

U. S. ATOMIC ENERGY COMMISSION
REGION I
DIVISION OF COMPLIANCE

Report of Inspection

CO Report No. 289/70-6

Licensee: Metropolitan Edison Company (Met Ed)
(Three Mile Island Unit No. 1)
License No. CPPR-40
Category A

Date of Inspection: August 26, 27, 28, 1970

Date of Previous Inspection: June 18, 1970

Inspected by: D. M. Hunnicutt
D. M. Hunnicutt, Reactor Inspector (Principal)

9/25/70
Date

D. M. Hunnicutt for
J. H. Tillou, Reactor Inspector (Construction)

9/25/70
Date

Reviewed by: D. M. Hunnicutt for
E. M. Howard, Senior Reactor Inspector

9/25/70
Date

Proprietary Information: None

SCOPE

A routine announced inspection was made of Unit No. 1, one of the two 2535 MWT pressurized water reactors (B&W) under construction on Three Mile Island near Middletown, Pennsylvania. The inspection effort was directed toward an appraisal of the performance of the licensee-contractor effort of various items listed in PI 3800/2 and included an inspection of Attachment F "Reactor Coolant Pressure Boundry Piping" (4800 and 5000), Attachment G "Other Class I Piping" (4800 and 5000), Attachment I "Electrical" (5200) and Attachment J "Reactor Vessel" (4900 and 5500).

SUMMARY

Safety Items - None

1419 176

Nonconformance Items - CONAM Laboratory, contractor to UE&C for all NDT of pipe welding at site, has not met the requirements of FSAR, Section 6.1.2.4 and USAS B 31.7, Appendix B-110.1, in that the CONAM NDT procedures for inspection of the make-up, purification and decay heat systems are not qualified as required by the above references. (Section E)

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Unusual Occurrences - None

Other Significant Items

1. The reactor vessel arrived at the construction site on August 22, 1970. This vessel is to be stored on a concrete pad near the equipment access opening. Concrete pouring and possibly other work will be performed above this storage area intermittently until the vessel is moved inside the containment vessel about December, 1970. Overhead protection for the reactor vessel has not been included in the storage plans. (Section H)
2. The decay heat coolers have been removed and returned to the manufacturer for rework. The stainless steel tubes in these coolers were cleaned in a chlorinated solvent. (Section C.5)
3. The field weld identification system for all piping installation was changed from a numerical sequence system to a new system that allows any erection drawing to be used as a weld map and the weld identification numbers can be pre-determined and are readily located. (Section D)
4. Several possible problems and/or problem areas concerning electrical safety related systems were discussed with Met Ed and UE&C. (Section G.3)

Status of Previously Reported Problems

1. Results of radiographic interpretation for Grinnel Corporation pipe following repairs. This item is considered resolved. (Section C.1)
2. Status of four inch valves from Alloyco. These valves have been replaced. Alloyco did not disclose the cause(s) of cracks in the rejected valves. This item is considered resolved. (Section C.2)
3. Weld history records. The areas of high stress stampings on the river water secondary system heat exchangers have been ground out and re-stamped with low stress stamps. This item is considered resolved. (Section C.3)
4. Deficiencies on PDM bleed tanks due to unacceptable welder qualification records. The records and tanks have been inspected and meet the prescribed requirements. This item is considered resolved. (Section C.4)
5. CB&I NDT qualification procedures meet the requirements stated in ASME B&V Code, Section III. This item is considered resolved. (Section C.7)

1419 177

Management Interview

An exit interview was held with Messrs. Hreczuch, Allen and Kopp on August 28, 1970. The following items were discussed:

The inspector stated that all outstanding items, with one exception had been resolved. Mr. Hreczuch stated that it was Met Ed policy to complete identified items at the earliest date possible and to up-date the status of outstanding items periodically.

The inspector stated that during a tour of the cable storage yard numerous "approved for use" tags were difficult to read and that some items could lose their identity. Mr. Kopp stated that UE&C is aware of this problem and is attempting to solve it by use of a cloth type tag and ink that is not affected by weather.

The inspector stated that no procedure was available for qualification of electrical material upon receipt. Mr. Kopp stated that manufacturers certifications are used and that some samples have been taken, but have not been tested.

