APPENDIX B

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-498/83-02
50-499/83-02

Dockets: 50-498; 50-499 Category: A2

Licensee: Houston Lighting and Power Company (HL&P)
P.O. Box 1700
Houston, Texas 77001

Facility Name: South Texas Project, Units 1 and 2

Inspection At: South Texas Project, Matagorda County, Texas

Inspection Conducted: February 1-28, 1983

Inspectors: W. M. Hill 5/11/83
W. M. Hill, Senior Resident Inspector Date

J. P. Boardman 5/11/83
J. P. Boardman, Reactor Inspector Date
Reactor Project Section B

Accompanying
Personnel: D. M. Hunnicutt, Chief
Engineering Section

for D. M. Hunnicutt 5/13/83
D. P. Tomlinson, Reactor Inspector Date
Engineering Section

Approved: W. A. Crossman, Chief — 5/13/83 Date
Reactor Project Section B

D. M. Hunnicutt, Chief — 5/13/83 Date
Engineering Section

Inspection Summary

Inspection Conducted February 1983 (Report 50-498/83-02; 50-499/83-02)

Areas Inspected: Construction activities including: Site Tours; Safety-Related Concrete; Reactor Coolant System Piping; Category I Backfill Beneath ECW Piping; Storage; Welding of RCS Piping; Welding of ECW Piping; Purchase and Control of Weld Filler Metal (including disposition of nonconformances); and Site Fabricated Category I Anchor Bolts. The inspection involved 180 inspector-hours by three NRC inspectors.

Results: Within the nine areas inspected, one violation was identified (retrieval of quality assurance records relating to site fabricated anchor bolts paragraph 10).

Details

1. Persons Contacted

Principal Licensee Employees

*G. W. Oprea, Executive Vice Presidnet
J. Geiger, Quality Assurance Manager
*D. Barker, Project Manager
*H. Walker, Project QA Manager
*D. Keating, Project QA General Supervisor
*J. Estella, Supervisor, Quality Systems
*J. Williams, Site Manager
I. Morrow, Construction Superintendent
*J. Barker, Supervising Project Engineer
*C. Wright, Project QA Supervisor-Mechanical/NDE
S. Hubbard, Senior QA Specialist
D. Bohner, Project QA Supervisor-Electrical
*G. Steinmann, Lead Site Engineer
T. Jordan, Project QA Supervisor-Design/Procurement
D. Bednarczyk, Project QA Supervisor-Civil/Structural
J. LeBlanc, General Supervisor, Records Management and Information Processing
W. Moye, Construction Engineering Supervisor
C. Grover, Senior Quality Assurance Engineer
*C. Von Nyvenheim, QA Engineer, Civil
*D. G. Long, Special Coordinator

Other Personnel

Bechtel Power Corporation (Bechtel)

*B. McCullough, Manager of Construction
J. Downs, Deputy Manager of Construction
*L. Hurst, Project QA Manager
*H. Reuter, Resident Project Engineer
S. Morton, Lead Field Planner
J. Senecal, Lead Mechanical QC Engineer
R. Schulman, Lead Resident Civil Engineer
*S. Bernsen, Assistant Project Manager
*J. M. Little, Assistant Resident Engineer
*R. W. Miller, PQA Engineer

Ebasco Services, Incorporated (Ebasco)

*J. Crnich, Construction Manager
*C. Hawn, Quality Program Site Manager
J. Thompson, Site Manager
R. Cummings, QA Site Supervisor
*R. Grippardi, QC Site Supervisor
*J. Christesen, Assistant to Site Manager

*Indicates attendance at one or more management meetings during February 1983.

The NRC inspectors also contacted other licensee and contractor personnel during the course of inspections.

2. Site Tours

Routine tours of the site were conducted by the NRC inspectors to observe housekeeping activities; general cleanliness; protection and preservation of equipment and material; personnel access control; and plant status. Areas observed included:

a. Units 1 and 2

Reactor containment buildings, mechanical-electrical auxiliary buildings, fuel handling buildings, and diesel generator buildings.

b. Site

Reservoir, essential cooling pond, and storage areas, including the warehouses, laydown areas, and the welding fabrication shop.

With regard to the above areas, the NRC inspector confirmed the following:

. Safety-related storage areas were free from accumulations of trash, refuse, and debris.

. Work areas were clean and orderly.

. Tools, equipment, and material were returned to their proper storage locations when no longer in use.

Occasionally, the NRC inspector noted accumulations of refuse due to construction activity in local areas. These were removed periodically and no further management attention was necessary. The NRC inspector had no further questions or items of concern relative to general site conditions.

3. Safety-Related Concrete

a. Concrete Preplacement Activities

The NRC inspector reviewed the following drawings relative to concrete placement for several walls in Unit 2 fuel handling building and the roof slab adjacent to the spent fuel storage pool for Unit 1 fuel handling building:

3F01-9-C-3003	Rev. 0	Concrete Fuel Handling Building Floor Plan @ EL. 21' 11"
3F01-9-C-3005	Rev. 0	Concrete Fuel Handling Building Plan @ EL. 52' 0", Units 1 and 2
3F01-9-C-3009	Rev. 0	Concrete Fuel Handling Building Roof Plan, Units 1 and 2
3F02-9-C-3030	Rev. 0	Concrete Fuel Handling Building West Elevation - Col. 26.9 through 30.2, Units 1 and 2
3F02-9-C-3035	Rev. 0	Concrete Fuel Handling Building Spent Fuel Pool Section A - A, Units 1 and 2
3F02-9-C-3036	Rev. 0	Concrete Fuel Handling Building Spent Fuel Pool Section, Units 1 and 2
3F02-9-C-3037	Rev. 0	Concrete Fuel Handling Building Fuel Transfer Tube Details, Units 1 and 2
3F02-1-C-3054	Rev. 1	Concrete Fuel Handling Building Section H - H, Unit 2
3F02-1-C-3056	Rev. 0	Concrete Fuel Handling Building Section R - R, Units 1 and 2
3F02-9-C-3058	Rev. 0	Concrete Fuel Handling Building Elevation and Sections, Units 1 and 2
3F01-9-C-3068	Rev. 0	Concrete Fuel Handling Building Floor Plan @ El. 36' 0" and Sections, Units 1 and 2
3F02-2-C-3079	Rev. 5	Concrete Fuel Handling Building Embedded Plate Sections, Unit 2

The NRC inspector examined the locations for wall placements adjacent to the spent fuel pool in the fuel handling building for the following details:

(1) Forms - properly secure, leak tight, and clean

(2) Rebar - properly placed, secured, free of concrete and excessive rust

The NRC inspector identified no unacceptable conditions relative to forms and rebar in this placement area.

b. Placement Activities

The NRC inspector observed selected portions of the following concrete placements:

(1) 2ME-W-029-017A (wall)

(2) 2ME-C-029-001 (column)

(3) 2ME-C-029-003 (column)

(4) 2ME-C-029-007 (column)

(5) 2ME-C-029-009 (column)

The NRC inspector confirmed that concrete placement activities were being accomplished in accordance with applicable drawings, specifications, codes, and procedures in the following areas:

(1) Proper mix specified and delivered

(2) Testing at placement locations - proper tests, frequency, and acceptance criteria - use of calibrated test equipment

(3) Adequate construction crews and quality control personnel

(4) Proper equipment and placement techniques - vibrators properly used and chutes of proper length to prevent excessive freefall

The NRC inspector did not identify any unacceptable areas during these pours.

c. Site Concrete Testing Laboratory

The NRC inspector observed the laboratory compression tests for the following concrete cyclinders and grout cubes:

Serial Nos.	Break Time
5994	7 days
5995	7 days
5996	7 days
5997	7 days
5998	7 days
5972	28 days

5863	90 days
841 (grout)	28 days

All cylinders and cubes exceeded the minimum strength requirements. The NRC inspector had no further questions relative to strength tests for concrete cylinders and cubes.

4. Reactor Coolant System Piping

The NRC inspector performed periodic visual inspections of interim weld passes for FW014 and FW016 in RCS Piping Loop 2. The visual inspections were satisfactory. The NRC inspector reviewed the following radiographs:

(1) RC 1202 FW014 RT322 dated February 23, 1983

(2) RC 1202 FW016 RT323 dated February 23, 1983

(3) RC 1202 FW016 RT333 dated February 25, 1983

All of these radiographs were for in-process welds. Items 2 and 3 indicated some porosity. The feedback level III inspector stated that this porosity was within code acceptance criteria; however, the radiograph of the completed weld would determine acceptance or rejection of the weld. An NRC inspector will review the radiographs of the completed welds during future inspections. The NRC inspector had no further questions at this time.

5. Category I Backfill Beneath the ECW Piping

The NRC inspector observed three retest for soil samples adjacent to the ECW piping. Pittsburg Testing Laboratory (PTL) personnel performed the testing under the direction of the Ebasco QC inspector. The PTL personnel performed the in-place density testing by the sand cone method outlined in ASTM D1556-64. PTL personnel computed the relative density in accordance with ASTM 02049-69, "Relative Density of Cohesionless Soils," and provided the following results:

Test No.	E2-B2-6-057R3(2305N)	E2-B2-6-059R2(2202N)	E2-B2-6-064R2(2105S)
Location	N61501/E45082	N61515/F45062	N61541/E45047
Lift	3	3	3
Elev. (ft.)	+9.4	+9.4	+9.4
Max Lab Density (lb./cu. ft)	124.7	124.7	124.7
Min Lab Density	107.8	107.8	107.8

Field Dry Density	125.0	119.9	125.7
Relative Density	101.5	74.5	105.1

These tests results were recorded on the "Summary of In-Place Density Tests (Noncohensive Material)" Form SF-4, dated February 25, 1983, Order HO-4471 and "In-Place Density Test by Sand Cone Method," Form SF-6 (three), dated February 25, 1983, Order HO-4471.

