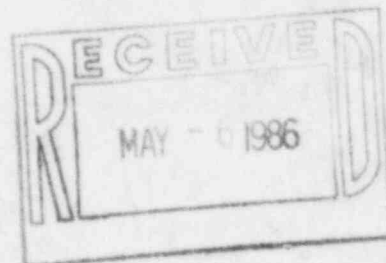




UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 2, 1986

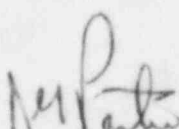


MEMORANDUM FOR: E. H. Johnson, Director
Division of Reactor Safety and Projects
Region IV

FROM: J. G. Partlow, Director
Division of Inspection Programs
Office of Inspection and Enforcement

SUBJECT: ASSESSMENT OF IMPLEMENTATION OF THE NRC INSPECTION
PROGRAM BY REGION IV AT SOUTH TEXAS PROJECT

The Office of Inspection and Enforcement described to the Commission in SECY 82-150A the assessment of the implementation of the NRC inspection program in conjunction with Construction Appraisal Team (CAT) inspections. Accordingly, we have examined Region IV's implementation of the construction inspection program based on the October-November 1985 CAT inspection at the South Texas Project. The results of the inspection were documented in Inspection Report 50-498/85-21 and 50-499/85-19 dated February 5, 1986. The enclosure to this memorandum documents the results of our assessment of the construction inspection program implementation.


J. G. Partlow, Director
Division of Inspection Programs
Office of Inspection and Enforcement

Enclosure:
Assessment

cc w/enclosure:
J. Taylor, IE
R. D. Martin, Region IV

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REGIONAL CONSTRUCTION INSPECTION
PROGRAM ASSESSMENT - OUTLINE
FOR SOUTH TEXAS PROJECT

- I. Objective
- II. Assessment Activities
- III. Assessment Findings
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- IV. Review of Inspection Reports and 766 Hours
 - A. Scope
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REGIONAL CONSTRUCTION INSPECTION PROGRAM
ASSESSMENT - SOUTH TEXAS PROJECT (R-IV)

I. OBJECTIVE

The objective of this assessment is to evaluate Region IV's implementation of the Light Water Reactor Inspection Program-Construction Phase (construction inspection program) and to make an overall assessment of the adequacy of Region IV's oversight of construction activities at the South Texas Project site.

The Construction Appraisal Team (CAT) of the Division of Inspection Programs conducted an announced construction inspection at the South Texas Project (STP) Units 1 and 2 during the period of October 21-November 1 and November 12-22, 1985. While the predominant effort of the inspection team was devoted to hardware inspection, the team also evaluated the control of design changes and corrective actions. The Executive Summary and Potential Enforcement Actions of the STP CAT inspection report (50-498/85-21 and 50-499/85-19) are provided as Appendix A and Appendix B, respectively.

II. ASSESSMENT ACTIVITIES

A review was made of Region IV inspection reports, SALP reports, and construction deficiency reports related to STP, to identify those deficiencies that were previously identified by Region IV inspectors or the licensee. The review included applicable open items and violations, and SALP reports for the periods ending November 30, 1983 and June 30, 1985.

The regional inspection effort at STP was determined through a review and analysis of inspection reports and the 766 Computer System inspection data for the period of 1979 through September, 1985. The overall and 1985 manhours of direct inspection effort at STP Unit 1 were also compared to other sites in a similar stage of construction.

III. ASSESSMENT FINDINGS

A. Electrical and Instrumentation Construction

1. CAT Findings

- ° It was noted that a number of raceway installations did not meet the licensee's FSAR commitment for spatial separation. Although originally identified by the licensee in 1984, the procedural and administrative controls have only recently been developed.
- ° Cable and termination installations were generally found to be in accordance with design requirements with the exception of some isolated deficiencies. However, several construction practices were identified to have the potential for cable damage. The color of a number of cables was also found to have faded, complicating divisional identification.

- ° Load-side terminal extensions on a number of molded case circuit breakers in Class 1E motor control centers were found to have the potential for circuit interruption or phase-to-phase faulting.
- ° Numerous hardware deficiencies and a lack of design change control were identified in the wiring of Westinghouse supplied motor operated valves.
- ° Numerous deficiencies were identified in a limited sample of instrumentation installations.

2. Assessment

- ° Problems in the area of electrical separation have been identified by the NRC CAT at numerous plants and have resulted in the issuance of IE Information Notice 85-11. The licensee first documented electrical separation problems at STP in May 1984. A review of the region's inspection reports indicated that the inspection requirements for raceway installations have not yet been completed.
- ° The region's and CAT's inspection findings for cable and terminations are consistent. The fading of cable jacket color was previously identified by the region.
- ° The region's work observation inspections for installed electrical equipment have so far been limited to the internals for control room cabinets and the mounting of a cabinet in a switchgear room (inspection report 50-498/85-04). Their findings in these areas are also supported by the CAT findings.
- ° The region's inspection reports document very little effort in the inspection of instrumentation construction. This is primarily due to the lack of construction in this area as documented in the SALP reports 50-498/499/83-26 and 50-498/499/85-12.

3. Recommendation

The region should continue with their routine inspection program in the electrical construction area and schedule the continuance of inspections for instrumentation construction. Regional inspection emphasis should be on areas of construction found deficient during prior regional inspections and the CAT inspection. It is also recommended that special attention be given to monitoring the licensee's deferred program for assuring adequate electrical separation.

B. Mechanical Construction

1. CAT Findings

The NRC CAT inspection for the area of QC accepted piping installations identified a number of hardware deficiencies. These are as follows:

- ° The CAT inspectors identified six lugged wafer valves in the Unit 1 essential cooling water system in which hex-head cap screws in the flange to valve joints were shorter than required, and identified other similar type valves for which threaded studs and nuts had been substituted without documentation.
- ° Two annubar flow probe mounting flanges were mislocated with respect to the distance from the pipe outer wall, based on the installation dimensions supplied by the vendor.
- ° Only two pipe supports/restraints were found with deficiencies; one with pipe clamp to horizontal member clearance discrepancy and the other with an undersize strap.

The NRC CAT identified a number of programmatic/procedural weaknesses, as well as inadequate QC inspection, in the area of mechanical equipment installations. They are as follows:

- ° Several discrepancies were noted in the reassembly of Unit 1 pumps: containment spray pump B, low head safety injection pump B and high head safety injection pump B.
- ° Six HVAC mechanical equipment components inspected had several discrepancies. Some are as follows: missing and undersize welds, unshimed foundations, and improper concrete expansion anchor embedment to concrete cored holes.
- ° Reactor water makeup tanks specified ring of cushion material (FLEXCELL) had been removed after QC acceptance of tank's installation.

2. Assessment

- ° The routine inspection under IP 37051 for sampling whether hardware installations meet design requirements is scheduled in the inspection procedure for implementation at one year prior to OL. It is likely that regional inspectors would have identified similar piping installation deficiencies to that found by the NRC CAT during their implementation of the IP 37051 inspection. Also, it is noted that, according to 766 data (see Attachment II), no inspection time was recorded for several modules in piping and mechanical components areas.

- ° The general programmatic/procedural weaknesses, as well as inadequate QC inspection, in the area of mechanical equipment would likely be identified through implementation of the followup Phase II (before work is 60% complete) construction inspection procedures. However, to date the region has only completed the initial (before work is 20% complete) inspection of safety-related components. As the initial inspection in this area does not present the opportunity to include an adequate sample of the licensee's completed mechanical equipment hardware installations, the mechanical equipment discrepancies noted by the NRC CAT could not have been readily identified by the region's inspections conducted to date.
- ° SALP Report 50-498/499/85-12 rated as Category 2 the three mechanical areas. This rating is consistent with the NRC CAT's conclusions in the mechanical areas of piping systems and supports, and HVAC. In the area of safety-related components the rating of 2, although consistent with the results of region inspections conducted for that period in the area of the storage and preservation of components, is considered inconsistent with the NRC CAT's inspection findings for the installation of safety-related components.

