

PITTSBURGH TESTING LABORATORY

**QUALITY CONTROL PROCEDURES
FOR PLACEMENT OF STRUCTURAL CONCRETE**

QUALITY CONTROL PROCEDURE NO. PTL-Q10

"SPECIFICATIONS PLACEMENT OF STRUCTURAL CONCRETE"
GILBERT ASSOCIATES, INC.
SP-5618

MAY, 1969

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COMPLETELY REVISED - OCT., 1972

Approved by: H. L. Bennett
Director - Gen. Const.

Date: _____

CRYSTAL RIVER - UNIT NO. 3
FLORIDA POWER CORPORATION

01/115

**PITTSBURGH TESTING LABORATORY
QUALITY CONTROL PROCEDURE FOR
PLACEMENT OF STRUCTURAL CONCRETE**

Quality Control Porcedure P.T.L. No. 10

I. GENERAL

- A. The Independent Testing Agency - Pittsburgh Testing Laboratory will perform the first level quality control as given within the scope of test procedures. The activities of Pittsburgh Testing Laboratory will be under the supervision of the owners' project manager.

Pittsburgh Testing Laboratory shall act within themselves in matters relating to daily procedure activities.

- B. Pittsburgh Testing Laboratory shall have sufficient personnel and equipment available at the project site in order to effectively, promptly and accurately carry out the routine duties prescribed within these procedures. The personnel shall be authorized by the owners' project manager. He shall also authorize any work to be performed off-site by Pittsburgh Testing Laboratory.
- C. Reports and Records - Reporting generated by Pittsburgh Testing Laboratory will be as required within the following specific procedures. These reports shall be submitted to the owners' project manager and will become part of the Quality Control File.
- D. Notification of each concrete placement shall be given to the Testing Laboratory on day prior to placement which shall consist of a copy of the concrete placement check-out sheet (copy attached) to make arrangements for necessary inspections and testing during placement. Two hour notice can be made for special circumstances when proper arrangements can be made.
- E. Pittsburgh Testing Laboratory shall review prior to placement to assure that completed concrete pour sheet is valid. Deviations shall be noted on Pittsburgh Testing Laboratory summary field report. Pittsburgh Testing Laboratory inspector shall perform final sign off. Pittsburgh Testing Laboratory inspector shall verify placement of embedded items including reinforcement. Exact positioning of all embedded items except rebars shall be performed by J. A. Jones Construction Company.

II. PROCEDURES**A. Subgrade Inspection**

1. Notification shall be given to the testing laboratory prior to placing concrete on subgrade.
2. Testing laboratory shall make following checks:
 - a. Subgrade compacted to density of 95% Minimum Modified AASHO Max. density unless other wise specified.
 - b. Subgrade thoroughly wetted - No frozen subgrade or organic and deleterious materials.
 - c. Concrete placed against rock - rock is carefully cleaned of all dirt and loose particles by air and or water jetting and brooming - rock thoroughly wetted.
 - d. Vapor barrier, if required, shall be installed in accordance with specifications and drawings.

B. Field Testing at Construction Site

1. Testing laboratory inspectors shall inspect and test first load of concrete to the site: for compliance with job specifications.
2. The water-cement ratio shall be checked to verify it has not been exceeded on each load.
3. Slump tests will be taken every 10 cubic yards or every load of concrete placed. Concrete exceeding the specified maximum slump shall be rejected.
4. Air content and temperature tests shall be taken every 50 cubic yards placed or more frequently if found necessary. Concrete not in conformance with air and temperature requirements shall be rejected.
5. Test cylinders will be molded, cured, stored, capped and tested in accordance with ASTM C-31 and C39. Four cylinders shall be cast for each 50 cubic yards or fraction thereof placed in any day. Two cylinders shall be tested at 7 days and two at 28 days. One additional cylinder made for each set during cold weather concreting as defined by ACI or whenever requested.
6. The concrete shall be sampled in accordance with ASTM C-172. Slump tests may be taken at other points in accordance with ASTM C-94 for uniformity evaluation.

