Enclosure:
CO Rpt. No. 50-361/71-1
50-362/71-1
by R. T. Dodds
dtd 4/16/71

cc w/encl:
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UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION V
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April 16, 1971

J. B. Henderson, Chief
Reactor Construction Branch
Division of Compliance, Headquarters

SOUTHERN CALIFORNIA EDISON CO. (SAN ONOFRE 2 & 3)
DOCKET NOS. 50-361 & 50-362

The Southern California Edison Company's General Office and Bechtel Corporation, Vernon Division in Los Angeles were visited February 5, 22-26, and April 8, 1971 for the purpose of conducting the initial quality assurance inspection of activities relating to the design and construction of San Onofre Units 2 and 3, and to determine the degree and manner in which the applicant is implementing the 18 point AEC QA criteria. The SCE QA group has been performing activities to date that appear to be commensurate with the status of the project. However, defieiencies of one sort or another were observed in most categories of the QA program and its implementation. The applicant and Bechtel stated during the management interviews that CO's observations would be considered and the program and its implementation changed accordingly.

An area of concern involved the current interim work agreement between SCE and Bechtel for "preliminary" engineering services which did not reference a requirement for a QA program consistent with regulatory requirements. SCE had taken this for granted since they were aware that Bechtel has a QA program applicable to engineering services. Bechtel's Project Quality Program Manual was just issued on February 22, 1971. However, prior activities were supposed to have been governed by Bechtel's own Quality Program Manual. Some deficiencies were identified with the Bechtel program. Corrective action has either been taken or promised by Bechtel.

It is our belief that both SCE and Bechtel have developed and implemented QA programs that should satisfy the regulatory requirements once the proposed corrective action has been taken to resolve the observed discrepancies. A follow-up inspection to review corrective action is planned for June, 1971.

G. S. Spencer
Senior Reactor Inspector

U. S. ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION V

Report of Inspection

CO Report No. 50-361/71-1
50-362/71-1

License: Southern California Edison Co.
San Onofre 2 and 3
License No. - None, Construction Permit pending.
Category A

Dates of Inspection: February 5, 22-26 & April 8, 1971

Date of Previous Inspection: November 25, 1970

Inspected by:

R. T. Dodds — Date: 4-16-71
Reactor Inspector (Principal Inspector)

A. D. Johnson — Date: 4/16/71
Reactor Inspector, CO:V

M. W. Peranich — Date: 4-7-71
Facilities Engineer, CO:HQ

Compiled by:

R. T. Dodds — Date: 4-16-71
Reactor Inspector, CO:V

Reviewed by:

G. S. Spencer — Date: 4-16-71
Senior Reactor Inspector, CO:V

Proprietary Information: Yes. Contractual Information.

## SCOPE

Type of Facility: Pressurized Water Reactor

Power Level: 3390 Mw

Location: San Clemente, California

Type of Inspection: Initial QA Inspection of Licensee and Engineering Contractor.

Accompanying Personnel: R. W. Smith, Director CO:V, for Management Interview on April 8, 1971.

## SUMMARY

General - The Southern California Edison Company's General Office and Bechtel Corporation, Vernon Division in Los Angeles were visited on February 22-26, 1971 for the purpose of conducting the initial quality assurance inspection of activities relating to the design and construction of San Onofre Units 2 and 3, and to determine the degree and manner in which the applicant is implementing the 18 point AEC QA criteria.

Bechtel, Vernon Division, has an open contract until July 1, 1971 to provide engineering services to SCE for San Onofre Units 2 and 3. Bechtel has provided most of the material for the PSAR and the conceptual design. To date, SCE has only given Combustion Engineering a "letter of intent" for the purchase of the NSSS. The final contracts for both the Engineer-Constructor and NSSS aspects of the project are still being negotiated with Bechtel and Combustion Engineering respectively.

SCE will have primary responsibility for vendor and construction surveillance with each individual contractor required to implement the QA programs applicable to their contracts. SCE, Source Vendor Inspection, will assign two men, from a group of 10 men, for this project. No construction or vendor contracts have been issued to date, but some are in the final stages of negotiations.

