter
*T. M. Westrom, Resident Engineer

*denotes those present at the exit interview.

2. Allegation as understood by NRC

It was alleged that spliced joints of waterstops in the SGB were not installed in accordance with the manufacturers instructions in the following respects:

- The work was performed at subfreezing temperatures contrary to the requirements that the adhesive be applied at temperatures of above approximately 60°F.
- In an attempt to overcome difficulties in obtaining a proper splice at the low temperatures, the joints were clamped in place for some time. A proper splice was obtained in those cases observed by the alleger.

3. Scope and Method of Investigation

The NRC investigation was undertaken to obtain:

- Specification requirements for installation of the waterstop.
- Compliance with or extent of noncompliance with specification requirements.

- Quality control of the installation.
- Adequacy of the installed splices.

The investigation consisted of:

- Review of specifications, work procedures, and QC procedures.
- Review of work and QC records.
- Interviews with licensee and contractor personnel.
- Observation of installed waterstop in the SGB wall.
- Observation of previously installed waterstop in the SGB foundation.

4. Specifications and Work Procedures

The inspector examined the sections concerning waterstop installation of Specification 2BVS904, "Placing Concrete and Reinforcing Steel," Addendum No. 1 and Field Construction Procedure FCP-117, "Placement of Concrete," Change No. 1. These documents require that field splices be in accordance with the manufacturers instructions. The adhesive is Type 1300 and the manufacturer is W. R. Grace and Company.

The following instructions are shown on the cans:

- "Store indoors at 65°F or above. If stored at lower temperature, warm up the cement and agitate before use. Material is useable as long as it is brushable."
- Splicing procedures include roughing up end of waterstop and inside surfaces of fittings; clean with xylene or mineral spirits and allow to dry; apply coating of "Field Splicing Cement" to surfaces and hold until dry to touch; insert waterstop into union and clamp splice firmly using metal or wood block on each side of splice. Allow clamped splice to dry a minimum of one hour. Drying times will be longer at lower temperatures.

Specification 2BVS 981, "Requirements During Storage," calls for level C storage (indoor, unheated) for the waterstop material (Purchase Specification 904) but the inspector observed that both the waterstop and the adhesive were stored in heated stor~~age~~ areas. The waterstop and adhesive are stored separately in level C (indoor, heated) storage areas.

5. QC Procedures and Records

The inspector examined Section 5.6.2 of IP-6.2.3, "Preplacement, Placement, and Post-Placement of Concrete," which is a part of DLC Site Quality Control Inspection Plan Manual. This section provides for inspection of installation and splicing of waterstops and states that field splices will be in accordance with the manufacturers instructions. These inspection requirements are identified as Attribute S-61. The inspector also examined DLC-SQC Inspection Report Nos. S-2394 and S-2409 for SGB wall pours No. 5 and No. 21, respectively. Each of these inspection reports show Attribute No. S-61 to have been verified and initialed as approved by SQC. Pour No. 5 had been placed on January 9, 1980, and No. 21 was in the preplacement stage.

6. Interviews

The inspector interviewed two SQC structural inspectors who were responsible for concrete inspection. Both of the inspectors were qualified as Level II inspectors on preplacement and placement of the concrete. Both men had inspected waterstop installation and one of the men had verified Attribute S-61 for SGB wall pour No. 21.

During preplacement preparation the inspectors stated they spent 5-20% of their time in observation of the work in progress for a specific pour. During this time they had observed waterstop installation and splicing of joints on a random basis. They occasionally checked a splice for bonding. Neither of the men had identified a splice which was not properly bonded. They had occasionally identified damaged or broken joints and damage to the waterstop itself. They had not observed heating of the waterstop/fitting prior to splicing or after clamping.

The SQC supervisor was interviewed and stated that he had not been made aware of any problems encountered during installation of waterstops.

The inspector also interviewed two carpenters who frequently worked on waterstop installation. They stated that they had installed most of the waterstops for the SGB. Both men were familiar with the manufacturers instructions and repeated the splicing instructions when asked to describe the procedure they followed. They stated that they draw the material (waterstop, fittings, adhesive, and miscellaneous) as needed, cut the waterstop to length and make up joints in the field. They check joints when they remove the clamps. Occasionally, they have noticed some separation at the edges. In such cases they add glue and reclamp the joints. Each of the men stated that about a week earlier they had received some cans of adhesive which had thickened and was

not brushable. The first can was returned to storage. The replacement can was also thick. It was placed in a warm area near a heater until thin enough to use.

There appears to be some uncertainty about the length of time the splices remained clamped. When asked, the men stated that in some cases they stayed on overnight, in others they remained on until the clamps were needed for another splice but the length of time could not be stated with any degree of precision.

The General Carpenter Foreman stated that they do find bad joints occasionally but had more problem with damage due to other work in progress in the area after the waterstop was installed.

7. Observation of Installed Waterstop

The inspector performed a visual inspection of a waterstop spliced joint in pour No. 21 and of waterstop splice joints installed at an electrical blockout on an adjacent wall form. The joints on the block out had been spliced in the carpenter shop. All of these joints are considered to be acceptable.

The inspector also observed the in-place condition of installed waterstop in the SGB foundation. This waterstop was partially embedded in the previously placed foundation concrete. Of approximately eight joints inspected, four showed visible gaps between the waterstop and the fitting. The remaining joints, although showing no separation, appeared to be poorly bonded. A transverse pull on the fitting wall readily separated it from the waterstop surface.

The inspector observed damage to waterstop in the foundation consisting of tears in the waterstop at and between the joints and separation at one joint apparently due to other work in progress after installation of the waterstop and placing of the concrete.

This item is unresolved pending evaluation by the licensee of the strength of bond and the joint separation. (80-01-01). Followup of this item will be performed during a routine inspection.

8. Conclusions

The allegation as understood by NRC was not substantiated.

9. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, or items of noncompliance. An unresolved item identified during this inspection is discussed in Paragraph 7.

10. Exit Interview

The inspector met with licensee and contractor representatives (denoted in Paragraph 1) at the conclusion of the inspection on January 15, 1980. The inspector summarized the scope and findings of the investigation as described in this report.