

# 504

UNITED ENGINEERS & CONSTRUCTORS INC.

QUALITY ASSURANCE PROCEDURE QC-30, REV. 4

FOR

WORK STOPPAGE

May 9, 1973

THREE MILE ISLAND - PROJECT NO. 1

METROPOLITAN EDISON COMPANY

Approved by:

B. G. Avers 5/25/73

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Manager of Quality Assurance  
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UNITED ENGINEERS & CONSTRUCTORS INC.

QUALITY ASSURANCE PROCEDURE QC-30  
FOR  
WORK STOPPAGE

POOR ORIGINAL

I. SCOPE

This procedure is applicable to work performed by UE&C within the scope of its responsibility as Construction Manager for Three Mile Island Unit No. 1.

II. GENERAL

During site construction, the UE&C Project Superintendent and the GPUSC Quality Assurance Manager will be advised immediately of any uncorrected deviations from specification requirements. For shop or field fabrication the GPUSC Project Manager and GPUSC Quality Assurance Manager, as appropriate, are authorized to initiate corrective action which includes ordering stoppage of work.

A. Purpose

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The purpose of this procedure is to clarify and emphasize that significant deficiencies noted by the UE&C Field Supervisor - Quality Control shall be brought immediately to the attention of the GPUSC Quality Assurance Manager and the UE&C Project Superintendent for corrective action before proceeding with the work. The GPUSC Project Manager and/or GPUSC Project Engineer will also be notified immediately. Furthermore, the GPUSC Project Manager has delegated authority to stop work to the appropriate GPUSC Project Engineer until corrective action is taken.

B. Reference Documents

1. Three Mile Island Unit No. 1 - Preliminary Safety Analysis Report and Supplements.
2. Three Mile Island Unit No. 1 - Final Safety Analysis Report.
3. Material and Construction Specifications, (prepared by GAI).
4. Quality Acceptance Standards, SP-5550 (GAI).
5. UE&C Quality Control Procedure - QC-17, "Control of Nonconforming Conditions".

1566 124

## II. GENERAL (Continued)

POOR ORIGINAL

### C. Definitions

Major Portion: When referenced in this procedure, a "Major Portion" applies to an entire discipline operation; e.g. concrete operations, welding, cable pulling, Cadwelding, etc. Other, more specific quality control deficiencies related to craft activities will be handled in accordance with QC-17, "Control of Nonconforming Conditions".

## III. PROCEDURE

If a condition arises wherein the UE&C Field Supervisor - Quality Control determines that project work or major portions thereof must be stopped in order to preserve the Quality of the project, he shall so inform the UE&C Project Superintendent and the GPUSC Quality Assurance Manager. If the UE&C Project Superintendent does not take immediate action to stop work, the UE&C Field Supervisor - Quality Control shall recommend to the GPUSC Project Manager and/or the GPUSC Quality Assurance Manager that work be stopped until such time as satisfactory corrective action is taken.

Information supplied by the UE&C Field Supervisor - Quality Control pertinent to his work stoppage recommendation shall include all applicable documentation such as inspection reports, test reports, analyses, deficiency reports of design criteria furnished by the Design Contractor.

## IV. DOCUMENTATION

The UE&C Field Supervisor - Quality Control will maintain a log of all stop work reports initiated by his function and shall reference all documented procedures, practices, codes, design criteria, or written instructions that were violated thereby initiating the stop work action.

In addition, the log will reference the action by serial number and shall include the following information:

- A. Date initiated.
- B. Name of initiator.
- C. Discipline involved and contractor or supplier involved.
- D. Due date for action statement.

1566 125

IV. DOCUMENTATION (Continued)

- E. Date action statement received.
- F. Date action is to be effective.
- G. Name of assigned auditor (inspector or Q.C. Engineer).
- H. Date audit or inspection is complete.
- I. Revision of procedure brought about by this action.
- J. Concurrence or non-concurrence of UE&C Site Project Superintendent.