Inspection Findings - The SCE QA group has been performing activities to date that appear to be commensurate with the status of the project. However, deficiencies of one sort or another were observed in almost every category of the QA program and its implementation. These discrepancies for the most part were considered to be easily correctable by improving the content of the QA procedures and by full implementation of the procedures covering activities currently in progress.

Management Interviews - Management interviews were held with SCE the morning of April 8, 1971 and with SCE and Bechtel jointly that afternoon. Personnel representing SCE include Messrs. Moore, Ortega, Fogharty, Johnson, Lowerison, Baskin and Grothues. Persons representing Bechtel included Messrs. Ibsen, McMahon and Holland. The following items summarize the inspection team's findings and the applicant's and Bechtel's responses to these observations.

A. SCE QA Program

1. Criterion I - Organization

a. Finding - The organization charts show the Quality Program Committee reporting to the Senior Quality Assurance Engineer, rather than to the Vice President of Engineering and Construction, as stated in the PSAR.

Response - The organization charts will be corrected. Also included in the correction will be the reorganization of the Engineering and Construction Department at the Vice President level that became effective on March 1, 1971.

b. Finding - SCE QA-QC personnel and organizations do not have stop-work authority for vendor or construction activities related to the San Onofre project.

Response - The program will provide QA-QC personnel with stop-work authority that is to be exercised through the job supervisors.

c. Finding - SCE Quality Control Engineers will not be fully independent of the responsible construction organization since they will be reporting directly to Field Construction Engineers who have responsibility for (1) quality, (2) cost, and (3) scheduling.

Response - SCE recognizes the potential problem for conflict of interest in this area but hopes to generate the right attitudes in its people. If the system does not work it will be changed accordingly.

2. Criterion II - Quality Assurance Program

a. Finding - The proposed QA manual does not contain the necessary detail required to provide management instructions for full implementation of the QA program.

Response - The manual will be reviewed and deficient areas will be corrected as necessary. The issuance of the QA manual has been delayed to ensure that Compliance's findings, as a result of the inspection, have been considered prior to the issuance of the approved manual.

b. Finding - The QA manual is not specific as to the requirement for the verification of quality by independent inspection.

Response - (Discussed under Criterion X.)

c. Finding - Material traceability on parts applies only to SCE designated Class I items and not Class II, both of which require traceability by AEC Criteria.

Response - The matter of material traceability is currently under discussion with DRL. However, the chart in the QAM is in error and will be corrected. SCE will have traceability on both Class I and II items, but the need for traceability of individual components of Class II items will be evaluated further and obtained only as deemed appropriate. The program will be modified to reflect the intended practice.

3. Criterion III - Design Control

a. Finding - For reviews pertaining to engineering documents, the following items are listed as areas requiring further definition:

(1) Engineering design review guides.

Response - All four engineering disciplines now have approved design review guides.

(2) The SCE Design Control and Review Summary Reference Table does not recognize the general content of engineering control and review of technical factors for either the coordinated reviews accomplished with other contractors or for engineering documents produced by SCE.

Response - The Engineering Phase Sheet will be included in the QAM as a requirement to show the method of assignment of responsibility for design review.

(3) The Design Verification release form does not satisfy all the signature approvals for various documents displayed on Figure 2.1 in the QAM since it does not include provision for QA approval.

Response - The form now contains provisions for QA approval. Instructions will be modified to make QA approval a mandatory requirement before design release.

(4) The QAM did not specifically address the review by SCE or the control of reviews performed by contractors of design documents for the accessibility requirements of in-service inspection, maintenance, and repair.

Response - The program will be corrected to require reviews by SCE and/or contractors of design documents for the accessibility requirements of in-service inspection, maintenance, and repair. Bechtel's effort in this area was acknowledged.

(5) The control of design changes requires further definition in the manual in order to be consistent with the commitment in the Application under 2.4 of the QAPP.

Response - The chart in the QAM will be modified to be consistent with the design change procedure as stated in the PSAR.

b. Finding - Sufficient numbers of codes and standards, referenced in the PSAR, do not appear readily available for use by the engineers assigned to this project.