7. The field inspector shall check that the time of the concrete in the truck mixer does not exceed 1 1/2 hours after batching and that total revolutions do not exceed 300.
8. The field inspector shall make the necessary notations on the delivery slips which shall include:
 - a. Time of concrete placement.
 - b. No. of revolutions.
 - c. Slump.
 - d. Temperature when tested.
 - e. Air content when tested.
 - f. Cylinder identifications when made.
 - g. Location of concrete placement.
9. Collect and submit to FPC project manager all PTL concrete batch slips for each placement.
10. Prepare reports of daily field concrete operations and testing which shall include:
 - a. Date
 - b. Location of placement
 - c. Class and amount of concrete placed
 - d. Number and identification of test cylinders including air content and slump of said test batch.
 - e. Number of cu. yds. of concrete rejected and disposition.
 - f. Weather conditions.
 - g. Time of beginning and end of pour.
 - h. Unusual conditions such as rejections or other pertinent remarks.
 - i. Results of other slump, air content, temperature, mixing date will be given on the batch slip for the respective placement.

C. Field Placement Inspection

1. Testing laboratory inspectors shall perform the following inspections and shall document this inspection on each placement. (Sample inspection form attached.)
 - a. Formwork for cleanliness, tight joints, form oiling and exposed edges chamfered.
 - b. Reinforcement for cleanliness, adequate securing and clearances to forms and subgrades.
 - c. Construction joint surfaces except as noted otherwise hereinafter shall be prepared for the placement of concrete there on by cleaning thoroughly with wire brushes, water under pressure, or by other means to remove all coatings, stains, debris, or other foreign material.
 - d. Horizontal and vertical construction joints in the reactor building cylindrical shell below 250'0 level shall be prepared for receiving next pour by either sandblasting, air water jet, bush hammering, or other means to remove all coatings, stains, debris or other foreign material. The horizontal joints shall be dampened, then thoroughly covered with cement - sand mortar, of similar proportions in concrete, of approximately 1/2 inch thick and concrete placed before initial set of mortar. Vertical joints shall be dampened before concreting.
 - e. Construction joint surface in the Ring Girder and Dome at and above 250'0 of the Reactor Bldg. are to be prepared by sandblasting to produce a clean rough surface and the applying an evenly distributed film of Colma Fix 8% adhesive.
 - f. Conveyance equipment in accordance with ACI 301 Chapter 8 and ASTM C94. All transporting to point of deposit to be without segregation of concrete.
 - g. Concrete deposited in horizontal layer not exceeding 18" - avoiding inclined joints with maximum free fall of 3 feet. Each layer vibrated together.
 - h. Placing of concrete shall not cause movement or damage to embedded items.
 - i. Concrete vibrated adequately and concrete of proper workability to avoid seams or planes of weakness.

- j. Vibrations adequate to thoroughly work around reinforcement, embedded items, corner, eliminating air or rock pockets, honeycombing, pitting or planes or weakness.
- k. Adequate vibrators used at a minimum frequency of 7000 rpms when immersed in concrete.

D. Curing

- 1. Curing methods shall be in accord with ACI-301 except that curing compound shall not be used on concrete of containment shell.
- 2. A curing log shall be set up to keep a record of each structure cured, methods and duration.
- 3. The following checks and documentation shall be made by the testing laboratory inspectors:
 - a. Location of part of the structure placed.
 - b. Date of placement.
 - c. Weather.
 - d. Curing of unformed surfaces - start immediately after final set.
 - e. Date forms removed.
 - f. Type of curing on formed and unformed surfaces.
 - g. Number of days of curing performed as compared to specified minimum per ACI-301.
 - h. Structure protected from stresses and rain or water during curing period.
- 4. During cold weather concreting as defined by ACI a detailed report of each part of structure cold weather protection and curing shall be made as shown on attached sample report form.
- 5. Concrete finishes shall be inspected and noticeable defects shall be reported.

E. Reports and Records

Completed records generated on each phase enumerated herein shall be submitted to the Quality Engineer within one week following the activity.

1. Batch delivery slips with field data included.
 2. Concrete placement report.
 3. Concrete curing report.
 4. Summary of field tests and daily field concrete operations.
 5. Laboratory tests of aggregates.
 6. Laboratory test results of 28 day cylinders - Note 7 day
- F. Deficiencies: results to be reported with 28 day results.

Results of all tests and inspections that do not meet specification requirements shall be immediately reported to the FPC project manager and Quality Engineer. Recommendations shall be made for remedial actions or measures required to bring the production within standard quality control and the limits of the engineering specifications. Final recourse for action shall be made by the FPC Project Manager.

Attachments: Cylinder Report Form FP-1
Concrete Placement Form FP-4
Daily Concrete Curing and Form Removal Form FP-3
Daily Concrete Pour Record-Cold Weather Form FP-2
Field Report of each load
Concrete surface defect form