6. Storage

The NRC inspectors observed activities in several warehouses and other designated storage areas with particular attention paid to the following activities:

- Classification and location of specific equipment - various storage areas were segregated and classified as levels A through D to provide appropriate storage and environmental control for various types of equipment.
- Temperature and humidity were being measured and recorded to confirm that ambient conditions were being controlled as appropriate.
- Storage areas were not being used to store food, drink, or salt.
- An active program was in effect to control rodents and small animals.
- Racks, crates, and cribbing were carrying the full weight without component distortion.
- All items were labeled and stored in a manner that allows access for inspection.
- Fire protection systems and equipment were available for use.
- Sufficient dunnage was available to materials and components in storage.
- Canvas or plastic covering was available for weather protection, as required.
- Protective covers and seals were properly attached.
- Personnel access to the storage locations were adequately controlled.

The NRC inspector identified no unacceptable conditions relative to storage.

7. Welding of Reactor Coolant System Piping

The NRC inspector observed several operations in-process during the welding of loop 2 of the reactor coolant system piping. Among these were the dimetric welding of Joint 15, the pre-weld inspections on Joints 14 and 16, and removal of the spacer blocks from Joint 15. All operations observed were progressing satisfactorily and were being performed in accordance with the applicable construction and inspection procedures. Three nonconformance reports (NCR) had been issued for dimensional discrepancies, nonapproved consumable materials in use on the piping, and the inadvertant use of the wrong shielding gas for welding. The NRC inspector reviewed each of the three NCR's and found the evaluations and dispositions to be satisfactory.

NCR CM-00116 was written to document the use of nonapproved items such as grinding wheels, tape, markers, and cleaning solvents on Westinghouse supplied components. Bechtel issued Field Change Request BP-00164 to incorporate the Westinghouse requirement for consumable supplies into Bechtel Specification 5L209PS100, Revision 1. Results of halogen and sulfur content tests for all items requiring these were attached to the final NCR disposition. All materials not in accordance with Westinghouse Plant Information Package (PIP) have been purged from the job site and are being held and segregated in the warehouse.

NCR FP-00071 was written for RCS Loop 2, Piping Joints 14 and 16 following the discovery that nitrogen was used for sheilding gas rather than argon for the automatic welding operation. Ebasco Welding Procedure 115, Revision 1, requires the use of argon as the shielding gas for the automatic welding of stainless steel RCS piping. When it was noticed that the available supply was running low a request was submitted to replace the depleted cylinders with full ones. An identification error was made and cylinders containing nitrogen were attached to the gas supply manifold for the loop piping. The two welders involved, being experienced, noted that something was wrong immediately upon initiation of the welding arc and ceased the operation at once. Both welding machines were in the "up-slope" mode which introduces a low, but steadly increasing, amperage to the tungsten electrode until the proper welding current is attained. Until the arc is stabilized at the welding current, no filler metal is introduced and no welding occurs. At the low amperage at which the arc was initiated, the two welders noted excessive arc instability and turned the machines off within several seconds. The mistake in the shield gas was discovered and the cylinders changed immediately. The areas of arc initiation on both welds were surface reconditioned by a minor grinding operation and welding was allowed to continue following the installation of argon cylinders and a thorough purge of the supply manifold and hoses. Disposition of this NCR was deemed acceptable due to the low "up-slope" amperage resulting in virtually no penetration of the material and the fact that no filler material was deposited.

NCR FP-00082 was written when dimensional discrepancies were noted during the fit-up of the Loop 4 crossover piping. When raised into place at one end and properly gapped in the center it was noted that the second end of the piping was in perfect alignment. Because allowances where supposed to have been made for weld shrinkage in Joint 31, the second end fit-up should have been 11/31" out of alignment. In accordance with the acceptable welded pipe joint design types stipulated in Section III of the ASME Code, it was decided by an engineering evaluation to open the root gap of Joint 31 an additional 11/31" and proceed with the welding utilizing a backing strip. One end will be tack-welded into place, making use of the original consumable insert. The second joint, Joint 31, will then be tack welded using the extended gap and stainless steel backing strip. Welding will proceed on these two joints until sufficient shrinkage has occurred to pull the opposite end joint into its proper position. The closure joint, when aligned, will be tack welded into place utilizing the consumable insert joint design. When all welding is completed, the backing ring is to be removed by mechanical means and the inside surface of the pipe restored to the configuration required for pre-service inspection (PSI). Final inspection and acceptance must be performed following completion of this restoration.

The NRC inspector reviewed the film produced during the in-process radiography of the three joints on Loop 2. Each joint was radiographed when approximately 1/2" of filler material had been deposited. This inspection is not required by the ASME Code but is being performed to minimize the amount of metal removal necessary in the event that repairs are needed.

No violations or deviations were noted during this portion of the inspection.

8. Welding of Essential Cooling Water (ECW) Piping

The NRC inspector observed several operations in progress on the ECW system. Included were defect removal, repair welding, fitting and tracking of backing rings, automatic welding, and manual welding. The NRC inspector noted that three elbow sections of the supply piping for Unit 1 had been removed from the ditch and were undergoing repairs in a small covered enclosure. This was done to allow easy access to the inside of the piping sections which required extensive weld repairs. A review of the weld data cards indicated that the welders making the repairs were qualified, that all required inspections were being performed, and that acceptable repairs were being made.

No violations or deviations were noted during this portion of the inspection.

9. Purchase and Control of Weld Filler Material

The NRC inspector selected for review one Bechtel purchase order for weld filler material. Only one was selected as this was the only order placed for which the material had been received. The original ordering data

along with reports of receiving inspection and reports of the physical and chemical properties were reviewed and found to be acceptable. A tour was made of the weld material area in the warehouse to verify that storage requirements were being adequately observed. The weld filler material area is a locked area located in a warehouse that has adequate humidity and temperature controls. All material was noted to be segregated and stored by reference numbers that are readily traceable to purchase orders and material identification documentation. The particular lot of material, as noted on Bechtel filler material request (FMR) FW 0012, was easily located. Half of the purchased material was properly stored in the warehouse with the other half already in the distribution system. No tour was made of the rod issue stations as tours were documented in NRC Inspection Reports 83-01, 82-15, and 82-13 with no unacceptable findings.

No violations or deviations were noted during this portion of the inspection.

10. Review of Licensee 10 CFR 50.55(e) Report Concerning Improper Anchor Bolt Material for Site Fabricated Anchor Bolts

On February 8, 1979, the licensee notified the NRC of a potentially reportable deficiency under 10 CFR 50.55(e). This deficiency concerned the installation of anchor bolts manufactured by B&R onsite from improper materials. Written reports were forwarded to the NRC on March 8, 1979; June 5, 1979; December 31, 1979; January 28, 1980; and January 26, 1981.

The NRC inspector reviewed documentation indicated by the licensee as substantiating their corrective actions relating to improper anchor bolt material for site fabricated anchor bolts. This review included B&R Technical Reference Document (TRD) 5A840SR163-A, "Anchor Bolt Integrity Verification Program," dated March 31, 1981, and Attachments 3 through 14. Also reviewed were representative B&R and Bechtel drawings; and B&R procedures, shop work requests (SWR), field material sketches (FMS), and quality assurance documentation.

The NRC inspector identified substantiating B&R documentation (1) which the licensee could not retrieve, and (2) which contained numerous irregularities raising questions as to the acceptability of the licensee's anchor bolt material integrity verification program.

B&R substantiating documentation also contained evidence of potential problems relating to the material integrity of vendor supplied anchor bolts, and of site fabricated embed plates which were required to be fabricated of welded bar and plate to ASTM A-36.

a. B&R Quality Documentation Which Was Not Retrievable

The licensee was unable to retrieve the following quality records substantiating satisfactory accomplishment of the B&R "Anchor Bolt Integrity Verification Program." These records were requested by the

NRC inspector during the period February 1-4, 1983, but were not available to the NRC inspector by February 24, 1983.

(1) Hardness Test Data Sheets (TDS) 958 through 965, and 967 through 991 documenting performance of reported anchor bolt hardness tests. The TDS's are identified on Attachment 4 of Attachment 9 to TRD 5A840SR163-A, the TDS summary.

(2) Documentation of calibration certification of the Telebrineller (Brinell) hardness tester and the Clark (Rockwell) hardness tester.

(3) Documentation of the use of certified Telebrineller hardness test bars for Brinell hardness verification.

(4) The red-lined drawings identifying bolt locations reported in TRD 5A840SR163-A, page 5, as being supplied to engineering on September 14, 1978.

(5) Records of training of personnel performing hardness tests.

10 CFR 50, Appendix B, Criterion XVII, requires records to be maintained of activities affecting quality, and requires that such records be retrievable.

The licensee "Quality Assurance Program for STP," Revision 3, dated March 9, 1982, Table 2, states licensee compliance with ANSI N45.2.9-1974, R. G. 1.88 (Rev. 2, October 1976), as modified by notes 24 through 26. These notes do not modify retrieval. ANSI N45.9-1974, Section 6.2, requires accurate retrieval of information without undue delay.

The inability of the licensee to retrieve the documents listed above without undue delay constitutes an apparent violation of 10 CFR 50, Appendix B, Criterion XVII. (8302-01)

b. Irregularities in B&R Substantiating Documentation in Regard to TRD 5A840SR163-A

The NRC inspector, in his review of B&R documentation, found five examples where the substantiating documentation contradicts rather than substantiates the TRD as follows:

(1) The TRD, page 36, Section 4.3.4.4, states that anchor bolts fabricated on B&R SWR 4170, Heat 8866608, were accepted without verification testing. Acceptance was based on review of documentation which showed that other tests indicated no discrepancies with Heat 8866608 (A-193).