3. Recommendations

The construction inspection program is determined to be adequate if implemented in a timely manner. DI/RCPB will evaluate the need for enhancement of inspection requirements or guidance relative to licensee's programs for the installation and inspection of mechanical equipment. Region IV will need to review the status of completion of the inspection program for mechanical equipment and also follow the licensee's corrective actions for mechanical equipment and other CAT findings.

C. Welding - NDE

1. CAT Findings

The NRC CAT inspectors identified undersized socket welds on 2-inch schedule 160 piping and found that vendor procured tanks and heat exchangers were accepted and installed with deficient welds. In addition, some vendor supplied radiographs did not have the required weld and film quality. The team also encountered difficulties in retrievability and location of vendor NDE film and documentation pertaining to the Balance of Plant scope of supply. In addition, the licensee subsequent to their discovery of missing radiographs for the reactor head, required only the Nuclear Steam System Supplier to take corrective action and did not address the other vendors.

2. Assessment

- ° Based on the 766 Computer System Data, the region has not implemented a number of the construction inspection procedures in the area of welding. See Attachment II.
- ° The undersized socket welds were found in 2-inch schedule 160 piping. This piping size was relatively small in quantity when compared to other piping sizes and may not have been in the region's inspection sample.

3. Recommendation

The construction inspection procedures for this area are determined to be adequate and a schedule for implementing remaining welding procedures should be established. An IE Information Notice has been issued relating to the tank and heat exchanger weld problems. It is also recommended that the region review the licensee's program to ensure the identification of welding and NDE requirements, and the existence and location of vendor documentation for this area. The region should also followup on the applicant's rework and inspection of the installed 2-inch schedule 160 piping with undersize welds.

D. Civil and Structural Assessment

1. CAT Findings

- ° A seismic separation space in the Unit 2 tendon access wall at azimuth 302° and elevation 13 ft 3 inches was found omitted.
- ° Structural steel sliding connections were found to have bolts installed too tight. In addition, site inspection procedures for sliding connections were inadequate.
- ° Cross flange welding on fully loaded members without engineering evaluation appears to be allowed in the project specifications.
- ° It was not demonstrated that the A₂ clay layer beneath the essential cooling water (ECW) pipes would not swell and cause overstressing of pipes once the site dewatering system is discontinued.
- ° It was not demonstrated that the concrete expansion anchor bolts with an allowable 1/16 inch slip were adequate to support Class I piping or equipment.

2. Assessment

A review of the regional inspection reports found that a number of the CAT findings, such as noted above, had not been previously identified by the regional office.

It was noted that, according to 766 data (see Attachment II), no inspection time was recorded for structural concrete modules 47063B and 47065B.

It is not apparent that the region's inspection sample included a review of the concrete expansion anchor (CEA) qualification test reports. However, the inspection of CEA qualification test reports is not emphasized in the construction inspection program procedures.

3. Recommendations

The inspection procedures in the areas of geotechnical/ foundations, structural concrete, and structural steel are considered adequate. Region inspections did not identify a number of the CAT findings. However, DI/RCPB will review the need to include a more definitive inspection requirement for review of cross flange welding without engineering evaluation, clay swell once dewatering is discontinued, and CEA qualification test reports. Region IV will need to follow the licensee's corrective actions for the resolution of NRC CAT findings. Region IV should have devoted a portion of inspection work to IPs 47063B and 47065B when those IPs were in force.

E. Material Traceability and Control

1. CAT Findings

- ° Lack of traceability was found for fastener materials for certain large vendor supplied mechanical and electrical equipment assemblies mounted on skids and for certain electrical equipment and cable tray and conduit supports. Also, documentation to permit verification of traceability of fasteners for certain equipment was not located by the licensee during the inspection.

2. Assessment

The large number of fastener problems found by the NRC CAT regarding fasteners furnished with vendor supplied equipment, not previously identified by the region, may indicate a weakness in the construction inspection program.

The following NRC regional activities indicate reasonable inspection of traceability aspects, except for fasteners on vendor supplied equipment:

- ° In several inspection reports in 1982 and 1983 the site was noted to have severe problems in control of anchor bolts and embedded items. Several NRC violations and unresolved items were issued.
- ° STP inspection report (IR) 50-498/499/85-05 indicates that the control and traceability of weld filler material was satisfactory.

- ° In STP IR 50-498/499/85-04 material traceability was verified as satisfactory in the three areas of Reactor Vessel Internals, Electrical Cable and Equipment, and Fire Protection system.
- ° In STP IR 50-498/499/85-06, traceability concerning HVAC systems, concrete, and spent fuel racks was found to be satisfactory.
- ° In STP IR 50-498/499/85-10, the resident inspector's report on concrete and anchor bolts records did not identify any traceability findings.
- ° In STP IR 50-498/499/85-15, open item 85-06-03 on lack of traceability for components of spent fuel racks resulted in a Level IV violation.

3. Recommendations

The construction inspection program and its implementation in this area is determined to be adequate. The NRC regional office should review licensee corrective action activities to rectify the mechanical bolting problems, particularly to assure that fasteners for mounting vendor supplied equipment are of required material and are traceable. Also, the region should monitor licensee's program to correct the problems associated with the deletion of specification requirements for marking of bolting used in the electrical area.

F. Corrective Action Systems

1. CAT Findings

The licensee's corrective action program was found to be generally acceptable, with some exceptions. The licensee's program did not:

- ° Prevent or identify the problem with material traceability of fasteners furnished with vendor supplied equipment.
- ° Address the need to assess and evaluate damage to equipment due to past deficiencies in preventative maintenance and incorporate such considerations into operational maintenance programs.
- ° Recognize the need to conduct a reasonable quantity of audits of actual radiographs of both field welds and vendor supplied welds. Also, failure of audits or corrective actions to assure that vendors required to supply radiographs were readily identified and that the location of radiographs and records were known and readily retrievable as required.

- ° Identify the need for timely and effective corrective action activities for certain electrical items: motor operated valves and motor control centers.
- ° Result in the effective application and control of "HOLD" tags on nonconforming material and equipment.

2. Assessment

The construction inspection program was determined to be adequate. In general, the NRC CAT found that satisfactory procedures were in place for corrective action systems.

The following NRC regional activities indicate reasonable monitoring of the licensee's corrective action system.

- ° In STP inspection report (IR) 50-498/499/85-06, the Region IV resident inspector reviewed the Deficiency Reporting System concerning 50.55(e) matters. Logging, forms, sequencing, time elements and general processing to the NRC was evaluated. No discrepancies were noted.
- ° In STP IR 50-498/499/85-10, the Region IV resident inspector reviewed the Construction/Engineering Deficiency Reporting to 50.55(e). All reported items from January 1, 1984 to June 30, 1985 were evaluated in detail. The procedures, reporting methods and time, evaluation and corrective action were evaluated and found to be adequate. Additionally, 115 IE circulars, information notices and bulletins were evaluated for corrective action and closed.
- ° In STP IRs 50-498/499/85-04, 85-06, 85-10 and 85-13 the resident inspectors evaluated unresolved items, violations and open items from previous reports for corrective action.
- ° In STP inspection reports generated in 1982 and 1983 approximately 25 unresolved items and violations were pursued by NRC concerning anchor bolts and embedded items. The region indicated that an extensive report concerning the licensee evaluation of these items has been generated and is awaiting review by Region IV inspectors.
- ° In STP IR 50-498/499/85-07, the Region IV inspector verified corrective action on six nonconformance reports, all of which were noted as satisfactory.