The inspector stated that proposed plans to store the reactor vessel near the containment vessel where it is exposed to possible damage from falling concrete or other materials could result in a serious problem. Mr. Hreczuch stated that protection for the reactor vessel would be constructed.

The inspector stated that GAI Specification 5550 did not specify adequate crane testing. Mr. Hreczuch stated that the subject would be evaluated and discussed with GAI.

UE&C Procedure MCP-4, "Testing Cranes, Etc.", does not include detailed requirements for testing and inspection of the polar crane for a 600 ton load (design tests, etc.) prior to lifting the steam generators (570 tons each) and the reactor vessel (400 tons). Mr. Hreczuch stated that the subject would be evaluated and discussed with UE&C.

The inspector stated that B&W General Erection Specification (for the NSSS) No. FS-II-2, "Cleanliness/Cleaning Procedures", was not available at the construction site. Mr. Hreczuch stated the matter would be followed up.

The inspector stated that Attachment 2, B&W Procedure No. FS-III-1A, "Setting the Reactor Vessel", was not available for review. Mr. Hreczuch stated that the procedure had not been prepared.

The inspector stated that no evidence had been found that indicated the licensee had reviewed or approved B&W field specifications for NSS components. Mr. Hreczuch stated that Met Ed had not reviewed these documents, but intended to review them in the near future.

1419 178

The inspector stated that there appeared to be no provisions or procedures to cover temporary storage and surveillance of the reactor vessel during storage. Mr. Hreczuch stated that this item would be taken under advisement and evaluated by Met Ed and its contractors.

The inspector stated that GAI Specification No. 5544 required only 5% radiography of the main steam system. Mr. Hreczuch stated that this requirement may be revised to 100% instead of 5%. All welds have been 100% radiographed, to date, although the commitment is for 5% to be radiographed.

The inspector stated that the site records for a randomly selected liquid waste disposal system (Class III) pipe spool, No. WDL-40, was unavailable for audit. Mr. Hreczuch stated that this matter was under investigation.

The inspector stated that there appeared to be no procedure for, nor documented evidence of any corrective action on items identified by UE&C site audits. Mr. Hreczuch stated that Met Ed would discuss this observation with Mr. Fant when Mr. Fant returned to the construction site.

The inspector stated that CONAM Laboratory NDT procedure qualification letters do not appear to meet the requirements of Section III, paragraph N-321, of the ASME B&PV Code. Mr. Hreczuch stated that appropriate corrective actions would be taken.

DETAILS

A. Persons Contacted

1. Met Ed

- Mr. Gene Hreczuch, Construction Engineer
- Mr. Earl Allen, Resident QA Supervisor
- Mr. Vern Stuebner, Resident Engineer, Electrical

2. UE&C

- Mr. J. E. Fant Site QC Manager
- Mr. George Dorn, Construction Superintendent
- Mr. David Lambert, QC Engineer (Cadm welding and Painting)
- Mr. Guy Kopp, QC Engineer (Electrical)
- Mr. Dennis Snyder, QC Engineer (Electrical)

3. B&W

- Mr. Jack Uhl, Construction Erection Consultant
- Mr. J. (Andy) Anderson, Site Representative

B. Construction Status

Mr. Hreczuch estimated that Unit No. 1 was approximately 50% complete. This estimate was based on manhours expended.

C. Outstanding Items

1. Stainless Steel Pipe, ASTM A-358, Class I and II by Grinnel Corporation*

Mr. Hreczuch stated that Met Ed had performed inspections and read the radiographs on this nuclear grade piping. All piping in this lot was rejected for nuclear service and has been replaced with piping acceptable under the provisions of ASTM A-358. This outstanding item is considered resolved by the inspector.

2. Cracked Stainless Steel Valves (4")**

A four inch Alloyco manufactured valve was observed to be cracked in the machined weld prep area and two other similar valves were cracked in the bodies. These valves have been replaced with valves that meet the purchase specifications. Alloyco did not disclose the cause(s) of cracks in the rejected valves. This outstanding item is considered resolved by the inspector.

