



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

TEC

Docket Nos. 50-354
50-355

SEP 1 1977

50354-000
50355-000

Public Service Electric and Gas Company
ATTN: Mr. T. J. Martin
Vice President
Engineering and Construction
80 Park Place
Newark, New Jersey 07101

Gentlemen:

Subject: Inspection Nos. 50-354/77-08 and 50-355/77-08

This refers to the inspection conducted by Mr. A. Varela of this office on August 2-5, 1977, at the Hope Creek 1 and 2 site in Lower Alloways Creek Township, Salem County, New Jersey of activities authorized by NRC License Nos. CPPR-120 and CPPR-121 and to the discussions of our findings held by Mr. Varela with Mr. E. Schwalje and Mr. Smith of your staff at the conclusion of the inspection.

Areas examined during this inspection are described in the Office of Inspection and Enforcement Inspection Report which is enclosed with this letter. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

Within the scope of this inspection, no items of noncompliance were observed.

In accordance with Section 2.790 of the NRC's "Rules of Practice", Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosures will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractor) believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. Any such application must be accompanied by an affidavit executed by the owner of the information, which identifies the document or part sought to be withheld, and which contains a statement of reasons which addresses with specificity the items which will be considered by the Commission as listed in subparagraph (b)(4) of Section 2.790. The information sought to be withheld shall be incorporated as far as

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Public Service Electric and
Gas Company

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possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified period, the report will be placed in the Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,


for Robert T. Carlson, Chief
Reactor Construction and Engineering
Support Branch

Enclosure:

1. Office of Inspection and Enforcement Inspection Report Numbers
50-354/77-08 and 50-355/77-08

cc w/encl:

E. N. Schwalje, Manager - Quality Assurance,
Engineering and Construction Department

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

Region I

Report Nos. 50-354/77-08
50-355/77-08

Docket Nos. 50-354
50-355

License Nos. CPPR-120
CPPR-121

Priority --

Category A

Licensee: Public Service Electric & Gas Company

80 Park Place

Newark, New Jersey 07101

Facility Name: Hope Creek Units 1 and 2

Inspection at: Lower Alloways Creek Township, Salem County, New Jersey

Inspection conducted: August 2-5, 1977

Inspectors: *S. D. Ebnetter*
A. A. Varela, Reactor Inspector

8/22/77
date signed

_____ date signed

_____ date signed

Approved by: *S. D. Ebnetter*
S. D. Ebnetter, Chief, Engineering Support
Section No. 2, RC&ES Branch

8/22/77
date signed

Inspection Summary:

Inspection on August 2-5, 1977 (Report No. 50-354/77-08; 50-355/77-08)
Areas Inspected: Routine, unannounced inspection of work performance in installation of reinforcing steel and in cadweld splicing for reactor number one base mat, review of caldwelder qualifications and requirements for cadweld inspection; observation of laboratory tests of production cadwelds; review of previously identified unresolved items for resolution; review of structural backfill installation records and test reports. The inspection involved 28 inspector hours on site by one NRC inspector.
Results: No items of noncompliance were identified.

DETAILS

1. Persons Contacted

Public Service Electric and Gas Company

- * S. Chawaga, Quality Assurance Division Head, Site
- * A. C. Smith, Project Construction Manager
- * E. N. Schwalje, Manager of Quality Assurance
- * W. J. Werder, Project Quality Liaison Engineer
- * P. T. Liu, Quality Assurance Engineer, Site
- * F. M. Linn, Principal Construction Engineer
- * P. J. Kudless, Senior Construction Engineer
- * J. Dugan, Quality Assurance Engineer, Site

Bechtel Power Company

- * W. Hindle, Project Field Engineer
- * J. B. Gatewood, Lead Quality Assurance Engineer
- * D. L. Hanks, Project Construction Quality Control Engineer
- * D. L. Long, Project Superintendent
- * D. Crowe, Lead Civil Quality Control Engineer
- C. Kasch, Quality Control Engineer - Materials Laboratory
- M. Henry, Assistant Project Field Engineer
- W. Cole, Quality Assurance Engineer
- F. Laughton, Quality Control Supervisor, Cadwelding
- J. Shepherd, Cadweld Foreman
- N. Kayser, Cadweld Quality Control Engineer
- R. Grogan, Cadweld Superintendent
- F. Hawkins, Quality Control Engineer, Batch Plant

Erico Products Incorporated (Erico)

- G. D. Carson, Technical Representative

Liberty/Westcon Company

- R. A. Ayers, Quality Assurance Manager

*Denotes presence at exit interview

2. Construction Site Tours

The inspector visited the various on-going construction activities at the site and observed the overall construction activity prior to his entrance meeting. This established the availability of work activities to be observed and indicated their inspection priority.