Response - The need for additional sets of codes and standards will be reviewed. As a minimum, copies of the nuclear codes will be obtained for each discipline shortly after July 1, 1971, following the extensive revision planned for Section III of the ASME Boiler and Pressure Vessel Code.

4. Criterion IV - Procurement Document Control

a. Finding - Instructions were not included in the Phase II Work Order (procurement document) to require Bechtel to provide a QA program consistent with regulatory requirements.

Response - This item was taken for granted since SCE was aware that Bechtel has a QA program. Nevertheless, the final contract will contain provisions that require a QA program consistent with regulatory requirements.

b. Finding - The group providing the quality input to the specification was Engineering, rather than QA, as required by the QA manual, Section 4.2.b.

Response - The inspector's finding is in error since QA has in fact been the group providing the quality input to specifications. However, the forms utilized do not show this to be the case. Consequently, the forms, as well as the instructions in the QAM, will be revised to acknowledge the QA input by all parties.

c. Finding - Instructions do not exist in the QA Manual to assure the review of interim procurement documents for quality requirements.

Response - The QAM will be revised to require the review of interim procurement documents for quality requirements.

5. Criterion V - Instructions, Procedures, and Drawings

a. Finding - The instructions for documenting intended PSAR deviations prior to the release of design disclosure documents have not been defined in the QAM.

Response - The Nuclear Project Group has developed a check list to detect deviations from the PSAR in the design phase that will be included in the QAM. Also, the stated purpose of the manual chapter will be changed to require all groups, and not just Inspection and Construction, to document deviations from the PSAR.

6. Criterion VI - Document Control

a. Finding - Chapter 6 of the QAM does not provide for the control and identification of the SCE Class I or II documents to assure their coordinated assembly in the final files of the Document Control Center.

Response - This area is currently being reviewed by QA for the Document Control Center and will be reviewed for all project activities in the hopes of developing a coordinated filing system.

b. Finding - The QAPP, 6.2.4 states, "The configuration control system (for change to design disclosure documents) shall include provisions for review and approval by those responsible for review and approval of the original design disclosure documents, as shown by Figure 5" (Figure 3.1 of the QAM). The following items appear not to meet the requirements of this statement.

(1) Configuration Change Notice (Exhibit 6.2) does not have provisions for approval by the Quality Assurance Organization.

Response - The desirability of QA sign off on Configuration Change Notices will be reviewed by SCE and acted upon as deemed appropriate.

(2) Subsection 6.1.5 of the QAM appears to indicate that changes at the job site can proceed without the engineering review required by Fig. 3.1, if the Supervising Construction Engineer is cognizant of the change.

Response - The QAM, as worded, is in error and will be corrected to require "downtown" review of changes. The intent of the paragraph in question was to ensure that "approved changes" were not made until the Supervising Construction Engineer was cognizant of the change.

c. Finding - Exhibit 4.1 and Figure 3.1 of the QAM do not provide instructions to control the review of quotations by such groups as Procurement, Engineering, or the Quality Assurance organizations, prior to approval for contract award.

Response - The QAM will be corrected to acknowledge the internal review procedure that is being followed on quotations.

d. Finding - For the specifications sampled, the QA organization did not review or approve the specifications after Engineering and QA comments were submitted to the originator. This does not appear consistent with the control requirements of Figure 3.1 of the QAM for design release (sign-off).

Response - SCE does not necessarily expect QA to be involved in specifications until the final bidder has been selected. QA reviews the specifications for the incorporation of quality requirements before the final specifications are let for bid. This requirement will be clarified in the QAM.

7. Criterion VII - Control of Purchased Material Equipment and Services

a. Finding - The instructions in the QAM do not indicate what documentary evidence is required to provide assurance that material and equipment conform to the procurement specifications prior to installation or use.

Response - The QAM will be reviewed and instructions provided as deemed appropriate.

b. Finding - The instructions in the QAM do not make reference to the review of bids or quotations as a measure to assure that purchased material, equipment, and services conform to procurement documents.