3. Weld History Records***

The plant records and discussion with Mr. Allen indicated that the areas of high stress stampings on the river water secondary system heat exchanger have been removed by grinding and weld deposit material buildup. Proper marking with low stress stamps on several joints on the secondary system heat exchangers had been completed in accordance with an approved procedure. This outstanding item is considered resolved by the inspector.

4. Reactor Bleed Tanks (RBT)****

The inspector verified that the welds were identified on each of the three RBT and that the welders' performance qualification records were in accordance with the requirements of Section IX of the ASME Code. This outstanding item is considered resolved by the inspector.

1419 180

*CO Report No. 289/70-2, Paragraph B.2, and CO Report No. 289/70-4, paragraph J
**CO Report No. 289/70-2, Paragraph C.2, and CO Report No. 289/70-4, paragraph
***CO Report No. 289/70-4, Paragraph J.5
****CO Report No. 289/70-4, Paragraph J.6

5. Decay Heat Coolers*

Mr. Hreczuch stated that the coolers have been removed and returned to the manufacturer. The decay heat cooler tubes are stainless steel and had been cleaned in a chlorinated solvent. The manufacturer is to remove the welds, reclean the tube sheets, reclean the tubes and reweld the tubes in the tube sheets. These coolers will be inspected during a future routine inspection.

6. CB&I NDT Qualification Documents**

The inspector verified that CB&I has qualified the NDT qualification procedure under the requirements stated in ASME B&PV Code, Section III, paragraph N-321. A copy of the NDT procedure qualification documents was available at the construction site. This outstanding item is considered resolved by the inspector.

D. Field Weld Identification System Changes

On August 4, 1970, the weld identification numbers for piping systems at Three Mile Island No. 1 were changed from numerical sequence, irrespective of the piping system (which required that numerous weld maps be kept to show the location of each weld) to a method where the weld will be assigned the number of the pipe spool piece. This method of identifying field welds will follow the flow of the process, starting upstream of the first weld between a piece of equipment or tank and the first spool piece will be designated the identification number on the pipe or other starting point. The last weld between the last spool piece and the piece of equipment tank it is welded to will be an odd weld number which will also be given the identification number of the last piece of pipe; however, in this case, the letter "Q" will be added to the identification number.

E. NDT Procedures

The inspector found that the CONAM Laboratory NDT procedures have not been qualified according to USAS B31.7, Appendix B-110.1 as required by FSAR, Section 6.1.2.4. NOTE: CONAM Laboratories are a subcontractor to UE&C for all NDT of pipe welding at site, including the make-up, purification and decay heat system.

In a subsequent telephone conversation with Mr. B. Avers, the inspector was informed that GPU is requiring CONAM Laboratory to qualify all NDT procedures under the provisions of NAVSHIPS 250-1500. NAVSHIPS 250-1500 requirements require qualification to a more stringent criteria than specified in USAS B31.7.

1419 181

*Inspection Memorandum No. 289/70-A, same subject, dated April 16, 1970
**CO Report No. 289/70-4, paragraph J.7

UE&C personnel stated that the former method of weld identification resulted in a single copy of the weld map, and if lost or misplaced, all records were unavailable. The newly adopted method, described above, allows any erection drawing to become a weld map and allows designation numbers to be pre-determined and readily located at any time.

F. Reactor Coolant Piping (Welding)

The inspection effort consisted of a detailed review of the QC system as required by Attachment F, "Reactor Coolant Pressure Boundary Piping", PI 3800/2, Item 4804.03 and 4804.04.a.1 through and including g.5, except for Items 4805.04.e.1 through and including 4805.04.e.6.

All items were found to be in accordance with approved procedures and FSAR commitments, except for the NDT procedures. (Section E)

G. Reactor Coolant Piping System (Piping)

The inspection effort consisted of a detailed review of procurement documents and procedures as required by Attachment F, "Reactor Coolant Pressure Boundary Piping", PI 3800/2 (5005.04.a.1 through and including 5005.04.d.3 and e.1 and e.2). This inspection indicated that the B&W Commercial Nuclear Components (B&W-CNC) purchase specification for the reactor coolant piping met the applicant's FSAR commitment.

Shipping, receipt, storage, issue and handling was adequately covered by procedures to assure proper supervision and inspection in the areas of marking, identification, cleanliness, protection and control of reactor coolant piping.