No items of noncompliance were identified.

3. Licensee Action on Previous Inspection Findings

(Closed) Unresolved item (354, 355/77-04-01): Testing of top 12 inches of compacted structural backfill is required in revised specification C-034, Addendum No. 3, Revision to Section 7.1.1, dated June 16, 1977.

(Closed) Unresolved item (354, 355/77-04-02): Review of engineering report on structural backfill test embankments. The test fill program report was reviewed by the inspector and conclusions were discussed with project field engineering. The inspector observed that special work procedure P-C 109 was revised to incorporate the conclusions recommended in the report.

(Closed) Unresolved item (354, 355/77-04-03): Limitations on repair of imperfections in concrete prior to engineering evaluation of nonconforming conditions is required in revised specification C-103 Addendum No. 1 to revision #1 dated June 10, 1977.

(Closed) Unresolved item (354, 355/77-04-04): Provision for concrete placement in congested and difficult locations is provided in special work procedure P-C-1 Revision No. 1 dated July 22, 1977.

4. Containment Mat Cadweld Splicing

The inspector observed installation of reinforcing steel in the first section of the containment mat, and observed cadwelds being prepared. He inspected 20 complete splices of the approximately 75 completed up to this time in the bottom layer of the first section to be concreted, in pour area IRA-F-002. QC inspectors were present during cadweld splice preparation and were observed to inspect completed splices as required by the QC instruction and QC inspection record C-6.00. The cadweld inspection report provides for inspection and documentation of the following attributes of each completed splice: slag and porosity at tap hole and both ends;

voids at ends of sleeve; centering marks to confirm that bar ends are properly centered in the splice sleeve; and evidence of cleanliness to confirm that the bar ends were properly cleaned in the splice sleeve. The cadweld inspection report does not provide for a documented inspection of splices prior to forming, although the QC instruction and inspection record C-6.00, under In-Process Inspection Activities, identifies the following items as being important to forming satisfactory splices:

- Pouring basins and crucibles preheated
- Graphite parts cleaned prior to reuse
- Sleeves are clean and free of rust
- Bar deformations are undamaged and full-sized, bar ends prepared and marked
- Bars preheated and thoroughly cleaned
- Material and equipment at correct temperature immediately prior to making splice
- Material and equipment positioned correctly
- Gap between bar ends per Erico catalog
- Centering reference marks applied.

The above items are identified on the inspection report for surveillance only. After a splice is completed the items identified in preceding paragraph are checked off on line 15 of the inspection report by the QC Engineer.

The licensee in PSAR Volume 5, Section 15, page 15.2-5 commits plant design in conformance to Regulatory Guide 1.10, Mechanical (Cadweld) splices in reinforcing bars of Category 1 Concrete Structures. The Regulatory position on visual inspection in this guide (paragraph No. 2) is that splices should be inspected prior to forming, to assure proper cleaning, drying, alignment and other attributes necessary to obtain satisfactory splices. The practice of not providing an inspection program wherein at least a sample of the splices are inspected and results documented prior to forming in an unresolved item. (354/77-08-01, 355/77-08-01)

5. Observation of Completed Structural Backfill

The status of construction at the time of this inspection prevented observation by the inspector of activities in placement of structural backfill beneath buildings in the power block area. Completed work, however, was observed for reactor No. 2 in an area where the concrete leveling mat was incomplete. This observation, discussions with contractor project field engineers, QA and QC personnel, and

review of records permitted the inspector to determine that fill placement, soil compaction, soil testing and records of these work activities were accomplished and controlled as required by applicable specifications, and established work and inspection procedures.

No items of noncompliance were identified.