The NRC inspector reviewed TDS's 765 and 766 which tested Heat 8866608 (heat code ADV). These TDS's show the material to be incorrect (A-36 in lieu of A-193).

B&R apparently did not respond to this data.

(2) The TRD, page 37, indicates that only 28 safety-related A-193 anchor bolts were not tested.

Based on B&R SWR Summary, the NRC inspector identified 181 A-193 (Type VI) anchor bolts that were not tested (SWR's 075, 1087, 1098, 3265, 3294, 3295, 3297, 3352, 3514, 3518, 4086, 4117, and 4458).

(3) TRD 5A840SR163-A was written after all testing was complete, but on page 33 it states that hardness test bars for Brinell tests were 163 Brinell (Bhn) for ASTM A-36 bar, and 248 Bhn for A-193 bar.

Attachments 6 and 9 to the TRD show tests using tests bars of hardnesses 124, 135, 142, 167, 201, 207, and 255 Bhn. A Clark Rockwell hardness tester was also used. Use of the different bars and the Rockwell tester do not indicate specific problems.

(4) The TRD, page 31, in Table 12 of SWR 1110 under "Test Results," shows 28 bolts test as A-193 material and two bolts as A-36. Substantiating related documentation (SWR 1110, SWR 3518, and TDS's 0137, 0138, and 477) contradict this statement. The documentation shows that SWR 1110 only fabricated 24 bolts, all of A-36 material. The TDS for hardness have undocumented changes and do not support the TRD.

(5) The TRD, page 31, in Table 12 for SWR 836, shows under "Test Results" three bolts of A-193 material.

The supporting documentation (SWR 836 and TDS 1003) shows these three anchor bolts to be A-36.

c. Irregularities Which Negate B&R Material Verification Program Methodology

The B&R anchor bolt material verification program as set forth in TRD 5A840SR163-A is based in part upon the following assumptions. B&R methodology appears valid only if these assumptions are valid.

(1) All installed site fabricated anchor bolts were fabricated on SWR's reviewed by B&R which should be included in the SWR Summary of Attachment 9 to the TRD.

(2) All material "mix-up" took place prior to or during fabrication, was limited to material type (A-36 vs. A-193), and did not include mix-up of material within a heat number or code.

(3) The heat numbers (or codes) recorded on the SWR data cards are valid and represent the fabricated (and installed) anchor bolts.

Below are findings made by the NRC inspector during his review of B&R substantiating documentation which appear to invalidate these B&R assumptions.

(1) The NRC inspector reviewed TRD 5A840SR163-A, page 31, Table 12. This table contains the tabular results of a hardness check made on randomly selected installed bolts.

The reports of 11 tests are shown in Table 12. Four of the 11 tests on installed bolts are identified "SWR unknown." This constitutes 36% of the total sample. One of the four samples of "SWR unknown" shows an A-36 anchor bolt where an A-193 bolt is required. On a sample lot basis for the sample of 11 taken, this shows an acceptable quality level (AQL) in percent defective of 9%, and an AQL of 25% defective for lots which were "SWR unknown."

(2) The NRC inspector reviewed the SWR Summary for SWR 1709 which shows as having fabricated 44 1-1/4" x 35" anchor bolts of A36 for MEAB 2, Drawing 2-C-4012, and shows 84 anchor bolts tested on TDS's 102, 103,220,221. The SWR Summary also states " some are vendor bolts," but substantiating documentation does not support this.

In addition, the related documentation (SWR's 218 and 1709; and TDS's 102, 103, 220, 221, 773, and 776) reflect the following apparent problem.

Bolts were tested as SWR 218 on TDS's 102, 103, and 776. TDS's 102 and 103 show heat number "92436" which was changed to "M92436." This heat number is not a heat number for safety-related material based on B&R lists of safety-related bar stock used for site fabrication of anchor bolts.

This apparent use of nonsafety-related material for safety-related anchor bolts was not addressed in the TRD or other substantiating documentation, but the bolts were apparently accepted.

(3) The NRC inspector's review of the SWR Summary revealed the following examples where apparently more anchor bolts were tested than were fabricated on the listed SWR, indicating anchor bolts being site fabricated which are outside the logic on which the verification program was based.

(a) SWR 3609 is shown as fabricating eight 1/2" x 10" A-193 anchor bolts of Heat 8097289. Twelve such bolts are shown as being tested on TDS 374 alone.

TDS 374 shows 12 anchor bolts tested on August 1, 1979, in MEAB 1. Eight bolts are identified to SWR 3609; four bolts (1Q1, 1Q5, 1Q7, and 1Q8) are identified as 1/2" x 8" A-193 from SWR 3611. No heat number is shown.

SWR 3611 is shown as fabricating four 1/2" x 8" A-193 anchor bolts of Heat 8097289 which were tested on TDS 162.

TDS 162 shows testing on August 7, 1979, in the yard four anchor bolts (AB 73), 1/2" x 8", A-193 (1Q4, 1Q2, 1Q6, 1Q1) of heat 8097289. No SWR is indicated.

(b) SWR 1622 shows fabrication of six anchor bolts 3/4" x 46", A-36, Heat 15878, TDS's 0045 and 181.

TDS 0045 performed no tests.

TDS 181 tests 18 3/4" x 46" anchor bolts in MEAB 2 on August 27, 1979, identified as Heat 17950.

The SWR on TDS 181 has been obliterated on the copy included in Attachment 6 to TRD 5A840SR163-A, provided to the NRC inspector. TDS 181 apparently tested bolts which did not have an SWR.

(c) SWR 4416 shows fabrication of six anchor bolts, 2" x 72", tested on TDS 644.

TDS 644 tested 24 such bolts in RCI; apparently 18 had no SWR.

(4) TDS 139 shows testing, in the embed yard, of eight 2-1/4" x 36" anchor bolts which were A-193 identified to SWR 652. SWR 652 was for the fabrication of eight 2-1/4" x 36" A-36 (Type V) anchor bolts. SWR 652 was reported missing by B&R in the cover memorandum to the SWR Summary date April 17, 1980.

TDS 139 states "no heat number" for the anchor bolts which were tested on August 7, 1979, in the embed yard. The anchor bolts were accepted by B&R even though there was no heat number; no documentation existed that any anchor bolts were in fact fabricated on SWR 652, and the material could be nonsafety-related and without CMTR's. This TDS indicates the existance of safety-related anchor bolts downstream of fabrication without heat traceability and of the incorrect material. The NRC inspector could not find a stated basis for accepting this material from an unknown source of unverifiable manufacture. Similiar cases exist with SWR's 053, 092, and 1717.

(5) SWR 3109 data card indicates that the 144 1-3/8" x 38" Type V anchor bolts fabricated were made from Heat 1-6709 (A-36) and Heat 50877 (A-193). The SWR Summary shows only Heat 50877.

The SWR Summary incorrectly shows 123 bolts tested as A-36 and 21 tested as A-193 on TDS's 0185-0188 and 0211-215.

The TDS Summary correctly shows the bolts tested on TDS's 0185, 0186, and 0211-0216.

TDS 0185 shows SWR 3109, and tested three bolts in the embed yard as A-193 of Heat 51302. HT 51302 indicates 1-3/8" A-193 bar from P.O. 13152 which is safety-related.

Manufacturing records do not reflect that SWR 3109 used bar from HT 51302, this tends to invalidate B&R material verification methodology which relies on the accuracy of manufacturing records.

(6) SWR 3352 shows 60 anchor bolts, 7/8" x 21", A-193, Type VI, Heat 54619 (A-193).

The SWR Summary shows the bolts tested on TDS 611 and 618.

TDS 611 shows 31-7/8" x 21" anchor bolts, SWR 3352, Heat 54619, tested in the embed yard as A-36.

TDS 618 shows 27 of these same bolts tested in Warehouse A as A-36.

These test results indicate improper heat number marking prior to manufacture. B&R methodology was based on the material tested being the same as that fabricated, even when of the incorrect type (A-36 or A-193). B&R manufacturing records show by heat numbers that the bar tested was not of the same type material as was used in manufacture.

The mix-up prior to manufacture apparently was that the bar was improperly identified by type but not by heat number, i.e., properly heat identified A-193 bar was improperly type identified as A-36.

This case of bar not being properly heat identified, raises a question on the homogeneity of all heats and all untested fasteners, and could explain the wide ranges of hardness values within heats of material.

The reason that the B&R material verification methodology is so critical is that B&R had no procedures controlling these anchor bolts after manufacture and did not verify or document material traceability at the time of installation.

There are unmarked anchor bolts installed that can not, by documentation, be verified as acceptable and were not verified by hardness testing. Unit 1 boron injection tank anchor bolts are an example.

(7) TDS 765 and 766 tested anchor bolts identified as heat code ADV (Heat 8866608), which is A-193 bar. This TDS shows that these anchor bolts tested as A-36 and were not identified to SWR or drawing.

This example further raises the issue of a stock of uncontrolled "free-stock" anchor bolts which B&R manufacturing personnel could use, and is another example that there were cases where a mix-up in material within a heat number occurred.

(8) The NRC inspector reviewed a representative sample of B&R and Bechtel drawings and compared drawing requirements for anchor bolts with the SWR Summary. There were a number anchor bolts shown on drawings for which no SWR was identified; there were also a number of SWR's fabricating anchor bolts against drawings that do not show such anchor bolts indicating possible uncontrolled "free stock."

B&R had no known procedures for invalidating quality assurance records or for impounding or for controlling material on superceded drawing revisions. (See unresolved item 8301-02 and the example where an outstanding NCR exists to replace anchor bolts installed on a superceded drawing revision which had been replaced. The replacement anchor bolts were also tested under the verification program and installed.)

