

DETAILS

1. Persons Contacted

General Public Utilities Service Corporation (GPU)

- *R. Fenti, Senior Site QA Auditor
- *J. Griest, Project Construction Manager
- *S. Levin, Supervisor Site Engineering
- *S. D. Morris, Senior Field Quality Control Engineer
- *J. C. Thompson, Site Quality Control Supervisor
- *J. E. Wright, Site Quality Assurance Manager
- T. R. Block, Site QA Auditor
- A. Pinter, Field Quality Control Engineer
- F. Spencer, Quality Control, Concrete Testing
- R. Drummond, Construction Engineer
- K. Snyder, Quality Control, Concrete Testing

Stone and Webster Engineering Corporation (S&W)

- *K. J. Platte, Resident Engineer
- *W. M. Sweetser, Project Manager
- *R. L. Wagner, Superintendent of Construction
- S. Deyo, Construction Engineer
- G. Dick, Area Superintendent

Morrison-Knudsen (M-K)

- *J. A. Heasley, Project Manager
- *D. Kovisto, Project Engineer
- *J. R. Lemley, Vice President, North American Operations
- *R. Stauber, Quality Assurance Manager
- D. Richards, Quality Control Engineer
- D. Vickery, Quality Control Engineer
- L. Grandpre, Construction Superintendent
- H. Herrin, Area Superintendent
- R. Love, Quality Assurance Manager, Home Office

Burns and Roe, Incorporated (B&R)

- M. Giannini, Structural Engineer
- T. Hayes, Geotechnical Engineer
- S. Lazorchak, Site Field Engineer

Eastern Shore Transit Mix (EST)

R. Johnson, Quality Control Manager
 V. Carpentier, Vice President
 A. Vendrasco, Vice President
 V. Nagee, Quality Control Engineer
 F. DeCessaro, Batch Plant Operator
 K. Hubach, Batch Plant Inspector (PTL)

* denotes those present at the exit interview.

The inspector also interviewed other licensee and contractor employees during the inspection, including quality control and construction crafts.

2. Construction Site Walk-Through Inspection

The inspector made a tour of the construction site to observe work activities in-progress. The inspector examined work items for any obvious defects or noncompliance with regulatory requirements and for evidence of quality control of the work. Specific activities observed by the inspector included installation of reinforcing steel and cadwelding for containment basemat reactor well, curing of previous basemat concrete placements, placement/composition/testing of structural backfill on southeast containment area, construction of north and south auxiliary building sumps including waterproof membrane installation and testing and installation of protective concrete over membrane.

No items of noncompliance were identified.

3. Containment Building Basemat - Preparation for Concrete Placementa. Morrison-Knudsen Quality Control/Construction Procedures Do Not Provide Acceptance Criteria

Licensee PSAR, Quality Assurance Program, Section 1.6.4.4, Control of Special Processes, Tests and Inspections, commits to procedures which include acceptance/rejection criteria for inspections. The GPU Quality Assurance Plan for Forked River states in Section 5, major contractors are required to assure that appropriate qualitative and quantitative acceptance criteria shall be provided to

ascertain that quality related activities are properly performed. Section 5 additionally states that procedures and instructions shall identify applicable prerequisites and be sufficiently clear and definitive to describe the activity or operation to be performed and type of characteristics to be measured or observed.

MK Construction Procedures CP-04-FR, Revision 4, August 30, 1978, Construction and Containment Building, and CP-11-FR, Revision 2, July 21, 1978, Placement and Curing of Concrete do not provide details in the inspection report forms nor specifically describe that the Concrete Placement Checklist is to be augmented by the Inspection Report identifying applicable prerequisites. Instructions are lacking in the procedure that explain to the QC inspector his responsibility in documenting on the Inspection Report his observation/verification of applicable prerequisites. For instance, the Concrete Placement Checklist is a form with the general item "Construction Joints" which QC must verify for adequacy of preparation/installation after craft supervision signs-off on the item. The procedures enumerate requirements, extracted from B&R specifications, on vertical special surfaced construction joints, and different requirements for concrete surface construction joints, both horizontal and vertical. Instructions do not exist in the MK QC procedures to provide inspection plans and reports or checklists including inspection/rejection criteria of the characteristics measured or observed.

b. Inadequate Preparation of Construction Joints

Containment building basemat interior block pour number LSK-111, scheduled for concrete placement on afternoon of October 10, 1978, was observed by the inspector to be prepared for concrete placement at about 2:00 p.m., October 10, 1978. The area had been formally released for concrete placement by MK QC sign-off of the prescribed form identified in procedure CP-11-FR, as Concrete Placement Checklist. The inspector observed and discussed with S&W and MK QC and construction personnel the following details regarding inadequate preparation of two vertical construction joints. The inspector cited three unacceptable conditions with regard to criteria identified in B&R Specification 206, Section 3A, Paragraph 6.1.4 and MK Construction Procedure CP-11-FR, Section VI.D:

" . . . construction joints not formed by the use of corrugated metal sheets shall be cleaned of laitance and foreign matter."