The UE&C Field Supervisor - Quality Control will utilize the status of this log to assure that corrective action is taken in a timely and effective manner, and to accumulate a regular monthly management report summarizing this activity to the GPUSC Quality Assurance Manager.

POOR ORIGINAL

1566 126

QUESTION 6:

"Please state all particulars regarding an inspectors authority to stop construction."

RESPONSE:

(See Response to Question 5).

1566 127

QUESTION 7:

"State in detail the discussion and by whom the decision was made with regard to the continuation of construction after the "honeycomb" concrete defect was discovered in the North 180° of the ring girder."

RESPONSE:

The decision to continue placement of concrete on the South 180° sector of the ring girder, after the "honeycomb" concrete defect was discovered and evaluated on the North 180° pour, was a joint effort on the part of United Engineers & Constructors, (UE&C) Gilbert Associates, Inc. (GAI) and GPU Service Corporation (GPUSC).

Because of the difficulties encountered in placing concrete in Lift 3 - North 180°, the constructor (UE&C) requested and received permission from the architect engineer (GAI) to change the location of the construction joint for the South 180° area. With the new construction choice permitting a decrease in depth of concrete lifts for the South 180° area, there was no problem experienced in placing and vibrating the concrete into all of the areas in Lifts 3, 4 and 5. To accomplish this, much of the reinforcing bar above each lift was taken out and replaced prior to concreting the next step. In addition, men were stationed on the form scaffolds to inspect, through windows cut in the form panels, that the concrete was being properly consolidated. Concrete was placed for Lift 3 on the South 180° area in two 90° sections rather than a complete 180° section to allow the inspectors to concentrate on a smaller area. Lifts 4 and 5 were cast in a 180° section each and the cranes placing the concrete were supplemented by a concrete pump.

The decreased depth of Lifts 3, 4 and 5 on the South 180° and the absence of the reinforcing bar above each lift provided complete physical and visual access for placement, consolidation and inspection.

Therefore, based on the above facts and as a result of complete and thorough placement inspection, it was the judgement of the concrete supervisor, area superintendent, field engineers and inspectors that the concrete in Lifts 3, 4 and 5 of the South 180° area of the ring girder was properly placed and consolidated.

1566 128

QUESTION 8:

"What will be the effect of any repairs made to the ring girder?"

RESPONSE:

There will be no adverse effect as a result of the repairs made to the ring girder. Additional pertinent information is contained in Section 5.06 of the "Report on Containment Ring Girder Construction and Repair", dated December 1, 1971, and addenda 3 and 4 to that report, referenced in your Question 1.

1566 129

QUESTION 9:

"State in detail the effect of the repairs upon the strength and integrity of the containment structure."

RESPONSE:

(See Response to Question 8).

1566 130



QUESTION 10:

"Name the persons who will perform the Structural Integrity Test, their immediate supervisor and job title."

RESPONSE:

The persons who will perform the Structural Integrity test, including gathering of test data, will be employees of the testing instrument contractors, Brewer Engineering Laboratories, Inc. The names of these persons are not available at this time. Brewer Engineering Laboratories, Inc. will be supervised in this regard by the Structural Integrity Test Engineer (presently anticipated to be Mr. Kory Nodland) of Gilbert Associates, Inc., who will make all decisions with respect to the structural portion of the Structural Integrity Test. Gilbert Associates, Inc.'s Structural Integrity Test Engineer will be supervised by the GPU Service Corporation Test Director (presently anticipated to be Mr. Gary Miller) who will oversee and coordinate the Structural Integrity Test.

1566 131

QUESTION 11:

"Name the persons, their job function and title who will do the inspection, before during and after the Structural Integrity Test."

RESPONSE:

The persons responsible for inspection before, during and after the Structural Integrity Test are the United Engineers and Constructors - Structural Quality Control Group. The names, job functions and titles of these persons are contained in the response to Question 4. UE&C Structural Quality Control personnel will report to Mr. Joseph E. Wright, GPU Service Corporation's Three Mile Island Site Quality Assurance Manager.