Below in tabular form are the results and apparent irregularities identified by the NRC inspector during his drawing review.

Drawing Number/ Drawing Requirements DWG 1-C-1501/1-C-1502		SWR (frm Summary	Qty	SWR Description	TDS
12	1"x40" Type III	None			
32	1-1/2"x29" Type V	0088	3	1-1/2"x29" Type V	0772(not tested) See Note
2	7/8"x35" Type III	0072	2	7/8"x35" Type II	0679
32	1-1/2"x27" Type V	None			
8	1-1/8"x28-1/2" Type VI	0075	8	1-1/4"x28-1/2" Type VI	0992

Drawing Number/ Drawing Requirements	SWR (frm Summary	Qty	SWR Description	TDS
DWG 1-C-1501/1-C-1502				
8 1-1/8"x25-1/2" Type VI	0075	8	1-1/4"x25-1/2" Type VI	0992
None	0082	44	3/4"x21-1/2" II	770(not tested)
None	0089	4	3/4"x21-1/2" II	770(not tested)

NOTE: TDS states that it was to Test 3 field fabricated bolts in a group of 64 (installed) vendor supplied bolts but could not locate, indicating that the installed group looked alike.

DWG 1-C-4017				
10 - 1-1/2"x57" Type VI	None			
DWG 1-C-4146				
7/8"x32' Threaded Rod	None			
4 7/8"13" Type V	None			
4 5/8"x15" Type II	None			
None	4826	15	1/2"x18-1/2" Type II	
DWG 1-C-4152				
4 1-1/4"x36" Type V	0792	4	1-1/4"x36" Type V	Can not test
12 1-1/4"x35" Type VI	None			
8 2-1/4"x36" Type V	0652	8	2-1/4"x36" Type V	0140
	761	8	2-1/4"x36" Type V	0037(Not tested)
None	791	8	2-1/4"x36" Type VI	See Note 1
8 1-7/8"x36" Type V	None			
4 1-7/8"x36" Welded	None			
18 1"x37" Type V	None			
4 5/8"x15" Type II	0893	4	5/8"x15" Type II	0270

Drawing Number/ Drawing Requirements	SWR (frm Summary	Qty	SWR Description	TDS
DWG 1-C-4152				
6 1/2"x31" Type IV	0839	6	1/2"x31" Type IV	974
None	0800	18	1-1/8"x36" Type V	0676-678, 0427
NOTE 1: TDS 0037 states that it covered four installed anchor bolts for SWR's 791/671.				
1-C-4153-7				
16 1-1/2x36" Type V	0043	6	1-1/2"x36" Type V	0984-0985 (Note 9)
(Note 8)	0054	8	1-1/2"x36" Type V	0984-0985
	0039	20	1-1/2"x36" Type V	0984-0985
8 3/4"x33" Type IV	0503	2	3/4"x33" Type IV	0365(See Note 1)
	4535	8	3/4"x33" Type IV	0278
4 1-3/4"49" Type VI	0801	4	1-3/4"x49" Type VI	257 and 260 (Note 2)
18 3/4"x46" Type IV	0039	18	3/4"x46" Type IV	"No TDS"
	0053	6	3/4"x46" Type IV	"Can not test"
4 1/2"x12" Type VI	3606	8	1/2"x12" Type VI	0429/0430 (Note 4)
4 1/2"x10" Type VI	3608 (Note 3)	8	1/2"x10" Type VI	0204/0276 (Note 5)
3 5/8"x20" Type V	None			
2 1/2"x14" Type V	None			
10 1-1/8"x15" Type V				
Reference 1-C-4153-1*	0838 (Note 6)	16	1/2"x20" Type IV	0424 (8 tested in embed yard) (Notes 6 & 7)
Reference 1-C-4153-2*	1050	16	1/2"x20" Type IV	0377 (8 tested in embed yard) (Note 6)
Reference 1-C-4153-3*	1752	4	1/2"x13" Type VI	0816 (Note 6)

Drawing Number/ Drawing Requirements	SWR (frm Summary	Qty	SWR Description	TDS
DWG 1-C-4152				
Reference 1-C-4153-3*	1755	3	3/4"x33" Type II	0172 (Notes 6 & 10)
Reference 1-C-4153-3*	3610	4	1/2"x8" Type VI	0142 (Note 11)
None	0802	18	1-1/8"x25" Type V	0408/0675 (Note 12)
None	0892	4	1/2"x13" Type II	0940 (states bolts scrapped)

*Not now on drawing.

Note 1: TDS 365 tested two loose anchor bolts of Heat 17950 (shown on SWR Summary as being used for SWR 503). Apparently at a later date, without documentation of the authority, the SWR number was obliterated from the TDS. The bolts tested were identified 3/4" x 46", not 3/4" x 33" as SWR 503 is identified as fabricating.

Note 2: It can not be determined that the same two bolts were not tested twice.

Note 3: The SWR Summary states that SWR 3608 replaces SWR's 836 and 1050. SWR 836 was for 1-1/2" x 34" Type VI (1-C-1510). SWR 1050 was for 1/2" x 20" Type VI (1-C-4153-2).

Note 4: The SWR Summary lists TDS's 429 and 430 for SWR 3606 (eight 1/2" x 12" Type VI). TDS 429 tested four installed 1/2" x 20" anchor bolts, Type IV, which tested as A-193, SWR 1050. TDS 430 also tested two 1/2" x 20" anchor bolts, Type IV (installed), SWR 3309, which tested as A-193.

Note 5: These TDS's both test bolts 1-4 and were performed by the same person with Brinell (TDS 274, August 13, 1979) and Rockwell (TDS 204, August 15, 1979). Apparently only four of the eight bolts were tested.

Note 6: These anchor bolts at the time of the material verification program were apparently uncontrolled free stock from superceded drawing revisions. There is no documentation of subsequent control of this material.

Note 7: TDS 424 originally identified these bolts to SWR 805, then SWR 1050. Material was tested as A-36, with A-193 required. No specific NCR is shown; no disposition is identified.

Note 8: SWR's 0039, 0043, and 0054 (34 bolts) are all identified against Unit 1 requirements (16 bolts), showing the existance of free stock.

Note 9: TDS's 0984 and 0985 are missing from back-up documentation at this time.

Note 10: TDS 0172 tested three 3/4" x 33" anchor bolts, Type IV, Heat 17950 (correct for SWR 1755) which were tested loose in MEAB 2. Subsequently, (apparently) the SWR number was obliterated. There is no documentation that these bolts were subsequently controlled.

Note 11: TDS 0142 on August 15, 1979, tested four 1-1/2" x 8", Type VI anchor bolts, SWR 3610 installed in MEAB 1.

Note 12: TDS 0408 tested six installed bolts. TDS 0675 tested six installed bolts indentified to SWR 0805.

During a subsequent inspection, the NRC inspector will verify documentation of the source and acceptability of the anchor bolts shown in the tables above on drawings for which no SWR is identified. The NRC inspector will also verify documentation of final disposition for anchor bolts fabricated against superceded drawing requirements, or for which there were no drawing requirements.

(9) TDS 334 tests 38 1-3/4" x 20' lengths of A-36 rod stock in the fab yard. Length number 74 tested as A-193 and was rejected. NCR S-M-2197, by description, (1-3/4" x 20', Rod 74) dispositions this nonconforming length.

B&R documentation and methodology do not address this additional case of mix-up of material within a heat number for Category I safety-related round bar.

(10)

(a) NCR S-M 3203, Item 2, accepts five Type II anchor bolts fabricated of A-193 material (in lieu of A-36), and lists TDS 113 as the applicable test data sheet for these anchor bolts.

TDS 113 tested eight anchor bolts installed in MEAB 1. They are identified as 7/8" x 37" fabricated on SWR 065; five were A-193 and three were A-36.

The SWR Summary shows SWR 065 as fabricating six 7/8" x 37" Type II anchor bolts of Heat 93084. It also show TDS 113 and that four were tested, of which three were A-36 and one was A-193. Heat 93084 is A-36 material purchased on P.O. 9141.

(b) NCR S-M 3713 accepts four type II anchor bolts on TDS 653.

TDS 653 indicates that it tests four 7/8" x 37" Type II anchor bolts on SWR 051.

The SWR Summary shows SWR 051 as fabricating eight 7/8" x 37" Type II anchor bolts, Heat 93084, which were tested on TDS's 113 and 653.

TDS's 113 and 653 tested 12; SWR's 051 and 065 fabricated 14 anchor bolts of Heat 93084 (A-36). Of the 12 bolts tested, 9 bolts had mechanical properties in the range of A-193 in lieu of A-36.

These case indicate a mix-up in material in a heat number which negates B&R methodolgy.

(11) The SWR Summary for SWR 0803 shows fabrication of 12 1-1/4" x 35" Type VI anchor bolts, Heat 46239. The heat number was verified by the NRC inspector by review of data included in the records of SWR 0803. The material is shown as tested on TDS 259; four tested A-36, and eight tested A-193. TDS 259 inspected installed anchor bolts on August 13, 1979. The four bolts not accepted on TDS 259 were accepted on NCR S-M 3203. Attachment 13, NCR S-M 3203 does not contain a copy of memorandum GM 59559 accepting these anchor bolts. The NRC inspector will review GM 59559 during a subsequent inspection. This is another case of "mixed" material within a heat number.

TDS 224 tests 12 1-1/4" x 35" Type VI anchor bolts on August 1, 1979, in the embed yard. The bolts were identified as Heat 83121, SWR 803. Five were shown as unacceptable.

The TDS Summary shows TDS 224 as testing 12 bolts on SWR 3172.

