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

Region I

Report No. 50-423/81-05

Docket No. 50-423

License No. CPPR-113 Priority -- Category A

Licensee: Northeast Nuclear Energy Company

P.O. Box 270

Hartford, Connecticut 06101

Facility Name: Millstone Nuclear Power Station, Unit 3

Inspection at: Waterford, Connecticut

Inspection conducted: April 8-30, and May 1, 1981

Inspectors: John F. McGann for — June 3, 1981
J.C. Mattia, Senior Resident Inspector — date signed

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Approved by: R.R. Keimig — 6-4-81
R.R. Keimig, Acting Chief, Reactor Projects Section 1B, DRPI — date signed

Inspection Summary:
Unit 3 Inspection on April 8-30, and May 1, 1981 (Report No. 50-423/81-05)
Areas Inspected: Routine inspection by the Resident Inspector of work activities relative to pipe and pipe support erection and welding and investigation into concerns on erecting NSSS Reactor Coolant System. The inspector also performed plant inspection tours and reviewed licensee action on reported construction deficiencies. The inspection involved 55 inspector-hours.

Results: No items of noncompliance were identified.

Region I Form 12
(Rev. April 77)

DETAILS

1. Persons Contacted

Northeast Utilities Service Company (NUSCO)

K. Gray, Supervisor, Construction Q.A.
S. Orefice, Superintendent, New Site Construction
S. Toth, System Superintendent/Generation Construction
J. Peterson, Senior Project Technician/Generation Construction
D. Diedrick, Manager, Quality Assurance (Berlin)
J. Crockett, Unit 3 Superintendent

Stone & Webster Corporation (S&W)

F. Sullivan, Senior Resident Engineer
W. Mackay, Resident Manager
F.K. Sullivan. Senior Resident Engineer
A. Prussi, Resident Engineer
J.G. Kappas, Superintendent of Construction
P.A. Gagel, QA Program Administrator
G.G. Turner, Superintendent, Field QC
W.B. Anderson, Assistant Superintendent Field QC
M.R. Matthews, Assistant Superintendent Field QC
G. Marsh, Senior Engineer, Welding/NDE
N. Kelly, Construction Supervisor, Welding
J. Flynn, Construction Supervisor, Piping
E. Fleming, Chief Engineer (Boston)
R. Kelly, Vice President & QA Manager (Boston)
C. Hall, Materials Engineer (Boston)

Westinghouse Corporation

E. Harlow, Site Representative
B. York, Senior Piping and Welding Engineer (Byron Site)

The inspector also conferred with other licensee and contractor personnel during the course of the inspection.

2. Plant Tours

The inspector observed work activities in progress, completed work and construction status in several areas of the plant. The inspector examined work for any obvious defects or noncompliance with regulatory requirements or license conditions. Particular note was taken of the presence of Quality Control Inspectors and Quality Control evidence such as inspection records, material identification, nonconforming material identification, housekeeping & equipment preservation.

Specifically, the inspector observed various preparations for concrete operations, such as slump test for Pour No. C-1986 (Service Building-Tunnel Wall). The Cadweld operations on containment, installation of rebar for control, ESF and Auxiliary Buildings.

The inspector also observed the installation of cable trays and supports and piping installation in the various Category I Buildings.

No items of noncompliance were identified; however, two items remain unresolved as discussed below:

During one of the plant tours, the inspector noted that the Reactor Pressure Vessel Mirror insulation was not adequately protected (written matter on walls) and that the incore instrumentation piping underneath the vessel needed additional support to prevent workers grabbing onto pipe and exerting some unwanted stresses at the nozzle due to the existing long moment arm. The licensee was informed of the inspectors concerns and corrective action is being initiated. This item is unresolved pending completion and review of corrective action (423/81-05-01).

The inspector also noted that the mechanical snubbers that are presently installed are not protected in any way from nearby construction activities. An attempt was made to obtain the vendor's instruction manual to determine what his requirements are for maintenance and protection during storage in place or in warehouse. No manuals are on site and S&W is trying to obtain one. This item is considered unresolved pending review of vendor's manual. The licensee was also made aware of the NRC Bulletin 81-01 sent to him for information on this subject (423/81-05-02).

3. Followup of Licensee Potential 50.55(e) Reports

a. On February 5, 1981, the licensee reported to the NRC Region I Office by phone a potential significant deficiency (NRC Number 81-00-01). The deficiency had to do with the substitution of ASTM A615 Grade 60 Reinforcement Steel for Grade 40. The licensee has determined that the deficiency is not significant and, therefore, not reportable in accordance with 10 CFR 50.55(e) requirements.