1566 132

QUESTION 12:

"How will the Structural Integrity Tests be performed, by what organization, who will supervise the operation, and will reports be made available to the general public."

RESPONSE:

The Structural Integrity Test will be performed as described in Appendix 5E of the TMI Unit 1 Final Safety Analysis Report. The test data will be gathered by Brewer Engineering Laboratories, Inc., as directed by Gilbert Associates, Inc.'s Structural Integrity Test Engineer. The report will be filed with the Atomic Energy Commission and will be made available to the public.

1566 133

QUESTION 13:

"What are the limiting factors for disapproval of the structural integrity of the containment, and who makes the decision?"

RESPONSE:

Paragraph 7 of Appendix 5E to the TMI Unit 1 Final Safety Analysis Report states the acceptance criteria for the structural integrity test. The Structural Integrity Test Engineer makes these decisions.

1566 134

QUESTION 14:

"Please state whether a final report was issued with regard to the Plume effects of Natural Draft Hyperbolic Cooling Towers? If so, please submit."

RESPONSE:

The latest status report entitled "Potential Effects of Plumes From Cooling Tower Operation at Three Mile Island Nuclear Station" was issued on June 25, 1973. The purpose of this report (a copy of which is enclosed) is to advise what has been done to date and the data that is presently available as a result of this study as well as to outline future studies. In view of the importance of environmental considerations the study will continue beyond initial plant operation, before a final report can be issued.

1566 135

# POOR ORIGINAL

## QUESTION 15:

"What corrective measures can be taken to reduce or eliminate "Fogging" effects from the cooling towers? Please state all alternatives and their approximate cost."

## RESPONSE:

Environmental effects of potential increased "Fogging" as a result of cooling tower operations are discussed in the Three Mile Island Nuclear Station Environmental Report, Section 5.1. Therein, it is estimated that under the most adverse meteorological circumstances there is a statistical possibility of "Fogging" or "Fogging" effects near ground level at Olmstead Airport for approximately 39 hours per year due to station cooling tower operation. In determining the hours of potential additional "Fogging," it was assumed that there was maximum evaporation of both units, TMI-1 and TMI-2, at full rated capacity throughout the year.

"Fogging" effects from the cooling towers could be reduced by modification of the TMI station circulating water systems for "once through" cooling, i.e., discharging circulating water directly to the river and bypassing the cooling towers. Modification of the station for this mode of operation would entail expenditures in excess of \$10,000,000 for design engineering, material and construction, and would also require permits, as a minimum, from the Commonwealth of Pennsylvania, Department of Environmental Resources and the United States Corps of Engineers.

Alternatively, "Fogging" effects could be reduced by reduction in station electrical, and consequently thermal, output; however, a reduction in power, for example, by 50%, would result in substantially less than a reduction of 50% in the potential for "Fogging.". The logical extention of this approach is that "Fogging" effects could be "eliminated" by total shutdown of the station. The direct cost resulting from such complete loss of generation is presently estimated to be in excess of \$150,000 per day. The indirect cost, at sometime in the future, of items such as loss of system reliability or the necessity for selected load shedding are incalculable.

Other alternatives to reduction of "Fogging", such as cloud seeding or area heating, have not been analyzed in detail in that it is anticipated that the ongoing meteorological studies which will be continued during initial plant operation will show that even the present minimal estimates of "Fogging" or "Fogging" effects are conservative. Further, it is recognized that alternatives similar to those mentioned above present their own substantial environmental problems.

1566 136

QUESTION 16:

"List tests performed on concrete in the containment structure. This listing should include destructive testing as well as non-destructive."

RESPONSE:

The following tests were performed in accordance with the requirements of UE&C Quality Control Procedure No. 1, Rev. 8 on concrete placed in the containment structure:

- a. Compressive strength tests of representative samples
- b. Slump tests
- c. Air and entrainment tests
- d. Temperature tests
- e. Core borings (used on ring girder only).

A copy of UE&C Quality Control Procedure No. 1, Rev. 8 is enclosed.

1566 137