3. Recommendation:

The construction inspection program in this area is determined to be adequate. The region should assure that the licensee reviews areas of identified problems including fastener materials, preventive maintenance, NDE records, wiring changes and "HOLD" tags for determining cause and appropriate corrective action to prevent recurrence.

G. Design and Design Change Control

1. CAT Findings

- ° A lack of effective design change control between the architect/engineer (AE), the nuclear steam system supplier (NSSS) and the organizations performing the physical work was identified. This was evidenced by the inability of the licensee to provide a design baseline wiring drawing for NSSS supplied motor operated valves (MOVs), the AE's revised designs not being provided to the NSSS for their review and incorporation into NSSS drawings, and the inability to correlate the actual wiring with current design documents.
- ° Vendor tolerance requirements for the mounting dimension of the annubar flow probe on essential cooling water piping were not included on installation drawings and subsequently a number of annubar mounting flanges were mislocated with respect to the distance from the pipe outer wall.
- ° Deficiencies were found in the control of modifications being made to change documents upon their incorporation into the design drawings. Six Field Change Requests and one Drawing Change Notice were modified upon incorporation into the design drawings without being adequately reviewed, approved and documented to reflect changes in technical content or scope.
- ° The undocumented use of engineering judgment in lieu of explicit or generic calculations for ensuring the adequacy of design in certain design change documents was identified. The licensee could not provide calculations or documented engineering judgment to substantiate the design adequacy of the addition of four bays of structural steel detailed on the November 5, 1984 revision of Bechtel Drawing No. 3M01-9-S-4043.
- ° Conflicting definitions for configuration control packages were identified in issued revisions of governing procedures of the AE and construction organizations (Bechtel, EDP 4.72 and WPP-22.0, and Ebasco, ASP-17).
- ° The controls for posting unincorporated design changes on design documents were not adequately implemented at one reference station.

2. Assessment

- ° The 766 Computer System Data reports for the South Texas Project do not show any hours expended against inspection procedures (IPs) 37051, 37051B, 37055 and 37055B and may be in error based on our review of the region inspection

reports. Some hours were expended in 1982 during the AE (B&R/Bechtel) transition period against IP 37995B "Design Inspection".

- ° A limited review of the South Texas Project IRs from IR 50-498/83-10 through IR 50-498/85-16 identified the following items related to the CAT inspection findings:

IR 50-498/83-26 (SALP) stated that HL&P identified a field document control problem and took corrective action.

IR 50-498/84-07 stated that NRC inspectors identified field document control problems.

IR 50-498/84-08 stated that NRC inspectors identified discrepancies between Westinghouse requirements for subvendor components and those stated in the subvendor manuals.

IR 50-498/85-06 stated that NRC inspectors checked document control stations and found no discrepancies.

IR 50-498/85-12 (SALP) stated that three inspections were held during the period December 1, 1983 through June 30, 1985 which indicated that there was improvement in the Design and Design Change Control process. The inspections concerned the issue, distribution, and recall of documents.

3. Recommendations

The region should review the 766 Computer System database to determine if it accurately records the inspection hours expended in the areas of design document control, design, and design change control. Also, the region should consider increasing their inspection effort in the area of design change control for areas of identified deficiencies. The IE inspection procedures are adequate in the design change control area.

IV. REVIEW OF STP INSPECTION REPORTS AND 766 HOURS

A. Scope

The resident and regional inspection reports through September 1985 (report 50-498/499/85-16) were reviewed for conformance to MC 0610 and 0611 requirements. They were evaluated to determine whether they include the required information, were sufficiently comprehensive, and were issued in a timely manner.

The inspection hours reported against STP Unit 1 under the MC 2512 program were reviewed. The reports from the 766 Computer System used in this evaluation included hours from inspections completed as of September 27, 1985 and reported to the 766 System as of January 16, 1986. For the purposes of this review the hours were adjusted to

exclude module hours which are not a part of the Phase 2 construction inspection program. This consisted of almost 700 hours reported against modules 37995 (design inspection) and 41990 (training). However, it is apparent that most of this time was expended in the region's overview of AE activities during the transition from Brown & Root to Bechtel.

The inspection hours for 1985 (January through September) and for the plant history (1975 through 1985) were compared to several other sites. These comparison sites were chosen based on their similarity to the South Texas Project. All the sites are PWRs and are either single units, the first unit of multiple units or are sufficiently different from their first unit to be considered a single unit. The estimated stage of completion for the sites are between 85 and 90 percent.

B. Assessment

The 766 Computer System data for South Texas Unit 1 shows that a total of 7159 hours have been recorded against the MC 2512 construction inspection program procedures since January 1975, with 1757 of these hours expended between January through September 1985. A comparison of hours for STP Unit 1 and five other sites is illustrated on Attachment I and indicates that, although the STP hours for 1985 are close to the average, the total plant hours are approximately 20 percent below the average for all six facilities.

The review of MC 2512 inspection procedures required to be implemented and the inspection hours recorded by Region IV indicate that the inspection program's completion status is not commensurate with the reported stage of construction of STP Unit 1. Eighty-two procedures are 50 percent or less complete with no hours reported against 41 of those procedures. This compares to the reported stage of completion at the site of 87 percent. However, the reported completion may not be an accurate estimate of the actual completion status which the region considers to be less. A summary of the total number of procedures used by the region in implementing the construction inspection program and a breakdown of hours into discipline areas are shown on Attachment II. Attachment II also identifies the 41 inspection procedures by area for which no inspection hours have been recorded. In addition, Attachment III shows the total number of inspections and reported hours for each inspection procedure of MC 2512.

A review of the program priorities and schedule for implementation of the 41 inspection procedures with no hours reported in the 766 Computer System data file was performed to provide further clarification of the implementation status of these procedures. The review found that only 28 of the 41 inspection procedures can be considered somewhat late in their implementation as the windows for initiation of inspection for 13 procedures have not been missed. A further breakdown of these procedures as related to areas of construction are: Geotechnical - 1 IP, Structural Concrete - 2 IPs, Piping - 6

IPs, Mechanical Components - 3 IPs, Electrical and Instrumentation - 3 IPs, Welding - 13 IPs. The individual procedures are identified in Attachment II.

A further review shows that 6 of the 13 welding and NDE procedures for which no hours are recorded are from the 550XX series of procedures which were superceded in 1979 by the 551XX series of procedures. However, only the welding requirements were superceded and the NDE requirements of the 550XX procedures remained as MC 2512 inspection items until the current welding procedures (55050, 55100) and NDE procedures (57050, 57060, 57070, 57080, 55090) were issued in June 1983. Two thirds (almost 600 hours) of the total welding and NDE inspection effort was conducted and reported by the Region I NDE van inspection in 1984 (report 50-498/499/84-02) against the current procedures. Subsequent regional inspections for welding and NDE have also been reported against the current program requirements. The region is currently reevaluating the outstanding program inspection requirements to assure that they will be sufficiently performed.

Six of the inspection procedures which should have been initiated with no hours reported are in the piping construction area. The region has indicated that when originally scheduled, qualified inspectors were unavailable or assigned to higher priority projects. The region has currently rescheduled these requirements and has begun inspections.

Discussions with the region on outstanding inspection procedures indicate that a large effort was devoted to followup on 50.55(e) reports and reactive inspections and not charged against the routine inspection program, although the inspections were applicable. A comparison of the hours charged against the followup procedures as a percentage of the total effort bears this out. Although followup averages only 20 percent of the overall inspections at several similar sites, it is almost 30 percent of the total effort at STP. This is also evident in several inspection reports (50-498/499/84-08 and 85-06) which discuss design and design change inspections as followup to previously identified items. We agree that there are instances where some credit for followup inspection effort could be taken for fulfilling routine construction program requirements in specific areas. However, some additional inspection effort, beyond followup effort, is required to fully meet the intent of a particular inspection procedure. The region should review this matter to ensure that the appropriate blend of procedure inspection and followup efforts have been applied to specific program areas to provide reasonable assurance that the hardware is acceptable.