   The resident inspector concurred with this determination.

b. On December 5, 1980, the licensee reported to the NRC Region I Office by phone a potential significant deficiency (NRC Number 81-00-08). The deficiency was associated with containment Flued Head Penetration Shopweld Joints being misaligned. The inspector reviewed the following documentation associated with the repair of twenty-nine penetrations:

   -- Nonconformance & Disposition Reports (N&D) Nos. 0653, 0635, 0603, 0570, 0538, 0526, 0520, 0512, 0428, 0397, and 0698.

   - S&W Weld Procedure Nos. W200C and W100B

-- S&W Technique Sheets No. W85U and W24L

-- S&W Engineering and Design Coordination (E&DCR) Report Nos. P-S-3204 and P-S-3053.

The inspector also observed the on-going welding activities for penetration Nos. 1, 5 and 126. The following concerns were identified by the inspector and related to the licensee and A/E.

(1) During inspection of the preparation fit-up for penetration #1, the craftsman informed the NRC and S&W Quality Control inspector that one of Tack Welds (approximately 2 inches) cracked its entire length. While the inspector was looking at the Fit-up alignment another tack (approximately 3 inches) also cracked its entire length. Discussions were held with crafts and S&W Supervision to determine if this was a frequent occurrence. The inspector was told that it has happened at least twice before. (Note: During the beginning of next shift, another tack weld cracked). The inspector reviewed the weld procedure to verify that all tack weld cracks are required to be ground out prior to welding. The inspector informed the licensee that no violations of procedure or code were identified. However, the inspector stated that there must be something wrong with the procedural method of tacking for the cracks to occur and that this is not considered "good welding practice." The A/E has agreed to review their procedure and will inform the NRC inspector of the results of their review. This item is considered unresolved (423/81-05-03).

(2) The inspector noted that the Stone & Webster's N&D and E&DCR for the penetration welds required post weld heat treatment (PWHT) of Penetration 126 which is a bi-metallic weld joint (welding of P8 and P1 material). The PWHT called for was to anneal at a temperature range of 400-500 F for 3 hours after the completion of the weld. The inspector had some concerns with the PWHT of this weld joint and also question its necessity. Discussions were held among the inspector, NRC Region I Specialist and S&W materials personnel. The outcome was that S&W will review their annealing process (which is to remove hydrogen) and determine whether the requirements of Section IX of the ASME Code have been met. This item is considered unresolved pending NRC review of the S&W findings (423/81-05-04).

(3) The inspector noted in the weld data package for penetration No. 1 (weld joint #CLP-3FW9) that the N&D #0698 dispositioned the numerous laminar indications that were found in the weld prep areas to "Accept As Is" after attempts were made to remove them. The inspector discussed this disposition with NRC Region I Specialist and cognizant S&W personnel.

In accordance with the S&W materials engineer, their fracture mechanics engineer had reviewed this E&DCR and concurred with the disposition. S&W will provide additional justification to the NRC inspector based upon their fracture mechanics engineer's analysis. This item is unresolved pending review of additional justification (423/81-05-05).

No items of noncompliance were identified in the above actions. However, the final document action for the penetration will be reviewed when all repairs have been completed.

c. In a letter dated November 4, 1977, the licensee informed the NRC Region I of a significant deficiency (NRC No. 77-00-01) associated with the Westinghouse AR-40 Relay used in the Millstone Unit 3 solid state protection system. These potentially defective relays are presently being replaced with Potter & Brumfield's series MDR rotary type relays. The licensee will inform NRC when this modification is complete and the resident NRC inspector will review the necessary documentation when the units are received at the site.

4. Investigation into Concerns of NSSS Equipment Installation

On March 23, 1981, an NRC resident inspector from Region III received an anonymous phone call, expressing the following concerns:

a. The Westinghouse resident was not competent to follow the erection of the Reactor Coolant (RC) piping.

b. The Reactor Coolant Pump casing was located 2 inches off center.

c. The Utility QA organization was ineffective and relied on Stone & Webster QC to follow erection on RC piping.

d. One of the Westinghouse equipment supports was cut and rewelded and this unauthorized rework was not documented.

The individual would not identify himself nor would he give the Region III NRC inspector specific details on his allegations, specifically what Particular NSSS equipment was reworked by S&W.

The Millstone Unit 3 Resident Inspector conducted an investigation into the above concerns and the observations resulting from this investigation are as follows:

(1) The inspector interviewed the NSSS Site Representative to review his qualifications and his purpose for being on the site. The inspector was informed by the Westinghouse Representative that his primary function was liaison with the licensee and his home office (Pittsburgh, Pa.) until the field office becomes officially staffed.

The Westinghouse representative's background was primarily a mechanical startup engineer & his knowledge of welding and pipe erection was minimal.

