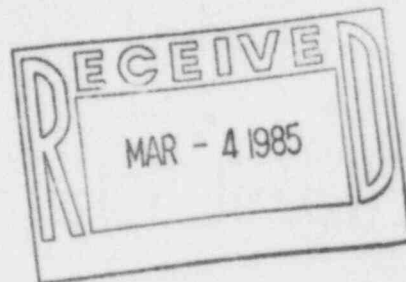


# The Light company

Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

February 28, 1985  
ST-HL-AE-1199  
File No.: G12.195

Mr. Robert D. Martin  
Regional Administrator, Region IV  
Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 1000  
Arlington, Texas 76011



Dear Mr. Martin:

South Texas Project  
Units 1 & 2  
Docket Nos. STN 498, STN 50-499  
Final Report Concerning  
Commingling of Round Rod Materials

On April 30, 1984, Houston Lighting & Power Company (HL&P), pursuant to 10CFR50.55(e), notified your office of an item concerning commingling of round rod materials. Attached please find our Final Report on this item.

Based on comprehensive testing and review of embed plates and anchor bolts, HL&P has determined that no compromise existed in either structural integrity or safety.

If you have any questions, please contact Mr. Michael E. Powell at (713) 993-1328.

Very truly yours,

*JH*  
*J. H. Goldberg*  
J. H. Goldberg  
Group Vice President, Nuclear

JSP/yd

Attachment: Final Report Concerning  
Commingling of Round Rod Materials

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Houston Lighting & Power Company

ST-HL-AE-1199  
File Number: G12/195  
Page 2

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South Texas Project  
Units 1 & 2  
Docket Nos. STN 50-498, STN 50-499  
Final Report Concerning  
Commingling of Round Rod Materials

I. Summary

Material Control Procedures in effect prior to May 21, 1984 prescribed the marking of bulk material by color coding and ribbon striping as a means of identification. Inspections of material at the fabricating shop storage area, performed in April 1984, pursuant to the discovery of incorrectly marked round rod specimens delivered to an independent testing laboratory, revealed improperly marked rods at the STP. This finding indicated a problem of commingling of ASTM A36 and ASTM A193 material restricted to the period when the rod material identity was exclusively controlled by the color coding and ribbon striping procedures.

II. Description

Material Control Procedures in effect from March 14, 1983 to May 21, 1984 prescribed that safety-related ASTM A193 round rods were to be coated red-grey with a ribbon stripe identifying A193 painted continuously along one side. Safety-related ASTM A36 rods were to be coated the same red-grey color, but without a ribbon stripe. On April 27, 1984 an inspection performed at the fabricating shop storage area revealed several 1-inch diameter rods with a stamped heat code known to be A193 material but without the prescribed ribbon stripe.

On April 28, 1984 a comprehensive testing program utilizing the Texas Nuclear Alloy Analyzer (TNAA) was initiated in order to determine the extent of the commingling revealed by the isolated incident. Additional A36/A193 material commingling was determined to exist within various rod diameters. The problems found consisted of A36 rods incorrectly ribbon striped as A193, as well as A193 rods without the required ribbon stripe. The rod stock has been retested by TNAA to verify the material identity. The retested stock included (1) the previously disbursed material that the Constructor had not used and was subsequently recalled to the warehouse and (2) the material not yet issued from the warehouse. These activities were performed pursuant to the dispositions for nonconformance reports (NCRs) BS-196 and BS-197.

The commingling problem was limited to rod material used for field-fabricated anchor bolts and embed plates with welded anchor rods produced during the above period when the material identity was exclusively controlled by color coding and ribbon striping.

### III. Corrective Action

The measures described in the second interim report to define the field-fabricated components that were susceptible to the material commingling and to preclude further installation of such components have been implemented. The status of the implementation and the results obtained to date are described below in accordance with the itemization of the prior interim report.

#### 1.0 Embed plates with welded anchor rods required to be A36

The total number of plates with welded anchor rods field-fabricated by Ebasco was determined through a comprehensive review of the Ebasco Work Requests (EWR). From the EWR documentation it was established that 18 types of embed plates amounting to a total of 64 individual plates were fabricated by Ebasco. Therefore, the scope of the field-fabricated plates susceptible to the material commingling was directly determined as bounded and the indirect identification approach for installed plates as presented in a prior report (Reference A) was not utilized.

#### 1.1 &

1.2 All of the Ebasco field-fabricated plates which were not installed in concrete have been tested by TNAA to verify A36 welded rod material. All the rod material for these plates was verified to be A36 and no evidence of rod material commingling was found.

1.3 As described in the prior report, the disposition of the installed field-fabricated plates is based on the evaluation of the structural load capacity that results when A193 rod is welded to A36 plate utilizing welding procedures intended for A36 rod material. The resultant load capacity of the A193 rod/A36 plate weldment has been evaluated through an experimental/analytical investigation by Bechtel and a Consultant. The investigation concluded that the available load capacities of the weldment exceed the ultimate loads and afford factors of safety consistent with the original design of the embed plates based on A36 rod material.

The technical description and conclusions of the investigation are documented in the report of Reference (B). The referenced investigation was initiated to address a separate but technically identical incident of rod material commingling experienced earlier at the STP.