The SWR Summary shows TDS 234 testing SWR 3172. The TDS Summary also shows TDS 234 testing SWR 3172.

TDS 234 tests 12 anchor bolts, in the embed yard on August 1, 1979, shown as 1-1/4", Heat 83121, SWR 3172 (Heat 83121 is for SWR 3172). Eight of the bolts were not accepted for low tensile strength, but no known NCR was written. There is no documentation that any action was taken on these anchor bolts.

TDS 224 and 234 were tested by the same person on the same day in the embed yard so there is no question that different material was tested (the bolts also had different serial numbers.)

Also SWR's 803 and 3172 fabricated a total of 24 anchor bolts, while TDS's 224, 234, and 259 tested a total of 36 bolts.

This is another example of anchor bolts being fabricated without an SWR and of an apparent mix-up of marking and/or material subsequent to fabrication, or mixed heat numbers.

(12) Other examples of irregularities are Category I leveling bolts summarized on TDS 962 and 963. The bolts themselves are not necessarily critical, but they were apparent controlled as safety-related ("Q") material.

These irregularities are examples of apparent problems with site fabricated anchor bolts which appear to invalidate the B&R logic and methodology.

(a) TDS 962 summarizes 1/2" Type AB 45A leveling bolts and gives the following data:

Nine hundred thirty-three bolts fabricated on ten work orders as follows:

SWR	Date "Fabed"	"Q" No.	Material HT	Material
1701	08-03-78	1-360	42849	A-36
2774	11-02-78	361-414	15170	A-36
2778	11-02-78	415-420	15170	A-36
2783	11-02-78	421-462	15170	A-36
2802	11-13-78	463-494	8895511	A-193
3451	03-08-79	495-538	20268	A-36
3391	03-09-79	539-605	20268	A-36
3979	03-14-79	606-873	20268	A-36
4481	06-07-79	874-893	20628	A-36
4512	06-11-79	894-933	20628	A-36

TDS 0376 tested 32 of these bolts in the yard on August 7, 1979, which were apparently identified as Heat 889551, SWR 1701, Bolts 1-Q-463 to 494. The SWR number was changed to SWR 3979 on August 24, 1979. (The bolt numbers are apparently for SWR 2802 by serial number.)

Both the TDS and SWR Summaries show TDS 0376 as being for SWR 2802. Documentation (TDS 0376) does not support this position. At the time of testing on TDS 0376, the identification of the bolts apparently indicated a marking mix-up in that they were identified to SWR 1701.

Similiar irregularities, not discussed by B&R documentation, exist on TDS's 461 and 462 which tested 39 leveling bolts with serial numbers ranging from 894 through 933 in the yard on August 4, 1979, identified to SWR 3979. Based

on TDS 0962, SWR 3979 fabricated bolts serial numbers 606-873. This is another example of apparent identification mix-up of controlled "Q" material after fabrication.

(b) TDS 963 summarizes 1/2" Type AB 44 leveling bolts and gives the following data:

SWR	Date "Fabed"	"Q" No.	Material HT	Material
1702	08-03-78	1-360	15170	A-36
2782	11-04-78	361-411	15170	A-36
2776	11-04-78	412-431	15170	A-36
2801	11-13-78	432-462	8895511	A-193 Note 1
4406	06-06-79	463-605	20268	A-36
4454	06-06-79	606-663	20268	A-36
4513	06-11-79	664-683	20268	A-36

Note 1: Not found in field per TDS 963.

TDS 963 only listed TDS's 0362-0363 as testing Type AB 44 bolts not installed, but in the yard.

TDS's 0362-0363 tested on August 4, 1979, 42 anchor bolts identified to SWR 1702, but having numbers 611-656. Based on TDS 963, these bolts were fabricated on SWR 4454. This is another apparent example of identification mix-up after fabrication.

(13) The NRC inspector found another example of a change in data which has no apparent documented authority, or apparent basis in fact.

SWR 3164 covered fabrication of four 1/2" x 13" anchor bolts, Type II, but to be fabricated of A-193 in accordance with Field Material Sketch (FMS) 266, Revision 1.

The SWR Summary shows for SWR 3164 "no heat recorded." Documentation for SWR 3164 provided to the NRC inspector does not substantiate that anchor bolts were fabricated on SWR 3164.

TDS 818 is purported to test four anchor bolts on SWR 3164.

TDS 818, on November 20, 1979, tested in the embed yard four 1/2" x 13" Type II anchor bolts, MK AB 34, Heat 20268 (A-36), numbered AQ9-AQ12. The SWR was shown as 1752, but was subsequently changed, without known basis or authority, to SWR 3164.

The SWR Summary shows that SWR 1752 fabricated four 1/2" x 13" Type VI anchor bolts. (The NRC inspector did not document the FMS to which fabricated, or the date.) The NRC inspector did

verify that SWR 1752 documentation showed fabrication from A-193 bar, Heat 8895511. (B&R at times identified Type II and IV anchor bolts of A-193 as Type VI.)

The anchor bolts for SWR 1752 are reported as being tested on TDS 816 on the same date, but the same person, at the same location as TDS 818. TDS 816 uses the same description as TDS 818, except shows Heat 88955110. (Apparently the 0 was added in error.) Bolt numbers are 1Q5-1Q8.

Both TDS's 816 and 818 show the anchor bolts as being fabricated for Drawing 1-C-4153 and MEAB 1. SWR 1752 was for MEAB 1; SWR 3162 was for MEAB 2, Drawing 2-C-4153.

Documentation shows that eight anchor bolts were identified to SWR 1752 as follows:

Bolts 1Q5-1Q8; Heat 8895511; TDS 816
Bolts 1Q9-1Q12; Heat 20268; TDS 818

There is no known basis for changing SWR 1752 to SWR 3164 on TDS 818. Without such a change, however, a determination would have to be made that anchor bolts were fabricated against an SWR contrary to documentation contained in the SWR data package, which determination would invalidate B&R methodology and logic.

(14) The NRC inspector has identified several cases where TDS's have SWR's which appear to have been obliterated. In the NRC inspector's review of selected TDS's, the following additional examples were discovered.

TDS 0175 The TDS Summary states TDS 0175 tested SWR 1717 for 7/8" x 36" Type II anchor bolts. The SWR Summary shows SWR 1717 as "no heat recorded." (The SWR has been "lost" since April 17, 1980, and there is no documentation that anchor bolts were fabricated on that SWR.)

TDS 0175 tested one Type II anchor bolt loose in MEAB 1, Heat 70546. There is no reason stated for obliterating the SWR number.

TDS 0183 The TDS Summary shows TDS's 0182 and 0183 tested SWR 1707 for 28 1-3/8" x 26" Type V anchor bolts.

TDS's 0182 and 0183 each test 14 installed anchor bolts. The authority for SWR obliteration is not documentated.

TDS 0184 The TDS Summary shows TDS 0184 tested SWR 3280 for 12 1-5/8" x 71" Type IV anchor bolts.

TDS 0184 tests 12 1-5/8" x 71" Type IV anchor bolts, Type AB 61, Heat 18748. The authority for SWR obliteration is not documented. COP-4, Appendix A, shows Type AB 61 as 5/8" x 61", not 1-5/8" x 61".

TDS 0365 The TDS Summary states TDS 0365 tested SWR 0503. The SWR Summary shows SWR 0503 fabricating two 3/4" x 33" Type IV (A-36) anchor bolts tested on TDS 0365. The HT number is listed as 17950.

TDS 0365 documents testing loose in MEAB 2, two anchor bolts, Heat 17950, 3/4" x 46". The SWR number, which apparently was 0503, was obliterated since the bolts being 46" long, not 33", and could not belong to SWR 0503, although they wereapparently marked "0503."

Again there is no documentation of authority for this change, and there are apparently anchor bolts for which an SWR cannot be identified.

In all cases, obliteration of SWR numbers raises a question of the source of the anchor bolts, since B&R should have listed all SWR's for fabrication of anchor bolts in their SWR Summary in Attachment 9 to TRD 5A840SR163-A.

There is no documentation of subsequent action taken for TDS's 0175, 0183, 0184, or 0365.

(15) SWR 1342 shows two anchor bolts (AB1&9) scrapped per NCR S-M 458. No SWR is identified for replacement.

The SWR Summary for SWR 1342 shows fabrication of 16 1-1/2" x 27 Type VI anchor bolts, Heat 77303 (incorrectly A-36) which tested as A-36 on TDS 0775.

TDS 0775 tests 16 installed bolts, the number identified on SWR 1342 prior to scrapping two anchor bolts.

Documentation indicates two anchor bolts were fabricated without an SWR.

d. Irregularities in Values of Mechanical Properites of Anchor Bolts Tested and Methodology of Hardness Testing

(1) Irregularities with tensile strength of anchor bolts fabricated of A-193 bar.

(a) A number of TDS's report tests of A-193 anchor bolts have hardness values reflecting extremely high tensile strengths. While ASTM A-193 has no upper limit on hardness or tensile

strength, it does contain limitations on reduction in area and elongation to preclude inadequate ductility. To attempt to establish an approximate upper limit on A-193 hardness values, the NRC inspector used the hardness limits of SAE Grades 5 and 6 which specify a maximum hardness in lieu of elongation and reduction in area. All are quenched and tempered. A comparison is given below.

Specification	Tensile Strength	Hardness Range
ASE Grade 5	120,000 min.	Bhn 241-302
ASTM A-193,B7	125,000 min.	
SAE Grade 6	133,000 min.	Bhn 269-331

Based on the above, the approximate upper limit for ASTM A-193, Gr. B7, for hardness would be 313 Bhn, which is equivalent to 150,000 psi.

The following are examples of TDS's reporting hardnesses in excess of this valve indicating possible noncompliance with the elongation and reduction in area requirements of A-193, Gr. B7.