Response - The QAM will be reviewed and instructions provided as deemed appropriate.

c. Finding - The responsible procurement buyer is required to send bid response documents to Engineering for evaluation. No instructions exist to assure that the Quality Assurance organization is required to review the bid response documents when "alternates", involving quality of materials or components, to the original bid document are presented by the selected bidders. This is not consistent with 6.2.4 of the QAPP.

Response - The system being followed is consistent with section 6.2.4 of the QAPP. The QAM will be revised to reflect current practices.

8. Criterion VIII - Identification and Control of Materials, Parts and Components

a. Finding - The general instructions of the QAM appear consistent with the requirements of this criterion.

Response - (None required.)

9. Criterion IX - Control of Special Processes

a. Finding - Proposed procedural requirements, approval, and inspection to be implemented to assure appropriate control of special processes during construction of the units appear to adequately satisfy the provisions of 10CFR50, Appendix B, Criterion IX.

Response - (None required.)

10. Criterion X - Inspection

a. Finding - The proposed SCE QA manual is not specific as to:

(1) The requirement that inspections be performed by others than those performing the work.

Response - The QAM manual will be revised to be consistent with the criteria. The Engineer-Constructor contract will include this requirement.

Response - The QAM will be reviewed and instructions provided as deemed appropriate.

c. Finding - The responsible procurement buyer is required to send bid response documents to Engineering for evaluation. No instructions exist to assure that the Quality Assurance organization is required to review the bid response documents when "alternates", involving quality of materials or components, to the original bid document are presented by the selected bidders. This is not consistent with 6.2.4 of the QAPP.

Response - The system being followed is consistent with section 6.2.4 of the QAPP. The QAM will be revised to reflect current practices.

8. Criterion VIII - Identification and Control of Materials, Parts and Components

a. Finding - The general instructions of the QAM appear consistent with the requirements of this criterion.

Response - (None required.)

9. Criterion IX - Control of Special Processes

a. Finding - Proposed procedural requirements, approval, and inspection to be implemented to assure appropriate control of special processes during construction of the units appear to adequately satisfy the provisions of 10CFR50, Appendix B, Criterion IX.

Response - (None required.)

10. Criterion X - Inspection

a. Finding - The proposed SCE QA manual is not specific as to:

(1) The requirement that inspections be performed by others than those performing the work.

Response - The QAM manual will be revised to be consistent with the criteria. The Engineer-Constructor contract will include this requirement.

(2) The requirement for inspection of Class I and II components.

Response - This was the intent of the criteria in the QAM, however, it will be modified to directly address the inspection of Class I and II components.

(3) Requirements for designating or establishing mandatory hold points which require independent witnessing or inspecting by SCE's designated representative.

Response - Mandatory hold-points have been established as an internal requirement by the SCE specification forms. Nevertheless this requirement will be emphasized by including it in the QAM.

11. Criterion XI - Test Control

a. Finding - The QA manual does not contain provisions for the evaluation of test results.

Response - The QAM will be revised to require the evaluation of test results.

b. Finding - The QA manual does not specifically provide that the developed test procedures must include provisions concerning prerequisites for a given test, availability and use of test instrumentation, and suitability of environmental conditions.

Response - The QAM will be revised to reflect the requirements of the criteria.

12. Criterion XII - Control of Measuring and Test Equipment

a. Finding - Provisions in the QA manual are adequate to provide for implementation of procedures to assure consistency with the requirements of Criterion XII.

Response - (None required.)

13. Criterion XIII - Handling, Storage, Shipping, and Preservation

a. Finding - The general provision contained in the QA manual coupled with the development and implementation of the detailed procedures for surveillance of materials should satisfy the requirement of Criterion XIII.

Response - (None required.)

14. Criterion XIV - Inspection, Test, and Operating Status

a. Finding - Adequate provisions have been incorporated in the proposed QA manual to assure implementation of appropriate measures to satisfy the requirements of Criterion XIV.

Response - (None required.)

15. Criterion XV - Nonconforming Materials, Parts, or Components

a. Finding - The program does not include provisions for the segregation of nonconforming material as required by Criterion XV.