It is acknowledged that the implementation of the inspection program at the STP site was impacted by a set of unique circumstances. This included a change in the AE and Constructor and several work stoppages, causing the region to conduct inspections under the extended construction delay procedures from November 1981 through January 1983. In addition, Region IV had four plants in NTOL status in 1984 and 1985, including two sites with extensive Technical Review efforts, which required a great deal of region resources. This necessitated reassigning a resident inspector from STP to one of the NTOL sites

for a period of time. The region indicates that as resources are now becoming available, it will be able to emphasize the continuation of the routine construction inspection program at STP.

A breakdown of inspection hours into the three main procedure areas (procedure review, work observation, and records review) indicates a majority of effort was expended in performing the work observation modules. Forty-eight percent of the total inspection time in these three areas was spent on hardware inspection. This emphasis on hardware inspections is consistent with the current policy of the construction inspection program.

A review of the inspection reports written by resident and regional inspectors indicate that they are well written, clear and concise, and sufficiently document findings. The content and format of the reports meet the requirements of MC 0610. Although the inspection procedures are not specifically identified in the reports as suggested by MC 0610, the section titles are generally descriptive enough to indicate which module has been used.

The review of the 1985 inspection reports found that the average time to issue a report (last day of inspection to transmittal letter date) is triple that of the MC 0610 requirement of 20 days. The days to issue 1985 reports ranged from 17 days (85-04) to 145 days (85-01), averaged 63 days and are illustrated in the chart below:

<u>Report No.</u>	<u>Inspection Office</u>	<u>Days to Issue</u>
85-01	Resident	145
85-03	Resident	121
85-04	Resident	17
85-06	Resident	53
85-07	Region	55
85-10	Resident	27
85-13	Resident	46
85-16	Region	40

AVERAGE: 63

Discussions with the region indicate that turnover in personnel and problems with electronic transfer of documents contributed to this problem. The region has also instituted new deadlines for submission of reports by inspectors and is currently tracking this item.

In addition, the region began performing the proprietary review in-house and eliminated the proprietary review statement from the report transmittal letter. This is commensurate with MC 0611 requirements.

C. Recommendations

The region's current awareness of the status of program completion and further plans for evaluating and completing remaining inspection requirements, along with the increased inspection resources for STP, should assure that the program is adequately completed.

The region should review the blending of routine inspection effort and followup effort to ensure that the intent of inspection procedures is covered and that the hardware is acceptable.

The high quality of the inspection reports themselves is expected to continue. The actions now being taken for issuing inspection reports should resolve the timeliness problem in this area.

V. SALP REPORTS

An analysis was made of the most recent SALP report (IR 50-498/85-12, 50-499/85-12) for the period December 1, 1983 - June 30, 1985. Generally, the SALP report reflects mostly Category 2 ratings with Category 1 ratings for Training, Corrective Action Reporting and Design and Design Change Control. However, the SALP report did not rate Instrumentation and Control Systems and Pre-operational Testing due to limited construction activities in these areas.

The previous SALP report for the period December 1, 1982 - November 30, 1983 indicated Category 1 performance for Piping Systems and Supports, Electrical Power Supply and Distribution, and for Licensing Activities, and the most recent SALP report as noted above indicated a decreased performance to Category 2 in these areas. This decrease appears to be generally in agreement with the CAT findings.

The most recent SALP report for the period December 1, 1983 - June 30, 1985 indicated improved performance for the following areas.

	<u>Previous SALP</u>	<u>Most Recent SALP</u>
o Material Control	3	2
o Corrective Action and Reporting	3	1
o Design and Design Change Control	2	1

NRC CAT examinations for material control included a broad sample of various types of plant hardware. The resulting CAT findings were, in most part, limited to uncertainties regarding the material traceability of fasteners used in mounting equipment and electrical raceway installations. This uncertainty was generally due to the lack of required fastener markings and/or documentation for verifying fastener traceability. The broad sample of hardware examined by the NRC CAT, would support the 2 rating for this area.

The NRC CAT findings do not support the number 1 performance rating for Corrective Action and Reporting. This is due to failure to identify, perform and report corrective actions required for problems with material traceability of fasteners, deficiencies in preventive maintenance, and certain electrical items.

In regard to the area of Design and Design Change Control, the NRC CAT findings do not support the assigned Category 1 rating for this area. This is primarily due to the significance of the NRC CAT findings relative to wiring changes to motor operated valves, modification of design changes on their incorporation into design drawings, and the absence of documentation of calculations to support the technical adequacy of the design change addition of four bays of structural steel.

The previous and present SALP report assigned a performance rating of 2 for the area of Quality Program and Administrative Controls. Additionally, the licensee's performance was noted as generally improved over the course of the SALP assessment period. However, the NRC CAT findings, in aggregate, are an indication that further improvement in the trend for direct management attention and involvement in the construction for the STP is warranted.

VI. OVERALL ASSESSMENT CONCLUSIONS

The implementation of the construction inspection program at STP is generally adequate. The CAT inspection findings were generally in agreement with and supportive of the regional inspection findings in most construction areas. It is recognized that the CAT inspection sample in various areas was large relative to the normal region samples, and that the CAT might discover findings that were not covered by the smaller region samples. However, the CAT did identify a number of different concerns in the area of civil and structural construction, where the region's inspection program is essentially complete. The CAT also identified some weaknesses in the mechanical construction area which the region did not identify during their inspection of the construction in this area.

The regional inspections that have been performed appear to have been thorough and their reporting has been detailed and concise. The inspection emphasis on hardware is consistent with the current program policy. However, the completion status of the program does not correspond to the reported stage of completion of construction for the site. This apparently is partly due to the previous assignment of inspection resources to other regional NTOL priorities and the region's schedule for program completion based on the view that the licensee's estimate for completion of site construction is optimistic. The region's current reevaluation of the status of program completion and rescheduling of inspection requirements should assure the completion of the remaining elements of the construction inspection program.

The CAT findings also support the most recent SALP evaluation in the areas of Piping Systems and Supports, Electrical Power Supply and Distribution, and Licensing Activities. However, they do not support the improved performance indicated for Corrective Action and Reporting and for Design and Design Change Control.

APPENDIX A

EXECUTIVE SUMMARY

An announced NRC Construction Appraisal Team (CAT) inspection was conducted at Houston Lighting and Power's South Texas Project (STP), Units 1 and 2, during the period October 21-November 1 and November 12-22, 1985.

OVERALL CONCLUSIONS

Hardware and documentation for construction activities were generally in accordance with requirements and licensee commitments. However, the NRC CAT did identify a number of hardware deficiencies that in most cases have resulted from construction program weaknesses. These include:

1. A lack of effective design change control between the architect/engineer (AE) and the nuclear steam system supplier (NSSS) which has resulted in the inability to correlate the actual wiring configuration of valve motor operators with design. The actions taken for prior site organization audit findings involving the adequacy of AE/NSSS design interface of the wiring design in another area also indicate a weakness in the application of corrective action measures. In addition, a significant number of hardware and workmanship deficiencies were identified with the wiring of motor operated valves.
2. Significant deficiencies in the configuration of Class 1E molded case circuit breakers with load-side terminal extensions and insulating barriers indicate that the licensee's inspection program was ineffective. The indicators of this ineffectiveness include source surveillance, receipt, and field cable termination inspections that failed to identify and correct these conditions.
3. A number of installation and procedural deficiencies were identified in mechanical equipment and in bolting of valve flange pipe installations for which Quality Control (QC) inspections had been completed. The omission of a vendor tolerance dimension on the installation instructions for the mounting of annubar flow probe devices indicates a weakness in the design/construction interface.
4. The numerous instances of overtightened bolts in structural steel sliding connections indicates that the licensee's installation and inspection programs were particularly ineffective in this area. Certain licensee evaluations performed during the inspection to address NRC CAT concerns are considered questionable. These include questions related to the extent the clay layer beneath the Essential Cooling Water (ECW) piping will expand upon cessation of the dewatering system and the potential of this occurrence to over stress the ECW piping, the potential for additional forces to be exerted on the Unit 2 tendon access wall due to the omission of the 3-inch seismic joint, and the effect of the practice of cross flange welding on the design strength of loaded structural steel.