The inspector informed the Westinghouse Representative and the licensee that in the RESAR-3 Amendment 4, Section 17.1.1.7, it states that special processes such as welding, cleaning, and nondestructive testing are to be observed by qualified Westinghouse personnel to assure the work is performed in accordance with written procedures. It also states that during component installation, Westinghouse monitors work on Nuclear Steam Supply and engineered safeguards equipment.

The licensee showed the inspector a letter, dated November 24, 1980 which requested that Westinghouse provide a welding engineer in the beginning of 1981. The inspector was also informed that Westinghouse was experiencing some difficulty in obtaining a welding engineer. During this inspection period, Westinghouse sent one of their senior piping and welding engineers from the Byron Construction site to inspect the erection of piping and storage of NSSS Equipment. A meeting was held on April 28, to discuss his observations while at Millstone 3. His conclusion after he reviewed on-going work, radiographs, documentation and storage of NSSS equipment was that he had no findings and everything was acceptable. The NRC inspector was approached during his inspection of the installation of Reactor Coolant Piping by some of the crafts personnel who were concerned about the lack of control over cleanliness when required to enter the Reactor Coolant Loop piping. They were basing their concerns upon what they observed during construction of Millstone 2. The inspector reviewed Westinghouse's process specification 59 7760, Revision 5 which addressed cleanliness during installation of Nuclear Power Systems. For the erection of piping, it states that the degree of cleanliness is that which can be achieved with on-going work activities, which will minimize the amount of final cleaning of systems. There were no specifics for erecting reactor coolant pipe such as the use of shoe covers when entering the pipe or pump volutes. The NRC inspector asked the Westinghouse welding and piping engineer if he had any concerns about construction cleanliness of the Reactor Coolant piping. He stated that all other sites he has been to are conducting their operations the same as Millstone 3 such as not using shoe covers and closing ends of pipe, valve and pump openings with protective covers (poly, wood, etc.) and he had no concerns.

The inspector informed the licensee that this matter of not having a NSSS welding engineer on the site is considered unresolved (423/ 81-05-06).

(2) The inspector reviewed the following documents associated with the erection of the reactor coolant piping:

-- Westinghouse Procedure for Setting of Major NSSS Components, Revision 2, Dated 2/13/79.

-- S&W Field Construction Procedure FCP-281, Revision 1, dated 2/13/79 and entitled "Reactor Coolant Pump Volute Installation."

-- Westinghouse Drawing No. 1167E28, entitled "Reactor Coolant Pump Outline."

-- S&W Drawings (EV-11D&-11E) for reactor coolant temporary erection supports.

-- S&W Field Construction Procedure FCP-291, Revision 0, entitled "Reactor Coolant Loop Cold Leg Piping Installation."

- S&W General Weld Procedure #W100B for ASME Section III piping.

-- S&W Field Construction Procedure #284, Revision 1, entitled "Reactor Coolant Pump Temporary Erection Supports."

-- S&W Drawing #EV64B, Revision 5, entitled "Interface Control-Reactor Coolant Pump."

-- S&W Drawing #EC 50N-3, entitled "Embedment Details Containment Structure-elevation 3'-8".

-- S&W Weld Technique Sheet No. W13B, Revision 2.

-- S&W Engineering & Design Coordination Reports (E&DCR) #P-S-M-1050, #F-P-4525, F-P-4132.

-- Westinghouse RESAR-3 section 5.2.5.5 which discusses sensitization of stainless steel and states ranges of heat input during welding for various methods be used at Millstone 3.

-- S&W ASME Section III QA Manual.

-- Radiographs and associated interpretation sheet for reactor coolant cold leg weld joints; RCS-15-FW28, RCS-10-FW17, and RCS-5-FW7.

-- S&W Noncomformance and Disposition Reports (N&D) #0334 and #0378.

-- S&W Minutes of meeting dated 3/18/80, those in attendance, NUSCO, Westinghouse and S&W.

-- S&W Specification No. 968, Revision 2, entitled "Field Fabrication and Erection of Power Piping."

-- Westinghouse initial comments (memo to S&W dated 8/13/80 and approval (8/21/80) of S&W Field Construction Procedure #291).

-- Westinghouse memo, dated 3/20/80 to S&W expressing concern on the use of temporary equipment supports.

-- NUSCO memo dated August 26, 1980 to S&W approving reactor coolant loop cold leg piping installation procedure FCP-291.