TDS's 992, 1000, 1020-1022.

Similarly, a number of TDS's report values below those allowable (125,00 psi) for ASTM A-193, GR. B7.

Examples are:

TDS's 0202 and 0259.

TDS's 0202 and 0259 test anchor bolts of Heat 46239 having unacceptably low hardnesses, while TDS 992 tests the same heat of material having extremely high hardnesses (475 Bhn). Approximate equivalent tensile strengths vary from 63,000 psi to 238,000 psi. Even with variances in testing, this extreme range indicates probable vendor heat treatment problems, or a mixture of material within this heat of material.

(b) Irregularities in Hardness Test Results

(1) TRD 5A840SR163-A, Attachment 9 (with its five attachments) covers the anchor bolt material reverification program.

Pages 1 and 2 state:

"1. RETESTING OF ANCHOR BOLTS

The material type of several groups of field fabricated anchor bolts were incorrectly identified by the original test team as a result of omitting the hardness of the Brinell test bar from the TDS submitted for evaluation. The omission of the test bar resulted in errors converting the raw test data to useable data. Retesting reinforced the original theory that the wrong constant (test bar hardness) was used in the conversions resulting in misidentified materials."

The NRC inspector recomputed the Brinell hardness and determined the tensile strengths for the original tests shown below and compared those values to the values of the retest as also indicated below. The data conversion formula was provided by Teleweld (Mr. Fitzpatrick). Use of both test bar hardnesses of 163 and 248 Bhn gave unacceptable ranges of hardnesses. Retest TDS's gave values which varied from data reduction of the initial tests using either test bar value. A review of original TDS's and reverfied TDS's are listed below:

Original	Reverification
249	992
250	993,994
296,297	997, 1018, 1019
606	1030
654	995
121	1052
485, 486	1000, 1021, 1022
393, 495	1027, 1028

The numerous examples which indicate a lack of correlation and repeatability of hardness testing raise questions concerning the validity of the B&R hardness test program. If the spread of hardness values is valid, it may be indicative of problems with vendor heat treatment, a special process for which the NRC inspector has found no documentation of B&R verification,

procedure approval, surveillance, or audit, or a mix-up of material either by vendors or by B&R. The licensee apparently had some concern regarding B&R hardness testing, since HL&P purchase requisition RPD 597114, dated May 7, 1980, was prepared for Southwest Research Institute or Battelle to conduct an anchor bolt reverification program. Based on the dates on B&R reverification TDS's (January 31, 1980, through April 17, 1980) this was after completion of the B&R reverification. HL&P memorandum ST-HL-17018, dated September 15, 1980, Subject: Independent Anchor Bolt Verification Testing Program South Texas Project Electric Generating Station, indicated that proposals would be received by November 1, 1980, and that the contract would be awarded.

Licensee personnel informed the NRC inspector that this reverification was not performed.

During a subsequent inspection, the NRC inspector will review this subject further, including referenced licensee Memoranda ST-HL-15912 and ST-HL-16872, relating to reverification by an outside organization.

e. Other Significant Irregularities in the Documentation of the B&R Anchor Bolt Material Verification Program Indicating Identification of other Potentially Significant Construction Problems Not Acted Upon by B&R

(1) A very significant finding was identified by the NRC inspector as a result of the review of TDS 0208.

TDS 0208 (in Attachment 6 to TDS 5A840SR163-A) tested Bolt 17 in the embed yard. The bolt was 2-1/2" x 3'7" and was shown as Drawing A-3620, HT 48191. It was shown as A-193 (minimun tensile 125,000 psi), but tested as A-36 (Bhn 115, tensile 58,000 - the minimum for A-36), which was not accepted (or rejected). The TDS shows this as a vendor bolt.

There were no 2-1/2" site fabricated anchor bolts based on COP-4, Revision 0, "Civil Engineering Take-Offs," dated November 28, 1979, and the SWR Summary. (2-1/2" A-36 and A-193 Bar was purchased and accepted, however.)

Anchor bolts of dimensions 2-1/2" x 3'7" (43") (Piece Mark A-3620) were provided by Bostrom-Bergen Metal Products on B&R P.O. 35-1197-6008 and accepted on B&R RIR 1607. CMTR's show hardness as 332-351 Bhn and tensiles as 154,000 and 153,500 psi.

There is no documentation of subsequent action concerning TDS 0208, or the nonconforming anchor bolt.

(2) Another significant finding relates tc a problem with embeds identified by B&R where A-36 round bar (anchor bolts) were required to be welded to A-36 plate.

Included in Attachments 6, 9, and 13 to B&R TRD 5A840SR163A was the following documentation.

TDS Summary (Attachment 9)

This summary shows 91 TDS's for embed plates where A-36 round bar was welded to A-36 plate. If A-193 bar was incorrectly used during fabrication, the resultant unapproved and unacceptable weld could affect reactor safety.

TDS 0508 (Attachment 6) and NCR S-M 2198 (Attachment 13)

These reflect a case where two A-193, B7, bars were found welded to an A-36 plate, and were required to be removed and replaced with A-36 bars.

Documentation of this corrective action will be verified by the NRC insepctor during a subsequent inspection.

NCR S-M 3417 (Attachment 13)

This NCR documents rejection and scrapping of 25 A-193 rods welded to crane rail embed plates; 37 other A-193 rods which cut and bent, but not yet welded which were scrapped; and 32 other A-193 rods at the fab shop which were scrapped.

Documentation of this scrapping will be reviewed further by the NRC inspector during a subsequent inspection.

SWR Summary (Attachment 9)

The SWR Summary does not show the SWR's for the embed plates tested on the 91 TDS's, nor is there substantiating documentation that all site fabricated embed plates were identified and tested.

The licensee was unable to identify to the NRC inspector a comprehensive listing to site fabricated embed plates such as exists for anchor bolts in B&R Procedure COP-4, Revision 0, discussed in Section 4.a above.

The NRC inspector, with licensee personnel, toured the laydown yard where residual B&R fab show material is stored. The following embed plates of welded construction, identified as "Q"

(safety-related), had round bar which was neither marked with heat code or number, nor showed evidence of having been hardness tested, and had no evidence of being rejected.

#82
#89
#92
#94
#252 (four of six bars)

This situation indicates apparently unverified and unidentified bar welded to embeds at the time B&R left STP.

(3) The NRC inspector's review of TRD 5A840SR163-A, page 2, paragraph 3.1.a, discovered that Types I through IV anchor bolts were limited by design to ASTM A-36 (1970) and certified. The following cases deviate from that requirement.

(a) Certain B&R Field Material Sketches (FMS 261, Revisions 1 and 2, and FMS 266, Revisions 1 and 2) require Type II and IV anchor bolts to be fabricated of A-193 bar. SWR 1712 fabricates A-193 Type II anchor bolts on FMS 266, Revision 2 as an example.

(b) Attachment 13, NCR S-M 3202, Item 2 accepts five Type II anchor bolts fabricated of ASTM A-193 tested on TDS 113.

(c) Attachment 13, NCR S-M 3713 accepts four Type II anchor bolts tested on TDS 653 as A-193.

(d) NCR S-M 4321A accepts the following anchor bolts fabricated of A-193.

24 1" x 40" Type III, TDS 1024
1 1-1/4" x 44" Type IV, SWR 1212
5 3/4" x 21-1/2" Type II TDS 1041 and 1042

(e) Attachment 13 NCR S-M 4323A SWR 1373, TDS 0296, 0297, 0997, 1018 accepts anchor bolts with hardnesses above the range of A-36.

No documentation in the NCR's in Attachment 13 discusses the prohibition on the use of A-193 material for Types I-IV anchor bolts discussed in the TRD, paragraph 3.1.a, discussed above. Neither is there a discussion of the fact that A-193 is work hardenable, hence the mechanical properties in the bend are indeterminate.

(4) No known B&R procedure required inspection of bent anchor bolts for cracks, fissues, or stress risers. The NRC inspector and licensee personnel noted some apparent stress risers in certain

nonsafety-related bent anchor bolts in the B&R residual material in the laydown yard.

(5) Finally, the NCR's in Attachment 13 do not discuss the allowable hot bending of A-36 bar discussed in TRD 5A840SR163-A, Section 3.0 "Structural Steel Design Criteria," Subsection 3.4 General Notes, Note E which states:

"Anchor bolts A-36 may be worked hot with temperatures up to 1200F. Anti-scaling compounds may be used to limit the scaling loss to 1/16" maximum. A-193 anchor bolts shall not be bent."

Since the acceptance of anchor bolts on NCR's S-M 3202, 3713, and 4321A did not discuss that if these anchor bolts were thought to be A-36 at the time of manufacture, they could have been hot bent and the resultant uncontrolled heat treatment would result in indeterminate mechanical properties in the heated area.

The licensee could not identify a procedure to control this hot bending of A-36, although such a procedure exists for rebar.

(6) Below are additional, specific comments on NCR's S-M 4321A and 4323A.

(a) NCR S-M 4321A, Item 2, accepts one A-193 Type IV anchor bolt tested on TDS 0202 for SWR 1212.

TDS 0202 reports testing of eight anchor bolts installed in MEAB 1, identified to SWR 1212. Seven bolts tested as A-36 type material, one tested at 115,000 psi, above the maximum for A-36 (80,000) and below the minimum for A-193 (125,000). This latter bolt was considered A-193.

The SWR Summary shows SWR 1212 as fabricating 16 1-1/4" x 44" Type IV anchor bolts of Heat 46239 (A-193) and that they were tested on TDS 0202 and 0203. Fifteen are shown as testing A-36 and one as A-193.

TDS 0202 tests eight bolts as stated above; TDS 0203 is as sketch and tested no bolts. Only eight bolts were tested, not 16 as shown on the SWR Summary.