5. A lack of traceability of fasteners for electrical equipment, certain vendor supplied equipment assemblies and bolting used in cable tray and conduit supports was identified by the NRC CAT. These deficiencies were magnified by the AE's change to a specification in the electrical area to delete the requirement for the manufacturers' marking on fasteners.
6. Certain areas of weakness were experienced during the inspection of design change control. In addition to the matter of motor operated valves discussed above, these included the control of the modification of design changes during their incorporation into design drawings; the undocumented use of engineering judgment in lieu of explicit or generic calculations for ensuring the adequacy of design in certain design change documents; and the conflicting definitions for configuration control packages in issued revisions of governing procedures (Bechtel, EDP 4.72 and WPP-22.0, and Ebasco, ASP-17).
7. Additional areas of weakness were found in the application of corrective action measures for the previously identified significant deficiencies in the maintenance of permanent plant equipment during the construction phase. The operations maintenance program does not address whether an identified deficiency could affect the equipment's ability to perform its design function or its operational maintenance program. Also, weakness was found in the control of "HOLD" tags.
8. Weaknesses were found in the area of nondestructive examination records for balance of plant suppliers. This included a weakness in the licensee program for audit review and acceptance of these records. In addition, after the radiographs for the reactor vessel head were discovered to be missing in May 1985, the licensee's scope of corrective actions did not address whether the records of balance of plant suppliers performing nondestructive examination activities may be similarly affected.
9. A significant number of reworked conduit installations were lacking QC reinspection for bolt torque. This indicates a weakness in the program for inspection of installations reworked after initial QC acceptance.
10. The project's response to identified deficiencies in electrical raceway separation was questioned. The decision was made to postpone further separation inspections until the time of area turnover. The NRC CAT is concerned with modifications to correct separation deficiencies that may adversely affect plant systems already accepted and turned over to startup or operations, in addition to being more difficult to identify after construction is completed. This concern was also raised by the STP pre-CAT verification team.

These construction program weaknesses indicate that additional management attention is required to assure that completed installations meet design requirements.

AREAS INSPECTED AND RESULTS

Electrical and Instrumentation Construction

The samples of electrical construction inspected generally met the applicable design requirements and installation specifications. However, several significant design and construction deficiencies in electrical construction, and numerous installation discrepancies in instrumentation construction were identified.

The configuration of molded case circuit breakers with load-side terminal extensions and insulating barriers in installed Class 1E motor control centers was found to be deficient in that the potential for phase-to-phase faulting or inadvertent circuit interruption exist. Relevant inspection activities, which had been completed, including source surveillance, receipt inspection, and field cable termination inspection did not identify these deficiencies. Additionally, the seismic qualification of equipment which exhibits this configuration could not be verified.

Hardware and workmanship deficiencies were found in all of the 16 installed motor operated valves inspected by the NRC CAT. In addition, lack of adequate design and installation control for the wiring of motor operators supplied by Westinghouse Corporation (NSSS vendor) and further modified by the architect/engineer resulted in various organizations not being supplied the required wiring configuration documents.

Numerous dimensional and workmanship deficiencies were found in the instrumentation construction sample inspected. This included an installation which had undergone the licensee's QC Effectiveness Inspection conducted after final construction QC inspection and turnover to the startup organization. Examples of these deficiencies include dimensions exceeding tolerance limits on five installations, an incorrect weld configuration on a support, a missing support clamp, and a support installed in accordance with an incorrect drawing detail. In addition, attachments were being made to existing supports without the required engineering review and approvals.

Several items of Class 1E equipment were found to deviate from their applicable specification requirements. These included the mislocation of terminal strips and fewer than the required minimum number of terminal block points in several switchgear cubicles, the absence of required vendor installed terminal lugs on three fan motors, and the incorrect insulation class for a pump motor.

The conduit strap bolts for a significant number of the conduit installations inspected did not exhibit the required torque seal. Since this is due to their removal and reinstallation without reinspection by QC, increased controls are required for inspection of rework of QC accepted conduit installations.

Mechanical Construction

Piping, pipe supports/restraints, concrete expansion anchors and heating ventilation and air conditioning hardware (supports/restraints, duct sections, fire dampers) were generally found to be installed in accordance with requirements or with deficiencies that generally had previously been identified. However, significant deficiencies were identified in two areas of piping

installation. These included the design tolerance dimension error applicable to the mounting of numerous annubar flow probes and the alternate bolting used in lugged wafer valves.

A significant number of hardware deficiencies were identified in ten of the twelve mechanical equipment items inspected. The sample of equipment was diverse and included: the reactor water makeup tank, various pumps (RHR, containment spray, and low and high head safety injection), charging pump coolers, EAB return air fan, and a fuel handling building filter. The identified deficiencies included items such as: the uncontrolled removal of specified tank cushion material (FLEXCELL), incorrect/indeterminate fastener material, missing shim for an equipment mounting pad, a damaged foundation beam flange, welding of a gusset plate to the edge of embed which exceeded specified tolerances, missing and undersized welds, and bolt holes not per drawing. The number and significance of the deficiencies identified, indicated a lack of overall effectiveness in the installation and inspection programs for mechanical equipment.

Welding and Nondestructive Examination

Welding and nondestructive examination activities were generally found to be conducted in accordance with the governing codes and specifications. However a number of examples were found where completed structural welds in pipe supports/restraints were smaller than that specified in the design drawings and some skewed welded connections were not supported by calculations. Also, a number of undersized socket welds were found in 2-inch schedule 160 piping spools.

Some vendor supplied tanks and heat exchangers were found to have undersized weld reinforcement in "nozzle to shell" and "manway to shell" joints. The NRC previously issued Information Notice 85-33 on the subject of undersized "ASME category D" joints in tanks and heat exchangers notifying the licensees of potentially significant deficiencies in this area. The NRC CAT inspectors did not find evidence that the project had reviewed the content of the information notice for applicability to their facility.

The NRC CAT inspectors also found a small number of radiographs which had unacceptable weld quality. In addition, the team encountered difficulties in retrievability and location of vendor NDE film and documentation covering the Balance of Plant (BOP). This indicated a need for a means to identify NDE requirements, and the location and existence of NDE film and documentation for BOP equipment supplied by vendors. In May 1985, the project had identified missing radiographs for the reactor head and as a result has instituted a program requiring Westinghouse to submit monthly reports concerning status and availability of NDE film and documentation. The NRC CAT findings indicate that the licensee's corrective action should have also covered the BOP suppliers.

Civil and Structural Construction

General quality of reinforced concrete construction was observed to be adequate. The issue of omission of the 3-inch seismic joint relative to the tendon access wall of the Unit 2 Reactor Containment Building at azimuth 304° and elevation (-)13 ft and 3 inches needs to be adequately evaluated and

appropriate actions taken. In general, structural steel installation appeared to be adequate. However, a high rate of deficiencies was identified in the overtightening of bolting for structural steel sliding connections for which the licensee has committed to perform a 100 percent reinspection to ensure that bolting is torqued to the proper level.

The extent to which the underlying and adjacent clay soil layer supporting the Essential Cooling Water (ECW) piping will swell when the dewatering system is discontinued remains a question which requires further review by the licensee and NRC.