Response - The problem of segregation of nonconforming material by other than the use of tags will be evaluated and acted upon accordingly since physical segregation introduces cost factors not previously considered.

b. Finding - The QA manual does not require that "reject" materials be documented on a Nonconformance Report to assure that project management is aware of supplier and/or constructor performance for the purpose of evaluating trends affecting quality items and to provide assurance of prompt disposition of reject materials.

Response - This observation will be evaluated and acted upon as deemed appropriate.

c. Finding - The scope of the term "rework on the spot" has not been defined by the QA manual but should be, since "rework on the spot" is not required to be documented on a Nonconformance Report.

Response - The several aspects of rework will be reviewed and the QAM revised to reflect the timeliness of rework, how the nonconformance was discovered, by whom, etc.

16. Criterion XVI - Corrective Action

a. Finding - The QA manual procedures for corrective action were found to be consistent with the requirements of AEC Criterion XVI and the PSAR, except that it does not specify who will make trending studies for Quality Program Committee review.

Response - The QAM will be revised to assign the responsibility for trending studies to QA.

17. Criterion XVII - Quality Assurance Records

a. Finding - The QA manual has not specified a retention period for QA records as required by the PSAR.

Response - The QAM will be revised to be consistent with the PSAR.

b. Finding - The QA manual does not specifically require organizations other than QA to establish and implement procedures to ensure that they maintain sufficient records to provide objective evidence of quality, as required by the PSAR.

Response - The QAM will be revised to reflect this requirement which is already a Company policy.

c. Finding - The SCE Engineering files have not been coordinated with QA to permit easy assembly into the QA Documentation Control Center.

Response - This area is currently under review. A coordinated system for docketing material will be developed.

18. Criterion XVIII - Audits

a. Finding - Audits have been performed of SCE, Bechtel and Combustion Engineering commensurate with the status of the project in accordance with the QA manual. The QA audit program appears to be consistent with and was being implemented in accordance with the requirements of Criterion XVIII.

Response - (None required.)

B. Bechtel QA Program

1. Criterion I - Organization

a. Finding - The Bechtel QA organization for the engineering effort related to the San Onofre project appears to be consistent with Criterion I and the Organization described in the PSAR.

Response - (None required.)

2. Criterion II - Quality Assurance Program

a. Finding - The QA program for current activities, and as planned when the scope of the contract is increased, appears to be consistent with Criterion II.

Response - (None required.)

3. Criterion III - Design Control

a. Finding - Bechtel's quality program did not contain instructions to close the "quality loop" if corrections are made to unchecked preliminary engineering calculations which support SCE designated Class I or II procurement documents presently out for bid or pending award.

Response - The calculations of items out for bid have now been reviewed. The quality program will be reviewed and additional requirements added to show when calculations are reviewed and how calculations are reviewed for changes.

b. Finding - QA records did not specifically identify that drawings contained in released Class I specifications received adequate reviews.

Response - The present forms used to show drawing review will be evaluated and adjusted accordingly.

c. Finding - The review copy of the civil engineering section of the preliminary Project Design Manual (also referred to as the Design Criteria Manual) did not list ACI-301, a requirement of the PSAR, in the listing of applicable codes for this project.

Response - The manual will be checked to ensure that SCI-301 has been listed as an applicable code for the project.

d. Finding - All engineering disciplines did not identify calculations by the appropriate SCE safety class designation.

Response - The Project Quality Program Manual (PQPM) now requires all engineering disciplines to identify calculations by the appropriate safety class designation. The several disciplines are now doing this.

e. Finding - The specification reviews performed by engineering did not fulfill all the quality review items specified in the QPM. Approximately 10% were omitted. Actual review records for drawings and specifications were not established.

Response - The PQPM as now prepared requires these reviews and records. QA will audit the application of the program.

4. Criterion IV - Procurement Document Control

a. Finding - The review of Bechtel's procurement activities for Rancho Seco disclosed that they were following the stated policies. (Note: Procurement activities for Rancho Seco were selected since Bechtel has not yet been active in this area for SCE.)

Response - (None required.)

b. Finding - Bechtel's program for Procurement Document Control appears to be consistent with Criterion IV.