(3) The inspector observed on-going work activities reviewed documentation, held discussions with various S&W personnel, including the crafts to verify that the requirements established in the above documents were adhered to. The following observations were made:

-- The location of reactor coolant pump volutes for loops "C" and "D" were not within the tolerance specified by the S&W specification M968 of $\pm$ 1 inch. The "C" pump was off approximately 3 1/4 inches. This was properly dispositioned in an S&W engineering and design Coordination Report No. F-P-4132, which waived the $\pm$ 1 inch tolerance and specified new tolerance values, based upon design calculations which were performed. The E&DCR was issued on 2/27/81. This new tolerance was discussed with Westinghouse representatives and the inspector was informed that S&W is solely responsible for installing NSSS equipment. The only concern with the S&W method of erection of the reactor coolant piping is their use of temporary supports for the RC pumps and steam generators. This was expressed in a memo to S&W dated 3/20/81. Westinghouse wants the hot legs and closure crossover weld joints to be welded when the permanent equipment supports are in place and if this is not feasible, the strain gages should be used on nozzles to insure that piping loads are consistent with design requirements. The inspector informed the licensee that this matter is considered unresolved pending resolution of the Westinghouse and NRC inspector's concerns in erecting the hot leg coolant piping with temporary supports (423/ 81-05-07).

-- The inspector observed on-going welding activities for Reactor Coolant Loop Piping welds RCS-10-FW18, RCS-5-FW10 and verified that the specified requirements were being adhered to. No items of noncompliance were identified.

(4) The inspector reviewed various documents associated with Reactor Coolant Weld Joints Numbers; RCS-10-FW18, RCS-5-FW10, RCS-5-FW7, RCS-15-FW28, RCS-10-FW17, RCS-15-FW27 and RCS-20-FW37. The inspector found the following discrepancies in the documentation which were corrected.

(a) Radiograph interpretation sheet for weld joint RCS-15-FW28 did not list the acceptance criteria for accepting the casting defect uncovered in film.

(b) Radiograph interpretation sheet for weld joint RCS-10-FW17 had incorrect number of films for two different radiographic shots taken.

(c) Radiograph interpretation sheet for field weld RCS-5-FW7 did not address the acceptable concavity that is visible on film station #42-56 for shot #1 and station #40-54 for shot #2.

(d) The licensee was informed that for all the weld joints the inspector reviewed nowhere was there any evidence that an acceptable purge was obtained prior to welding. They stated this was a surveillance function by S&W Quality Control and S&W construction verifies that the purge is acceptable. There is no code or S&W requirements for documenting that less than 2% oxygen has been obtained, however S&W agreed to document this on a random basis.

(e) The inspector noted that the radiographers performing the radiography of weld joints were not documented on interpretation sheets but there is traceability to a qualified radiographer by documentation controlling the use of isotopes for radiographing the particular weld joint.

No items of noncompliance were identified for the above items.

(5) The inspector held discussions with the licensee to determine what they have done to verify that S&W was complying with the specific requirements for erecting the Reactor Coolant Cold Leg piping. The inspector was informed by the various cognizant managers as follows:

(a) The construction (Non QA) level III NDE specialist has reviewed random radiographs of reactor coolant weld joints but there is no objective evidence to verify this. (Note: there is no licensee commitment or NRC requirement that a constructor shall have a level III NDE in the QA Program).

(b) The NUSCO QA contstruction group has not performed any audits, surveillances or in process verifications to date on any of the activities associated with the erection of the cold leg piping.

The inspector stated that the QA construction group's lack of any QA activities in the erection of Reactor Coolant piping is the same problem (inadequate staffing) that NRC had identified during a construction team inspection conducted on January 26-February 6, 1981 (Report No. 423/81-02). The inspector informed the licensee that since knowing that Westinghouse has not supplied a qualified welding and NDE engineer to observe S&W erection activities, which had started in the latter part of 1980, it would have been prudent for them to perform QA Audits and/or surveillances in this area. The inspector informed the licensee that this item is unresolved and would be considered as part of the observations and items of noncompliance found in inspection 423/81-02. (423/81-05-08)

(6) The inspector interviewed various craftsmen, S&W supervisors, NUSCO and Westinghouse site representatives in an effort to determine what NSSS equipment support was modified. The NRC inspector and the Westinghouse site representative toured the containment to inspect the various Westinghouse supplied equipment installed in place. The visual inspection and the discussions did not substantiate the allegation. However, during this inspection the inspector noticed that a stiffener plane on one of the safety injection accumulator (3 SIL-TK-1A) support skirts was bent. This item is considered unresolved pending disposition by the A/E. (423/81-05-09).

The inspector also informed the licensee that he would perform an inspection of the NSSS supplied regenerative heat exchanger supports when the drawing is received from the S&W Boston office. This item is considered unresolved pending completion of an inspection of the supports to insure that unauthorized modifications were not made in the field (423/81-05-10).

5. 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 deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 2, 3, and 4.

6. Management Meetings

At periodic intervals during the course of this inspection meetings were held with senior plant management to discuss the scope and findings of this inspection.