Material Traceability and Control

The licensee's material traceability and control program was generally found to be acceptable. However, lack of traceability was found for fastener materials for certain large vendor supplied mechanical equipment assemblies mounted on skids and for certain electrical equipment. It was also found that engineering had deleted the requirement of the specified national standard for manufacturers marking of fasteners intended for electrical cable tray and conduit supports, which contributed to the resulting uncertainty of control and traceability during and after installation.

Design Change Control

The design change control program was determined to be generally in accordance with site procedures with several exceptions. These include:

- ° The deficiencies identified with respect to the installation of Westinghouse supplied motor operated valves indicates that a design control weakness exists in the AE/NSSS interface at STP.
- ° The controls for posting unincorporated design changes on design documents were not adequately implemented at one reference station.
- ° The control of modifications being made to change documents upon their incorporation into the design drawings. Identified changes to the original scope or technical content of the change document were not being adequately documented, reviewed and approved.
- ° The conflicting definitions for configuration control packages in issued revisions of governing procedures of the AE and constructor organizations.

Corrective Action Systems

Appropriate corrective action systems and procedures were generally found to be in place except for certain areas. These include: weaknesses in areas involving control of fastener materials, preventive maintenance, audits and records of radiographs, unidentified deficiencies with certain electrical items (motor operated valves, motor control centers, and instrumentation construction), and control of "HOLD" tags.

APPENDIX B

POTENTIAL ENFORCEMENT ACTIONS

As a result of the NRC CAT inspection of October 21-November 1 and November 12-22, 1985 at the South Texas Project site, the following items are being referred to Region IV as Potential Enforcement Actions. Section references are to the detailed portion of the inspection report.

1. 10 CFR 50 Appendix B, Criterion III, as implemented by the South Texas Project (STP) Quality Assurance Plan (QAP) Section 3.0, requires that measures be established for the identification and control of design interfaces and coordination among design organizations. These measures shall include the review, approval, release, distribution, and revision of documents involving design interfaces.

Contrary to these requirements, at the time of this inspection:

- a. The licensee failed to provide adequate interface between the design organizations (architect/engineer (AE), and the nuclear steam system supplier (NSSS)), and the organizations performing the physical work. This was evidenced by the inability of the licensee to provide a design baseline wiring drawing for NSSS supplied motor operated valves, the AE's revised designs not being provided to the NSSS for their review and incorporation into NSSS drawings, and the inability to correlate the actual wiring with current design documents. (Section II.B.3.b.(8))
- b. Vendor tolerance requirements for the mounting dimension of the annubar flow probe on essential cooling water piping were not included on installation drawings and subsequently a number of annubar mounting flanges were mislocated with respect to the distance from the pipe outer wall. (Section III.B.1.b).

2. 10 CFR 50 Appendix B, Criterion III, as implemented by the STP QAP Section 3.0, requires that design control measures provide for verifying or checking the adequacy of design and that design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design.

Contrary to these requirements, at the time of this inspection:

- a. The licensee could not provide calculations or documented engineering judgment to substantiate the design adequacy of the addition of four bays of structural steel detailed on the November 5, 1984 revision of Bechtel drawing No. 3M01-9-S-4043. (Section VII.B.3.b.(5))
- b. Six field change request (Nos. BC-01202, CC-03426, CC-04949, CC-04461, PS-1-0194, and BS-1-0235) and one drawing change notice (No. 7) were modified upon incorporation into the design drawings without being adequately reviewed, approved and documented to reflect changes in technical content or scope. (Section VII.B.3.b.(2))

3. 10 CFR 50 Appendix B, Criteria VII, as implemented by the STP QAP Section 7.0., requires that measures be established to assure that purchased equipment conform to the procurement documents. These measures shall provide objective evidence of the quality furnished by the contractor or subcontractor.

Contrary to these requirements, at the time of this inspection:

- a. The licensee failed to identify the deficiencies in the bolting of load-side terminal extensions and in the insulating barriers supplied with certain molded case breakers in motor control centers. These deficiencies have the potential for causing phase-to-phase faulting or inadvertent circuit interruption. Further, the licensee was not able to confirm that the load-side terminal extensions or insulating barriers were seismically qualified. (Section II.B.3.b.(4))
- b. The NRC CAT inspectors found several deficiencies in vendor supplied components. The deficiencies included undersized welds in tanks and heat exchangers and radiographs which did not have the required weld and film quality. These also include 5KV switchgear cubicles with mislocated terminal strips and terminal blocks with less than the minimum required terminal points, fan motors which did not have the required vendor installed terminal lugs, and a pump motor without the required class of insulation. (Sections II.B.3.b and IV.B.10.b with Table IV-5 and Table IV-6)

4. 10 CFR 50 Appendix B, Criterion VII, as implemented by the STP QAP Section 7.0, requires documentary evidence that material and equipment conform to the procurement requirements shall be available at the plant site prior to installation or use of such material and equipment. This documentary evidence shall be retained at the nuclear power plant site and be sufficient to identify the specific requirements, such as codes, standards, or specifications, met by the purchase material and equipment.

Contrary to the requirements, at the time of this inspection the licensee could not determine the location of NDE film and documentation required by engineering specifications as documented evidence of the quality of welding for equipment and hardware procured from various vendors for the balance of plant equipment. (Section IV.B.10.b)

5. 10 CFR 50 Appendix B, Criterion VIII, as implemented by the STP QAP Section 8.0, requires that measures be established for the control of materials, parts and components to prevent the use of incorrect or defective items.

Contrary to these requirements, at the time of this inspection it was determined that traceability and control of some fasteners, including bolting for mechanical and electrical equipment of various types, and the unmarked bolting for electrical cable tray and conduit supports, has not been adequate to assure the use of correct materials. Also, the deletion of the requirement for marking of fasteners required to comply with national standards contributed to the loss of traceability and control of the referenced unmarked bolting. [Section VI.B.1.b (3)(c), (d) and (f)]

6. 10 CFR 50 Appendix B, Criterion X, as implemented by the STP QAP Section 10.0, requires that a program for inspection of activities affecting quality be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures and drawings for accomplishing the activity.

Contrary to the above requirements, at the time of this inspection, the licensee's inspection program was ineffective in that:

- a. Numerous deficiencies were identified with the installation of QC accepted instrumentation and instrument tubing. Examples of these deficiencies include dimensions exceeding tolerance limits on five installations inspected, an incorrect weld configuration on a tubing support, a missing support clamp, and a support installed in accordance with an incorrect drawing detail. The specific installations and deficiencies are detailed on Table II-7 of the report. (Section II.B.4.b)
- b. A number of undersized socket welds were found in 2-inch schedule 160 piping. Additional examinations of approximately 200 QC accepted field welds of this type found at least 15 percent to be undersized. (Sections III.B.1.b and IV.B.1.b)
- c. On six lugged wafer valves, hex-head cap screws had been substituted for threaded studs and nuts inconsistent with the applicable essential cooling water piping installation isometric drawing and/or bill of materials. (Section III.B.1.b)
- d. Ten of the twelve mechanical equipment items selected for NRC CAT examination included components which were not constructed or otherwise installed in accordance with applicable design or specified installation requirements. (Section III.B.4.b. and Table III-5)
- e. A number of examples were found where completed structural welds in pipe supports/restraints in welded joints were smaller than that specified in the design drawings. The list of these welds is in Table IV-1. (Section IV.B.1.b)
- f. More than 60 percent of the inspection sample of 68 high strength bolts for structural steel sliding connections were installed over-tight. Installation and inspection requirements had not been translated into appropriate procedures ensuring proper installation of the bolts in a "snug tight" condition. (Section V.B.2.b)
- g. Strap bolts on 8 of the 28 conduit runs inspected did not exhibit the required torque seal. Reinspections for torque had not been accomplished following rework to QC accepted conduit installations. (Section II.B.1.b.(2))