- The north and south vertical construction joints of the 10' deep block are surfaces of previously placed blocks formed by expanded metal at bottom 24" of the pour. Here an eight layer grid pattern of #12 rebar extends through the basemat blocks. Expanded metal used to form the previous construction joint was observed to have excess material and/or material not in contact with concrete that had not been removed. The excess expanded metal would have prevented flow of concrete around rebar and against the vertical joint.
- The above joints have a 10" barbell horizontal waterstop which had not been cleaned of laitance covered mortar that leaked through the form over the top surface of the waterstop in the new pour.
- This fins of laitance covered mortar which leaked between wooden form supports below the waterstop had been left in place after removal of the forms.

As a consequence of the inspector identification of the above, concrete pour number LSK-111 was delayed by Construction Manager until the north and south construction joints were prepared by MK conforming to requirements of the specifications. The lack of quantitative and qualitative acceptance criteria in the MK construction/quality control procedures & as a result the acceptance by QC of an inadequately prepared construction joint, is considered to be in noncompliance with Criterion V of 10 CFR 50, Appendix B (78-13-01).

4. Containment Building Basemat - Observation of Concrete Placement

The inspector observed preparation for and concrete placement of two containment basemat lower blocks containing an estimated volume of 500 cubic yards of 3,000 psi concrete. Pour number LSK-111, on October 10, 1978, and number LSK-110 on October 13, were observed accomplished in accordance with NRC requirements and as identified in the following criteria:

- Forked River Nuclear Station, Unit 1, PSAR Section V and Appendix 5 D
- B&R Specification 2700-206, Revision 6, "Substructure"
- B&R Specification 2700-202, Revision 8, "Production and Delivery of Concrete"
- GPU Specification 202-003, Revision 3, "Specification for Performance of Owner's Site Civil Testing"
- GPU QC Procedure FR-1-10-04, Revision 0, "Site QA/QC Surveillance Procedure"
- MK Construction Procedure CP-11-FR, Revision 2, "Placement and Curing of Concrete"

The inspector determined the following activities were accomplished to applicable specifications, codes, standards and procedures:

- a. Placement Preparation
- b. Delivery and Placement
- c. Aggregate and Cement Storage
- d. Rebar Installation and Cadwelding
- e. Batch Plant Operation
- f. Concrete Curing
- g. In Process Inspection of Above Activities

No items of noncompliance were identified.

5. Unresolved Item

- a. Engineering Safety Features Compartment Interior Concrete Wall - Nonconformance Due to Rock Pockets and Honeycombing

In accordance with the GPU QA Plan, a nonconforming condition was reported October 5, 1978, for the north wall of the ESFC interior pit. NCR Number 0016, states that, after some of the

forms were removed, rock pockets and honeycombing were found. The inspector observed manual chipping of loose pockets of concrete beneath and surrounding five pipe penetrations in the three foot thick 5000 psi (90 day) concrete wall. Chipping to sound concrete from both sides of the wall had not been completed. This is an unresolved item (78-13-02).

b. MK Documentary Records of Completed Basemat Concrete Placements Found Not Acceptable by Construction Manager

Concrete Construction QC records by MK for completed containment building basemat blocks were transmitted to the construction manager for filing in the GPUSC document center. S&W Procedure FR-1-17-1 requires no specific time after completion of the 14 day cure period for QC record transfer, but the intention is that where completed work impacts on the quality of succeeding work the records must be received prior to start of affected work. S&W in their capacity of planning, controlling and directing site activities has returned to MK for correction all the concrete records on containment basemat blocks that have been completed. The NRC inspector reviewed copies of some of the MK records and the S&W comments on the corrections needed. Additionally, the inspector found the records incorrectly identified that MK performed "surveillance" whereas first level inspection actually was performed by QC on in-process inspection of concrete placements. This is an unresolved item (78-13-03).

6. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items or items of noncompliance. Unresolved items disclosed during the inspection are discussed in Paragraphs 3 and 5.

7. Exit Interview

At the conclusion of the inspection on October 13, 1978, a meeting was held at the site with representatives of the licensee, construction manager and contractor organization. The inspector summarized the results of the inspection, as described in this report. In telephone conversation, on October 20, 1978, the inspector informed licensee representatives that the October 13 findings would be combined in this report to show one noncompliance item.