6. Review of Structural Backfill Records for Reactor Foundation

The inspector reviewed the pertinent work and quality records associated with structural backfill placement/foundation preparation activities for the reactor areas. An approximate 20% sample of records was reviewed to determine that established work and QC procedures reflect work accomplishment consistent with NRC requirements and SAR commitments. The records were found in conformance to specification C-034, Revision 2 of May 20, 1977, as changed by EMF-776 of June 30, 1977 to SWP/P-C-107, Revision 2 of July 18, 1977 for placing and compacting category 1 structural backfill, and to QC inspection procedures. Additionally the qualifications of QA and QC personnel responsible for quality related foundation activities were reviewed.

No items of noncompliance were identified.

7. Review of Cadwelder Qualifications and Witnessing of Cadwelder Sampling and Testing

The inspector reviewed documentary records on cadwelder qualifications for conformance to Specification C-115 Revision 0 of November 6, 1975 and Addendum 1 of March 28, 1977. The QC inspection procedure requires, prior to starting production splicing, that each member of the splicing crew prepare two qualification splices for the splice position to be used. The inspector verified and witnessed the qualification of ten operators for horizontal positions on number 18 rebar. The inspector observed work in the field, and was accompanied by an Erico representative.

The inspector observed the removal of a production splice for test of the first ten splices made by one cadwelder. Destruction strength testing of this splice, No. T 314, on No. 18 rebar was observed in the laboratory to conform to requirements of ASTM A-370-70, and strength requirements exceeded the guaranteed ultimate tensile strength specified for the ASTM A-615-72 Grade 60 rebar.

No items of noncompliance were identified.

8. Unresolved Item Identified This Inspection/Cadweld Splicing

The specification C-115 on mechanical splicing of reinforcing bars contain three items that allow options which could result in loss of effective QC. These items require clarification and are designated as unresolved items. These are:

- Section 6.5.9 states; "A line shall be marked by painting, keel or round file 12 (+1/8) inches back from the end of each bar for a reference point to confirm that the bar ends are properly centered in the splice sleeve." The option permitting use of a nonpermanent keel could result in loss of the mark and inability to inspect. (354/77-08-02; 355/77-08-02).
- Section 6.3.3 states: "...cadwelder is subject to requalification if (2) completed splices fail to pass the visual inspection or the tensile tests..." And Section 6.6.5 states: "Splices which do not meet the visual quality acceptance standards will be rejected. Such splices shall be completely removed and the bars be respliced as required. Requalification will not be necessary if based on a single visual reject. Continued visual rejects shall be cause for requalification."

Clarification is required of the above to provide quantitative and qualitative acceptance criteria. (354/77-08-03; 355/77-08-03).

- Section 6.5.9 states: "A line shall be marked by painting, keel or round file 12 (+ 1/8) inches back from the end of each bar..." The inspector observed in practice that a round file was used. On splice #P 45 one file mark was placed on the diagonal deformation while on splice #P 84 one bar had the 12 inch file mark between diagonal deformation. The practice of placing a permanent mark on the longitudinal rib provides for effective control and retrievability for QC and QA respectively. (354/77-08-04; 355/77-08-04).

9. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or items which if uncorrected could result in noncompliance or deviations. Unresolved items identified during this inspection are discussed in paragraphs 4 and 8.

10. Record Errors Identified by Inspector on Which Action Was Taken to Provide Correction

The inspector identified in his review of production records on structural backfill placement and compaction and in the associated documentation that the characteristics of the vibro-compaction roller used was not in agreement with those given in the report of the machine employed in the test fill program. Since conclusion No. 4 of the test report stated that consideration should be given to obtaining and testing a heavier roller the possibility was investigated that for the production work another roller had been used. This was found not to be the case, and corrections were made in two documents giving the characteristics of the machine actually used in production, after the inspector identified this discrepancy.

11. Exit Interview

The inspector met with the licensee and engineer/constructor representatives (denoted in paragraph 1) at the conclusion of the inspection on August 5, 1977. The inspector summarized the scope and findings of the inspection. At this meeting the inspector was informed by the licensee that the status of construction, based on manhours expended remained at three percent as of July 30, 1977.

END

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