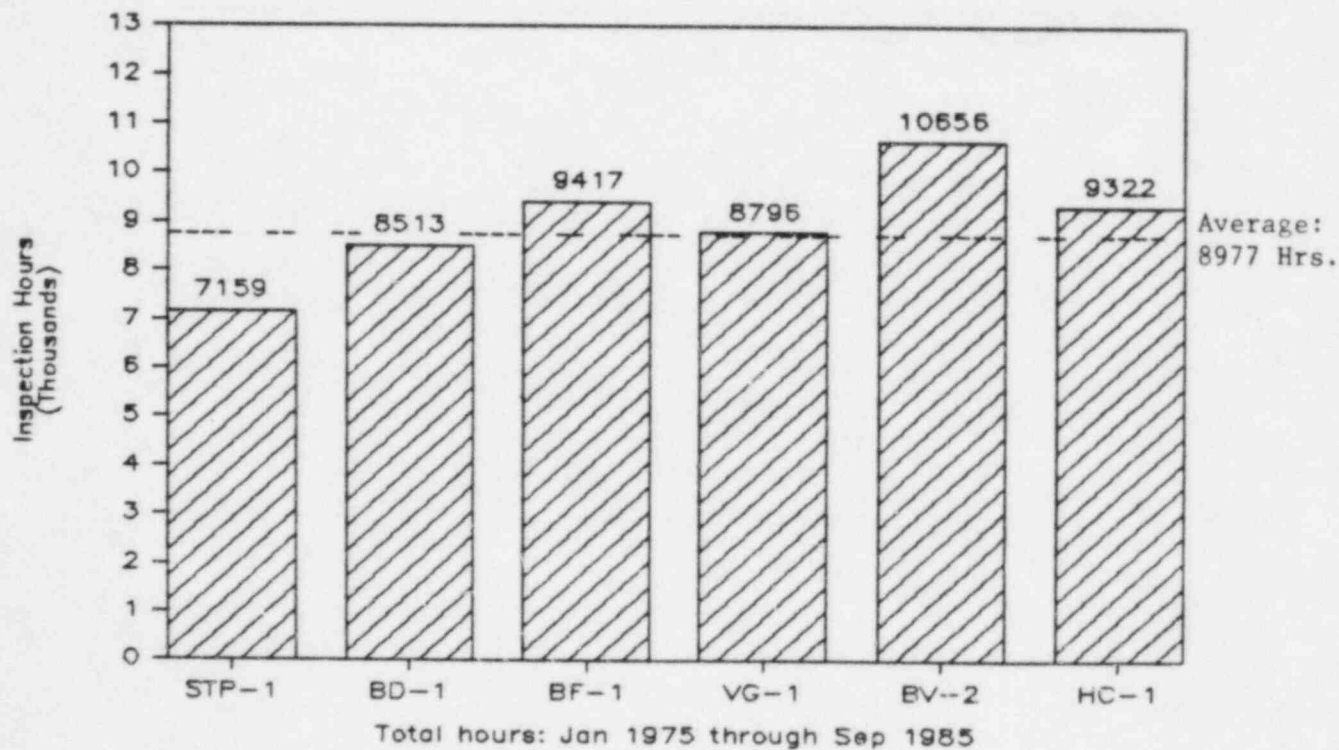
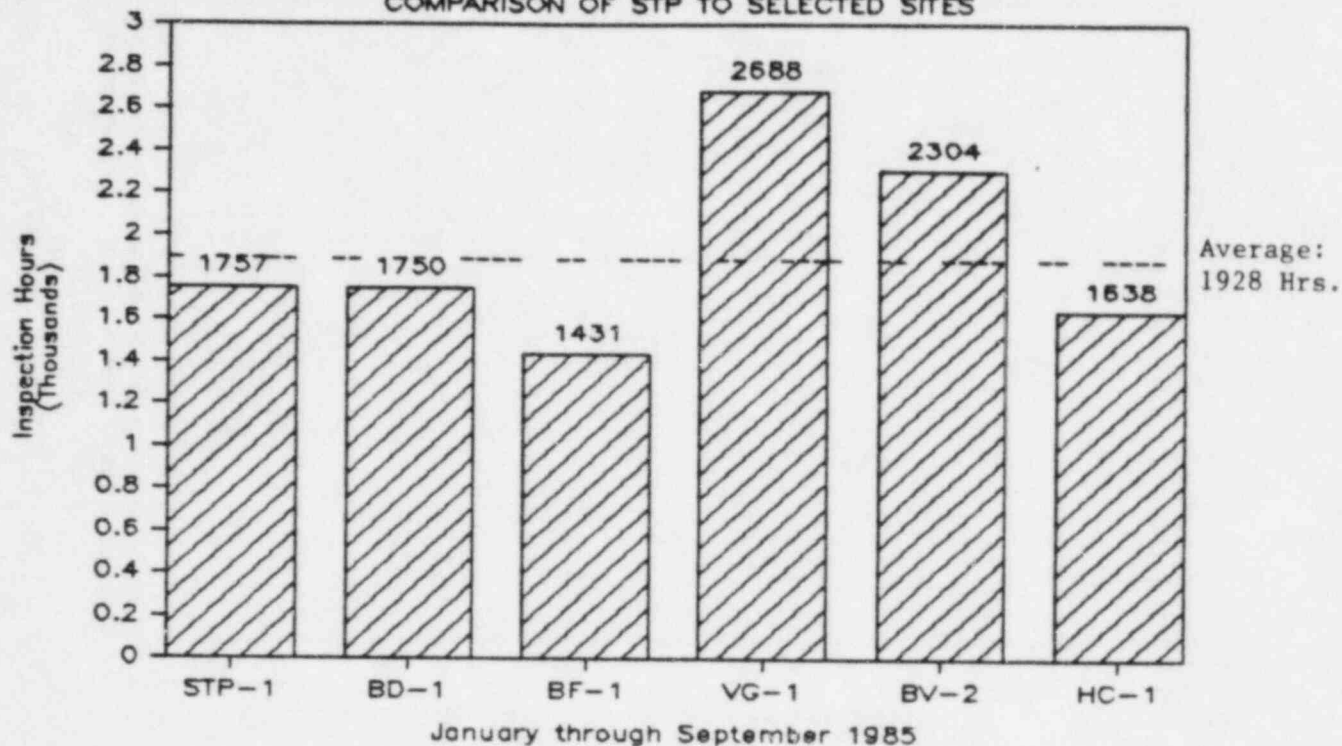
7. 10 CFR 50 Appendix B, Criterion XVI, as implemented by the STP QAP Section 16.0, requires that measures shall be established to assure that conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to these requirements, at the time of the inspection the licensee's corrective actions were found to be inadequate in that the balance of plant suppliers of NDE film and documentation were not included in the corrective actions taken after the radiographs for the reactor vessel head were discovered to be missing in May 1985.

ATTACHMENT I

MC 2512 INSPECTION HOURS

COMPARISON OF STP TO SELECTED SITES



BD-1: Braidwood Unit 1
 BF-1: Bellefonte Unit 1
 BV-2: Beaver Valley Unit 2

HC-1: Hope Creek Unit 1
 STP-1: South Texas Project Unit 1
 VG-1: Vogtle Unit 1

ATTACHMENT II

766 DATA SUMMARY MC 2512 STATUS OF SOUTH TEXAS UNIT 1

Summary of Manual Chapter 2512 Inspection Procedures (IPs) used, manhour expenditures and distributions among program requirements. Manhours are those recorded in the 766 Computer System as of January 16, 1986.