Heat 46239 is A-193, not A-36, but seven of the eight tested anchor bolts tested as A-36 type material. This heat is one identified elsewhere in this report as having tests indicating an apparent vendor heat treatment problem, based on B&R testng. Since most of the tests of this heat indicate high tensile values (as high as 252,000 psi), these excessively low tensile values may be indicative of a mix-up in material within a heat number.

(b) NCR S-M 4321A, Item 4, discusses 5 of 44 3/4" x 21-1/2" Type II anchor bolts misfabricated on SWR 1054. The five bolts are purportedly A-193.

SWR 1054 has been missing since at least April 17, 1980, as documented by B&R. There is no documentation that any bolts were made on SWR 1054.

The SWR Summary for SWR 1054 shows 32 bolts tested on TDS's 1040 and 1041, 25 as A-36 and 7 as A-193.

TDS's 1040 and 1041 show 32 bolts tested with the following values, none marked acceptable on the TDS's.

Reported Tensile Strengths	Number of Bolts
103,000	1
100,000	1
99,000	2
97,000	1
90,000	2
88,000	4
83,000	4
80,000	5
73,000	7
71,000	4
67,000	1

NOTE: The maximum allowable by A-36 is 80,000 psi; the minimum for A-193, B7, (2 1/2" and below) is 125,000.

Apparently B&R considered material with tensile strength of 90,000 psi and above as A-193 based on the SWR Summary for SWR 1054.

e. Other Irregularities in Substantiating Documentation Relating to the B&R Verification of Site Fabricated Anchor Bolt Material

(1) TRD 5A840SR163-A, Attachment 13, NCR S-M 4318-A, Item 2, discusses 12 anchor bolts on SWR's 1214 and 1715, which were finally unacceptable. TDS's 451 and 1037 are shown as applicable. The NCR also states that the anchor bolts were improperly fabricated because FMS 0025 required A-36 in lieu of A-193. FMS errors were not identified in the TRD as contributing to material mix-up.

The TDS Summary shows the following:

SWR 1214 fabricated four anchor bolts 1-1/8" x 24" Type V, Heat 81536, which were not tested. SWR 1715 fabricated eight anchor bolts 1-1/8" x 24" Type VI, Heat 81536, tested on 0451 and 1037.

TDS 0451 (from Attachment 6) shows a test of four 1-1/8" x 24" anchor bolts, SWR 1214 Heat 81536, as A-36. The test was performed in the embed yard.

TDS 0451 (from Attachment 13, NCR 4318-A) shows SWR 1214 marked through and SWR 1715 written in.

No authority or basis for this change is documented. As discussed previously, there are a number of changes on TDS's for which documentation of the authority or basis is not documented.

Additional paradoxes concerning these anchor bolts are covered in NRC Inspection Report 83-01, paragraph 3.

(2) Nuts for Type VI anchor bolts.

(a) SWR 791 fabricated Type VI (A-193) anchor bolts, but provided A-307 nuts in lieu of A-194 nuts.

(b) SWR 4170 fabricated Type VI anchor bolts, but did not provide anchor bolt to embed plate nuts, raising the concern that A-307 nuts might have been used.

(c) SWR 075 fabricated A-193 anchor bolts without allocating A-194 nuts where required. SWR 075 data card shows the nuts as not applicable (N/A), raising also, a concern over the possible welding of the A-193 bolt to the plate.

The problem of possibly lower strength (A-307) nuts for Type VI anchor bolts was not addressed by B&R.

(3) The SWR Summary for SWR 159 shows fabrication of four 5/8" x 27" Type II anchor bolts, Heat 26410, tested on TDS 580, but no test results recorded.

The TDS Summary for TDS 580 shows testing for SWR 824.

The SWR Summary for SWR 824 shows fabrication of four 5/8" x 24" Type II anchor bolts of Heat 10732 (1-0732), with testing on TDS 0580 of two anchor bolts as A-36.

TDS 580 shows testing on August 6, 1979, of two 3/4" x 29" Type II anchor bolts in the embed yard from SWR 663. The TDS shows Heat 1-0732. A 5/8" dimension is struck through and 3/4" written in for diameter of the anchor bolts. Heat 1-0732 is 5/8" A-36 bar on P.O. 9477. No 3/4" safety-related bar of that heat number is known to be at STP. No authority for this change is documented.

SWR 663 is for 12 3/4" x 29" Type II non-Category I anchor bolts (no heat given) tested on TDS 0599.

TDS 0599 reflects testing on September 7, 1979, of 12 such anchor bolts installed for the screen wash pump.

(4) The SWR Summary for SWR 3306 shows fabrication of 20 7/8" x 46", Type III anchor bolts, Heat 70546, tested on TDS 0321.

TDS 0321 tested in RCB1, 20 installed anchor bolts, 7/8" x 46", Type III, and shows SWR-871 (the first digit is cut off).

SWR 3871 is for ten 7/8" x 46", Type III anchor bolts, Heat 1-5550, for which the TDS and SWR Summaries show no TDS.

(5) TDS 5A840SR163-A, Attachment 9, SWR Summary does not contain the following SWR's and TDS's, which are in the TDS Summary (SWR 4463 shows as 4403 in the TDS Summary).

TDS	SWR	Comments
0228	4463	TDS 0028 Tests 22 1-1/4" Diameter anchor bolts.
0228	4451	Location given in west pressurizer RCB-1. NCR-SM-1551 is referenced. Reported test values are as follows.

Reported Tensiles	Number of Bolts	Comments
86,000	2	Nine of the 22 have tensiles outside the allowable range of A-36. The tensile reported less than 56,000 had a reported Bhn of 104; the lowest reading on the scale of conversion is 111 Bhn which is 56,000. The TDS did not show nine out of specification readings as acceptable. The TDS Summary shows all readings as A-36.
82,000	6	
74,000	1	
73,000	2	
71,000	4	
69,000	1	
66,000	1	
65,000	2	
63,000	1	
60,000	1	
56,000	1	

TDS 0228 was performed on installed anchor bolts on July 19, 1979, (prior to training or issue of the procedure for testing) by the person identified as having problems in data reduction resulting in the reverification program. TDS 0228 does not show the test bar used and shows a date of July 19, 1979. CCP-24, testing anchor bolt materials, Revision 0, was not issued until July 23, 1979. There is no documentation of retest.

(6) TRD 5A840SR163-A, Attachment 9, B&R Memorandum BC-26810-MTH, page 4, states that the following bolts were fabricated correctly and lists SWR 0053 and states "Bolts are inaccessable, heat number given is for correct material."

Attachment 9, B&R Memorandum SQA-3603, the SWR Summary, states that SWR 0053 was not on file as of April 17, 1980, and shows no heat number for SWR 0053.

Licensee personnel were not able to retrieve documentation that anchor bolts were fabricated on SWR 0053 when asked by the NRC inspector in February 1983. The heat number is shown by B&R on Attachment 1 to Attachment 11 of the TRD, (which is NCR S-M 1080A) as Heat 17950. The NRC inspector has found no basis in documentation for stating that this heat number is valid for SWR 0053, or for the 3/4" x 46" anchor bolts installed in MEAB 1, or that anchor bolts were fabricated on SWR 0053.

(7) TRD 5A840SR163-A, Attachment 13, NCR S-M-3922 states that Type VI anchor bolts on TDS's 955, 956, and 957 (1-1/4" x 28" on SWR 3106) were replaced with bolts from SWR 4407, QA/QC verification of the closure of the NCR was shown a satisfactory and was dated November 6, 1980.

The SWR Summary for SWR 4407 shows bolts tested on TDS 304-307 (this also is shown in the TDS Summary).

TDS 304-307 tested, on August 28, 1979, 72 1-1/4" x 28" Type VI installed anchor bolts identified to SWR 3748.

TDS 0028, on September 15, 1979, states bolts on 3748 were scrapped for being too short and replaced by bolts on SWR 4407.

The SWR Summary shows SWR 4407 fabricated 72 1-1/4" x 28" Type VI anchor bolts, Heat 46239, the same length as the bolts replaced on SWR 3748, which were replaced for being too short.

TDS's 1014-1016 state the test SWR 4407, and are a retest of TDS's 304-306 (which tested SWR 3748).

(8) On September 25, 1978, B&R issued GOP-23, "Control of Field Sketches," which includes control of Field Material Sketches (FMS).

Section 3.1.1 required that the chief construction discipline engineer assure that the information presented on the field sketch will in no way conflict with design requirements.

B&R Drawing 2-C-1567 shows 28 2-1/4" x 58" Type V (A-36) anchor bolts for the safety injection system (SIS) tank.

Based on B&R documentation, SWR 1096 was used to fabricate these anchor bolts in accordance with FMS 282, Revision 0. FMS 282, Revision), and SWR 1096 specified A-193, not A-36. TDS's 1020, 1021, and 1022, documenting tensile strengths of 104,000 to 202,000, indicate that material is more probably A-193 type

material than A-36, and these TDS's were accepted by B&R as being A-193.

Though this was identified by B&R documentation as another case where the FMS deviated from the design drawing, TRD 5A840SR263-A did not identify that deviation of FMS's from design drawings and failure to comply with GOP-23 contributed to the problem of incorrectly fabricated anchor bolts.

The NRC inspector considers that B&R substantiating documentation to TRD 5A840SR163-A does not appear to prove the acceptability of installed anchor bolts and embed plates, nor to substantiate the statement of the licensee in letter ST-HL-AE-400, dated December 31, 1979, paragraph VB, as modified by licensee letters dated January 28, 1980, and January 26, 1981. The licensee stated:

The NRC inspector could find no licensee personnel who appeared thoroughly knowledgeable of the B&R Anchor Bolt Reverification Program, or who appeared to have reviewed the B&R documentation in detail.