The reactor coolant piping is being supplied by B&W-CNC, Barberton, Ohio.

H. Electrical

1. Attachment I - Electrical (Cables and Terminations - 5200)

The inspection effort consisted of a detailed review of the QC system as required by Attachment I, "Electrical", PI 3800/2, Items 5205.04.a through and including d.3 and e.1 and e.2.

All items were found to be in accordance with approved procedures and FSAR commitments.

2. Identifying Tags

The inspector observed that several of the "approved for other paper tags used for identification of electrical cable storage yard were fading and may soon become illegible. He stated that UE&C was aware of this deficiency and was searching for a more satisfactory method of identification.

1499 182

3. General

The inspector discussed the desirability of UE&C, GAI and Mer Ed assuring themselves of the following safety related items:

a. Redundant Circuits

Messrs. Kopp and Stuebner stated that computer runs would be used to design cables routes. The inspector informed Messrs. Kopp and Stuebner that this method has proved to be misleading at other facilities and that important safety circuits were found to be non-redundant in several cases. Mr. Kopp stated that additional study would be carried out. The inspector stated that this issue would be pursued during future inspections.

b. Methods of Marking and Tagging Installed Cables

GAI has prepared a procedure indicating that plastic or brass tags attached with fiberglass string will be used. The inspector stated that a method to assure that each cable is accurately labeled or marked is extremely important. Mr. Stuebner stated that other possibilities are still being considered, but this appears to be the best method proposed to date.

c. De-Rating

Mr. Kopp stated that the present plans are for one layer of cables in each tray and conceivably with additional separation to assure adequate de-rating. A specification stating the method of de-rating is being prepared.

d. Cable Trays

The inspector asked what precautions had been taken to assure adequate clearances between cable trays and components, walls and operating equipment. Mr. Kopp stated that the matter would be investigated. No cable trays have been installed in the containment vessel to date.

e. Methods for Wire Pulling

Mr. Kopp stated that each bend will be pulled and off-sets checked. Each cable will be laid and lashed to avoid cable piling on one site of a tray.

f. Cable Handling

Mr. Kopp stated that each cable will be inspected prior to and during installation and workmen cautioned concerning cable handling.

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g. Lubricants

Mr. Kopp stated that no wire pulling compound would be allowed without special permission from UE&C Engineering.

I. Reactor Vessel

The reactor vessel arrived by railroad car at the construction site on August 22, 1970.

UE&C is responsible for providing both construction and QC personnel to accomplish receiving inspection, handling, storage and installation of the reactor vessel. The FSAR states that these activities are to be accomplished according to the UE&C Field QC Manual, supplemented by detailed procedures and instructions from B&W. UE&C activities will be under surveillance by Met Ed and B&W representatives.

There was no evidence that the B&W QA program or the B&W field specifications for site handling of NSSS components has been formally approved by Met Ed, the applicant.

The UE&C QC procedures appear to be adequate when supplemented by detailed B&W procedures. However, B&W has not provided a procedure for outside storage of the reactor vessel nor a procedure for inspection, monitoring or auditing of the storage conditions related to the reactor vessel during the indefinite outside storage period.

UE&C is preparing a special procedure for installation of the reactor vessel and the reactor vessel head. Also, UE&C is preparing additional drawings to provide for a storage saddle and handling equipment and a handling sequence for the lateral travel of the reactor vessel from the railroad car to the temporary storage area. These reported procedures were not available for the inspector's review.

The reactor vessel is to be stored on a concrete pad near the equipment access opening. Concrete pouring and possibly other work will be performed above this storage area intermittently until the reactor vessel is moved inside the containment vessel about December, 1970. Overhead protection for the reactor vessel had not been included in the storage plans. The inspectors discussed this apparent oversight with Met Ed management. Mr. Hreczuch stated that overhead protection for the reactor vessel would be constructed.

The inspector telephoned Mr. Avers on August 28, 1970, to emphasize the concern that the reactor vessel storage proposal appeared to be substandard. Mr. Avers stated that adequate storage, surveillance and overhead protective structures would be provided to assure that the reactor vessel was not damaged or contaminated while in outside storage.

1419-184