A. Phase 2 (Construction) Procedures Used and Total Inspection Hours

<u>Program</u>	<u>No. of Procedures Used</u>	<u>Inspection Hours</u>
2512	135	7159
Other	3	682

B. Total Hours per Inspection Area for MC 2512

<u>Inspection Area</u>	<u>Hours</u>	<u>Percentage</u>
Management Meetings	425	6
Quality Assurance	282	4
Design and As-Built	0	0
Geotechnical	213	3
Structural Concrete	319	4
Structural Steel	203	3
Piping	18	<1
Mechanical Components	520	7
Electrical	191	3
Instrumentation	21	<1
Containment Penetrations	16	<1
Welding/NDE	900	13
Containment Test	0	0
Fire Prevention/Protection	24	<1
Inservice/Preservice Inspection	0	0
Environmental Protection	46	1
Followup	2099	29
Independent Inspection	1669	23
Miscellaneous	213	3
	<u>7159</u>	<u>100 (Approx)</u>

C. Distribution of IPs by Percent Completion As Reported in 766 System

<u>Percent Completion</u>	<u>No.</u>	<u>Percent</u>
25% or less*	68	47
26 - 50%	14	10
51 - 75%	18	12
76 - 99%	12	8
100%	34	23
	<u>146</u>	<u>100</u>

*Includes all applicable IPs with no hours recorded against them as of January 16, 1986.

D. Applicable IPs With No Inspection Hours Recorded in 766 System as of January 16, 1986

Design & As-Built	*37055B	*37051B
Geotechnical	46153B	
Structural Concrete	47063B	47065B
Piping	49051B	49053B
	49054B	49055B
	49061B	49063B
Mechanical Components	50074B	50075B
	50090B	
Electrical/Instrumentation	51064B	51066B
	52051B	*52054B
	*52055B	*52056B
	*52064B	*52066B
Welding/NDE	55063B	55064B
	55065B	*55066B
	55075B	
	55153B	55154B
	55155B	55156B
	55158B	55175B
	55176B	55178B
	55185B	
Containment Test	*63050B	
Inservice/Preservice Inspection	*73051B	*73052B
	*73053B	*73055B

*The designated inspection windows for these procedures have not been missed.

ATTACHMENT III

INSPECTION PROGRAM HISTORY FOR SOUTH TEXAS 1

Inspections Performed at South Texas 1

A. Civil and Structural Procedures

1. Site Preparation

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
45051B	1	4	100	C
45053	1	21	80	-
45053B	1	5	100	C
45055B	1	9	100	C

2. Lakes, Dams and Canals

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
45061B	2	3	100	C
45063B	2	4	100	C
45063C	3	4	20	-
45065B	2	4	100	C

3. Foundations

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
46051B	1	8	100	C
46053B	8	81	100	C
46053C	1	16	100	C
46055B	5	54	100	C

4. Containment (Structural Concrete)

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
47051B	3	23	10	L
47053B	2	27	100	C
47053C	12	96	100	C
47054B	10	54	100	C
47055B	5	51	100	C
47056B	9	59	100	C
47061B	1	8	-	-
47063C	1	1	10	-

5. Containment (Steel Structures & Supports)

48051B	2	17	-	-
48053B	8	60	-	-
48053C	3	8	59	-
48055B	10	65	80	-

6. Safety-Related Structures (Structural Steel & Supports)

48061B	2	7	50	-
48063B	4	14	40	-
48063C	6	20	30	-
48065B	4	12	30	-

B. Mechanical Construction Procedures

1. Reactor Coolant Pressure Boundary Piping

49053C	4	4	60	-
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2. Safety-Related Piping

49063	1	4	10	-
49063C	5	7	60	-
49065B	1	3	30	-

3. Reactor Vessel Installation

50051B	2	21	60	-
50053	1	5	80	-
50053B	2	17	70	-
50053C	6	39	80	-
50055B	2	35	60	-

4. Reactor Vessel Internals

50061B	2	9	100	C
50063B	3	32	100	P
50063C	5	22	100	C
50065B	2	16	100	C

5. Safety Related Components

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
50071B	2	8	-	-
50073	1	40	80	-
50073B	3	14	10	-
50073C	8	15	60	-

6. Safety-Related Pipe Support & Restraint Systems

50090	2	102	30	-
50090C	3	3	10	-

7. Spent Fuel Storage Racks

50095	1	8	60	-
50095B	1	35	40	-

8. Safety-Related HVAC Systems

50100	2	99	40	-
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C. Electrical & Instrumentation Construction Procedures

1. Electrical Components & Systems

51051B	4	25	30	-
51053B	1	2	10	-
51053C	5	7	60	-
51054B	1	2	10	-
51055B	1	2	10	-
51056B	2	11	10	-

2. Electrical Cables & Terminations

51061B	7	55	70	-
51063B	2	2	10	-
51063C	4	56	20	-
51065B	4	29	20	-

3. Instrumentation Components & Systems

51053B	1	1	10	-
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4. Instrumentation Cables & Terminations

52061B	3	17	25	-
52063B	1	1	10	-
52063C	1	1	59	-
52065B	1	1	10	-

D. Containment Penetration Procedures

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
53051B	1	2	100	C
53053B	1	3	20	-
53053C	5	5	60	-
53055B	1	6	10	-

E. Welding and NDE Procedures

1. Nuclear Welding - General

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
55050	2	114	40	-
55100	1	50	90	-

2. Containment Structural Steel Welding

55051B	2	14	100	C
55053B	6	30	90	-
55053C	2	2	10	-
55055B	2	26	90	-

3. Safety-Related Structures Welding

55061B	1	8	20	-
55063C	4	24	60	-

4. Reactor Coolant Pressure Boundary Piping Welding

55071B	1	8	40	-
55073B	2	18	20	-
55073C	1	1	10	-

5. Safety-Related Piping Welding

55081B	1	9	10	-
55083B	2	13	20	-
55083C	6	30	80	-
55085B	2	13	100	C

6. Steel Structures and Supports

55151B	2	7	100	C
55152B	2	7	100	C
55157B	2	8	100	C

7. Reactor Coolant Loop Piping

55171B	3	7	90	C
55172B	3	10	100	C
55173B	2	9	20	C
55177B	1	1	60	C

8. Other Safety-Related Piping Welding

55181B	2	3	80	C
55182B	6	29	100	C
55183B	3	10	10	-
55186B	1	1	10	C
55187B	4	11	100	C
55188B	1	11	20	C

9. NDE

57050	1	60	70	-
57060	1	50	70	-
57070	1	3	70	-
57080	1	30	30	-
57090	1	283	90	-

F. Miscellaneous Inspection Procedures

1. Meetings, QA, As-Builts, Fire Protection/Prevention, Construction Delay, Containment SIT, Environmental Protection and Fuel Storage

30702B	10	67	-	-
30703B/C	170	358	-	-
35060B	1	25	30	-
35061	1	40	100	C
35061B	3	127	40	-
35065	1	16	100	C
35065B	3	15	30	-
35200B	1	59	100	C
42051C	3	4	60	-
64053B	1	20	100	C
80220B	6	46	100	C
92051B	10	57		
92053B	13	83		
92055B	10	49		
9460C	1	12		

2. Followup and Independent Inspection

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
36100B	1	4	100	C
90712B	1	6		
92700B	19	156		
92700C	7	41		
92701B	51	383		
92702	3	95		
92702B	47	699		
92702C	7	147		
92703B	14	356		
92703C	2	13		

<u>Procedure Number</u>	<u>Number of Inspections</u>	<u>Total Staff Hours</u>	<u>Reported Percent Completion</u>	<u>Reported Status</u>
92704B	2	9		
92705B	7	78		
92705C	2	35		
92706	13	391		
92706B	104	1108		
92706C	14	170		
92715B	1	2		
93700B	1	51		
97707	1	36		