This will be an unresolved item pending further review by the NRC inspector during a subsequent inspection (8302-02).

11. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations or deviations. One unresolved disclosed during the inspection is discussed in paragraph 10.

12. Management Meetings

Management meetings were held periodically with licensee personnel during the course of this inspection to discuss inspection scope and findings.

NRC FORM 366 (11-81) IE MC 0535

U.S. NUCLEAR REGULATORY COMMISSION

INSPECTOR'S REPORT

Office of Inspection and Enforcement

PRINCIPAL INSPECTOR (Name, last, first, and middle initial): W. M. HILL

REVIEWER: W. A. CROSSMAN

INSPECTORS: J. R. BOARDMAN; D. P TOMLINSON

LICENSEE/VENDOR: HOUSTON LIGHTING AND POWER Co.
P.O. BOX 1700
HOUSTON, TX 77001

TRANSACTION TYPE: X I – INSERT; X M – MODIFY; D – DELETE; R – REPLACE

DOCKET NO. (8 digits) OR LICENSE NO. (BY PRODUCT) (13 digits): 050004998; 050004999

REPORT NO.: 8302 (SEQ. A, B)

NEXT INSPEC. DATE: MO. ; YR.

PERIOD OF INVESTIGATION/INSPECTION: FROM MO. 02 DAY 01 YR. 83; TO MO. 02 DAY 28 YR. 83

INSPECTION PERFORMED BY: X 1 – REGIONAL OFFICE STAFF; X 2 – RESIDENT INSPECTOR; 3 – PERFORMANCE APPRAISAL TEAM; OTHER

ORGANIZATION CODE OF REGION/HQ CONDUCTING ACTIVITY (See IEMC 0530 "Manpower Reporting—Weekly Manpower Reporting" for code.): REGION 4; DIVISION C; BRANCH A

REGIONAL ACTION (Check one box only): 1 – NRC FORM 591; X 2 – REGIONAL OFFICE LETTER

TYPE OF ACTIVITY CONDUCTED (Check one box only): X 02 – SAFETY; 03 – INCIDENT; 04 – ENFORCEMENT; 05 – MGMT. AUDIT; 06 – MGMT. VISIT; 07 – SPECIAL; 08 – VENDOR; 09 – MAT. ACCT.; 10 – PLANT SEC.; 11 – INVENT. VER.; 12 – SHIPMENT/EXPORT; 13 – IMPORT; 14 – INQUIRY; 15 – INVESTIGATION

INSPECTION/INVESTIGATION FINDINGS (Check one box only): X A – 2 – VIOLATION; X B – 2 – VIOLATION; 1 – CLEAR; 3 – DEVIATION; 4 – VIOLATION & DEVIATION

TOTAL NUMBER OF VIOLATIONS AND DEVIATIONS: A 0; B 1; C 0; D 1

ENFORCEMENT CONFERENCE HELD: 1 – YES

REPORT CONTAIN 2.790 INFORMATION: 1 – YES

LETTER OR REPORT TRANSMITTAL DATE: NRC FORM 591 OR REG. LETTER ISSUED: MAY 18 1983; REPORT SENT TO HQ. FOR ACTION

MODULE INFORMATION

REC ORD	TYPE	NUMBER	MODULE NUMBER INSP PHASE	MANUAL CHAPTER	PROCEDURE NUMBER	LEVEL	SEQ *	PRIORITY	DIRECT INSPECTION EFFORT IN STAFF HOURS EXPENDED THIS INSPECTION	PERCENTAGE COMPLETED TO DATE	STATUS	MODULE REQ. FOLLOWUP PHASE	MANUAL CHAPTER	PROCEDURE NUMBER	LEVEL
B	1	2	3	0	7	0	3	A	1	0	0	4								
								B	1	0	0	3								
								C												
								D												
B	1	2	5	5	0	7	3	C	A	2	0	1	0	2	0					
								B												
								C												
								D												
B	1	2	4	6	0	5	3	C	A											
								B	1	0	1	0	5	1	0					
								C												
								D												
B	1	2	9	2	7	0	6	A	1	0	5	6								
								B	1	0	5	6								
								C												
								D												

* CIRCLE SEQUENCE IF VIOLATION OR DEVIATION

MODULE INFORMATION

REC ORD	TYPE	NUMBER	MODULE NUMBER INSP PHASE	MANUAL CHAPTER	PROCEDURE NUMBER	LEVEL	SEQ *	PRIORITY	DIRECT INSPECTION EFFORT IN STAFF HOURS EXPENDED THIS INSPECTION	PERCENTAGE COMPLETED TO DATE	STATUS	MODULE REQ. FOLLOWUP PHASE	MANUAL CHAPTER	PROCEDURE NUMBER	LEVEL
B	1	2	5	5	1	5	1	A	1	0	0	4	1	0	0	C				
								B												
								C												
								D												
B	1	2	5	5	1	5	7	B	A	1	0	0	6	1	0	0	C				
								B												
								C												
								D												
B	1	2	5	5	1	7	2	B	A	1	0	0	5	1	0	0	C				
								B												
								C												
								D												
B	1	2	5	5	1	8	2	B	A	1	0	0	5	1	0	0	C				
								B												
								C												
								D												

NRC FORM 766 A*
(11-81)
IE MC 0535

INSPECTOR'S REPORT
(Continuation)
Office of Inspection and Enforcement

DOCKET NO. (8 digits) OR LICENSE NO. (BY PRODUCT) (13 digits)	REPORT NO.	SEQ.
05000498	8203	A
05000499	8203	B
		C
		D

MODULE NUMBER: 29270615 2

VIOLATION SEVERITY OR DEVIATION: 1 2 3 4 5 6 D — X (5)

SITE RELATED: S A

VIOLATION OR DEVIATION (Enter up to 2400 characters for each item. If the text exceeds this number, it will be necessary to paraphrase. Limit lines to 50 characters each.)

CONTRARY TO 10CFR50, APPENDIX B, CRITERION XVII and ANSI N45.2.9-1974, the licensee failed to have retrievable records

U.S. NUCLEAR REGULATORY COMMISSION

Page 2

NRC FORM 766 (11-81) IE MC 0535

U.S. NUCLEAR REGULATORY COMMISSION

INSPECTOR'S REPORT

Office of Inspection and Enforcement

PRINCIPAL INSPECTOR (Name, last, first, and middle initial): W. M. HILL

REVIEWER: W. A. CROSSMAN

INSPECTORS

LICENSEE/VENDOR	TRANSACTION TYPE	DOCKET NO. (8 digits) OR LICENSE NO. (BY PRODUCT) (13 digits)	REPORT NO.	SEQ.	NEXT INSPEC. DATE MO.	YR.
HOUSTON LIGHTING AND POWER Co.	I – INSERT	05000498	8302	A		
P.O. BOX 1700	M – MODIFY	05000499	8302	B		
HOUSTON, TX 77001	D – DELETE			C		
	R – REPLACE			D		

PERIOD OF INVESTIGATION/INSPECTION FROM (MO. DAY YR.)	TO (MO. DAY YR.)	INSPECTION PERFORMED BY	OTHER	ORGANIZATION CODE OF REGION/HQ CONDUCTING ACTIVITY (See IEMC 0530 "Manpower Reporting—Weekly Manpower Reporting," for code.) REGION	DIVISION	BRANCH
02 01 83	02 28 83	[X] 1 – REGIONAL OFFICE STAFF; [X] 2 – RESIDENT INSPECTOR; 3 – PERFORMANCE APPRAISAL TEAM		4	C	A

REGIONAL ACTION (Check one box only): 1 – NRC FORM 591; [X] 2 – REGIONAL OFFICE LETTER

TYPE OF ACTIVITY CONDUCTED (Check one box only): [X] 02 – SAFETY; 03 – INCIDENT; 04 – ENFORCEMENT; 05 – MGMT. AUDIT; 06 – MGMT. VISIT; 07 – SPECIAL; 08 – VENDOR; 09 – MAT. ACCT.; 10 – PLANT SEC.; 11 – INVENT. VER.; 12 – SHIPMENT/EXPORT; 13 – IMPORT; 14 – INQUIRY; 15 – INVESTIGATION

INSPECTION/INVESTIGATION FINDINGS (Check one box only): 1 – CLEAR; 2 – VIOLATION (A: X, B: X); 3 – DEVIATION; 4 – VIOLATION & DEVIATION

TOTAL NUMBER OF VIOLATIONS AND DEVIATIONS: A 01, B 01, C, D

ENFORCEMENT CONFERENCE HELD (A B C D): 1 – YES

REPORT CONTAIN 2.790 INFORMATION (A B C D): 1 – YES

LETTER OR REPORT TRANSMITTAL DATE: NRC FORM 591 OR REG. LETTER ISSUED: MAY 18 1983; REPORT SENT TO HQ. FOR ACTION: MO. DAY YR.

MODULE INFORMATION

REC ORD TYPE	MODULE NUMBER INSP (NUMBER, PHASE, MANUAL CHAPTER, PROCEDURE NUMBER, LEVEL)	SEQ.*	PRIORITY	DIRECT INSPECTION EFFORT IN STAFF HOURS EXPENDED THIS INSPECTION	PERCENTAGE COMPLETED TO DATE	STATUS	MODULE REQ. FOLLOWUP
B	25518 7B	A	1	004	100	C	
		B					
		C					
		D					
B	25515 2B	A	1	005	100	C	
		B					
		C					
		D					
B	29701	A	1	006			
		B	1	006			
		C					
		D					
B		A					
		B					
		C					
		D					

* CIRCLE SEQUENCE IF VIOLATION OR DEVIATION