#### 2.0 Anchor bolts specified by design drawings as A193

For the concrete placements made after March 14, 1983 the anchor bolts specified by design to be A193 have been identified on drawings. Among these bolts, those required for safety-related applications were determined and were found to be accessible for testing. The testing by TNAA to verify A193 material has been completed, and no evidence of material commingling was found for these field-fabricated safety-related installed bolts.

All of the field-fabricated A193 anchor bolts for ongoing and future concrete placements have been tested by TNAA to verify the use of A193 material. All the field-fabricated bolt material was verified to be as specified and no evidence of material commingling was found.

### 3.0 Anchor bolts specified by design drawings as A36

As stated in the second interim report, the inadvertent substitution of A193 rod for A36 rod is inconsequential since the A193 material is of higher strength and is not degraded by the cold work involved in the fabrication of some types of A36 anchor bolts. The only concern arises when the design prescribes welding onto installed anchor bolts and the potential exists for the anchor bolts to be A193 material. Accordingly, when field welding to an existing embedded anchor bolt is permitted by a design drawing or other design disclosure document, the requirement to verify prior to welding that the anchor bolt material is A36 or other weldable material has been imposed.

The specific cases where welding to installed anchor bolts may have been performed prior to the imposition of the pre-weld verification and may not be documented were investigated through a comprehensive review of the design drawings and related NCRs. It was established that none of these cases existed since no drawings prescribed welding to anchor bolts and the single NCR addressing welding to anchor bolts included proper verification of A36 bolt material prior to welding. Therefore, the experimental/analytical investigation on the available load capacity for the potential A193/A36 bolt weldment, as addressed in the previous report, is no longer required.

## IV. Recurrence Control

The recurrence control measures stated in the second interim report have remained in effect and unchanged and are restated here for reference. The first step of the recurrence control program was to recall to the warehouse all of the suspect rod stock material previously disbursed to the Constructor. Next, the recalled material as well as all of the rod material at the warehouse underwent material identity verification by means of TNAA testing. All of the material documented and/or identified as A193 was then collected and segregated from the warehouse at a remote location designated for surplus non-consumable material. This location is separated by fencing from the construction and laydown areas and release of materials from this location is restricted by administrative control.

In addition, the following changes have been made:

- 1) As indicated in Reference (C), no anchor bolts or threaded embed rods are being fabricated at the STP site.
- 2) As indicated in Reference (C), improvements have been made to the STP material control program. Specifically, anchor bolts and embeds are hard-marked (stamped) as part of the User Testing Program to indicate material type separate from the color coding process. (Please see Reference (D) for more information). QC utilizes the hard-marking in carrying out its responsibilities to verify material correctness.
- 3) As also indicated in Reference (C), provisions have been made to require that whenever a design change requires field welding to an existing embedded anchor bolt, the bolt material will be verified to be weldable.

#### V. Safety Analysis

The safety analyses have been completed for the embed plates with welded anchor rods required to be A36 (items III 1.0 through 1.3), the anchor bolts specified by design as A193 (item III 2.0), and the anchor bolts specified by design as A36 (item III 3.0). The analyses for each item are as follows:

##### Embed plates

- Item 1.0

The quantity and type of all the Ebasco field-fabricated plates with welded anchor rods have been determined and have been evaluated as follows:

##### Items 1.1 & 1.2

All of the embed plates which were not installed in concrete and which were either field-fabricated plates or physically could not be confirmed as nonfield-fabricated plates were tested by TNAA to verify the use of A36 welded rod material. All the rod material for these plates was verified to be A36. Therefore, there is no compromise of structural integrity and safety.

##### Item 1.3

The installed embed plates, which were not accessible for testing of rod material, are acceptable based on the available load capacity determined for the A193 rod/A36 plate weldment. The resultant load capacity of the weldment was evaluated through an investigation by Bechtel and a Consultant and was determined to be

sufficient to develop ultimate loads and factors of safety consistent with the A36 rod material as originally specified in the embed plate design. Therefore, there is no compromise of structural integrity and safety.

#### Anchor Bolts

- Item 2.0

For concrete placements during the period in question, the installed anchor bolts specified to be A193 have been identified on drawings. Among these bolts, the anchor bolts required for safety-related applications have been tested by TNAA to verify A193 material. All of the field-fabricated bolt material was verified to be A193. Therefore, there is no compromise of structural integrity and safety.

All of the field-fabricated A193 anchor bolts for ongoing and future concrete placements have been tested by TNAA to verify A193 material. All the bolt material was verified to be as specified, and no evidence of material commingling was found. Therefore, there is no compromise of structural integrity and safety.

- Item 3.0

The limited number of instances where field welding to installed anchor bolts was performed were confirmed to have the proper pre-weld verification of A36 bolt material. Therefore, there is no compromise of structural integrity and safety.

#### References:

- (A) HL&P to NRC letter ST-HL-AE-1099, dated May 30, 1984
- (B) HL&P to NRC letter ST-HL-AE-1176, dated January 18, 1985
- (C) HL&P to NRC letter ST-HL-AE-1060, dated February 21, 1984
- (D) HL&P to NRC letter ST-HL-AE-1110, dated July 30, 1984