Response - (None required.)

5. Criterion V - Instructions, Procedures and Drawings

a. Finding - The Project Design Manual (also referred to as Design Criteria Manual) has not been issued. It is stated to be in the final stages of review. Aside from this, the program and its implementation for instructions, procedures, and drawings appears to be consistent with the requirements of Criterion V for the current status of the project.

Response - All departments have developed the material for the manual to the point where it is ready for assembly into a single document. The material is being used on a trial basis to ensure its applicability to the program.

6. Criterion VI - Document Control

a. Finding - In general, individual calculations were not safety class identified. Three of the four engineering disciplines inspected had summary indexes for their calculations books. Two of these indexes did identify the safety class of the calculations.

Response - All disciplines are now identifying the safety class of calculations (see Criterion III).

b. Finding - Calculations were to be retained by Bechtel, Vernon Division. To date no instructions had been issued by SCE to Bechtel for maintaining the availability of Class I or II calculations for the life of the nuclear plants.

Response - Instructions are being prepared to implement this requirement.

7. Criterion VII - Control of Purchased Material, Equipment and Services

a. Finding - Bechtel has established and implemented plans for the control of purchased material, equipment, and services that appear to be consistent with Criterion VII. (Note: Reviewed activities related to Rancho Seco in this area since no action as yet has been taken for San Onofre.)

Response - (None required.)

8. Criterion XVI - Corrective Action

a. Finding - The QA program for corrective action for design engineering appears to be consistent with Criterion XVI.

Response - (None required.)

9. Criterion XVII - Quality Assurance Records

a. Finding - The Project Quality Program Manual has not included requirements for the control of quality documents, as required by Criterion XVII.

Response - An interim procedure is being prepared that will be used until a firm engineering contract has been negotiated with SCE.

10. Criterion XVIII - Audits

a. Finding - The audit program for Bechtel's design engineering effort for San Onofre appears to be consistent with Criterion XVIII.

Response - (None required.)

11. Inspection of Bechtel for Drawing and Specification Change Control, Criteria III, V, and VI

a. Finding - The program satisfies the requirements of Criteria III, V, and VI for change document control of CCD's and DCN's.

Response - (None required.)

b. Finding - The preparation, review, control, and engineering evaluation of the change reviewed met the criteria requirements. The capability to change drawings existed. Also, the ability to evaluate following changes, against the effect of previous changes, existed even though it involved the review of many documents, rather than one "as built" drawing and/or master specification.

Response - A system has been developed at the Rancho Seco site to assemble all applicable documents for changes into a single file. QA is currently reviewing the system in use at Bechtel, Vernon, and will revise it accordingly.

## DETAILS

### I. General

#### A. Background and Purpose

The initial quality assurance (QA) inspection was conducted for the purpose of obtaining objective evidence of Southern California Edison Company's (SCE) and Bechtel's (Vernon Division) QA activities relating to the design and construction of San Onofre Units 2 and 3 and to determine the degree and manner in which the licensee is implementing the 18 point AEC QA criteria. Proposed CO PI 4000 (February, 1971 issue) was used as a guide for the scope of the inspection.

R. T. Dodds and G. S. Spencer met with SCE and Bechtel personnel on February 5, 1971 for the purpose of outlining the scope of the QA inspection. SCE's General Office was visited by members of the inspection team on February 22, 23, 24 and 26, 1971. Bechtel, Vernon office was visited on February 24, 25 and 26, 1971.

The management interviews were held with SCE and Bechtel on April 8, 1971. The inspection team of Dodds, Johnson and Peranich plus R. W. Smith participated in the management interviews.

#### B. Team Membership and Assignments

G. S. Spencer - Senior Reactor Inspector, CO:V

Overall administrative responsibility for the inspection effort, including the planning of the inspection and the review of inspection results.

R. T. Dodds - Reactor Inspector, CO:V, Principal Inspector

Responsible for inspection of licensee conformance with Criteria I, II, XV, XVI, XVII and XVIII.

A. D. Johnson - Reactor Inspector, CO:V

Responsible for inspection of licensee conformance with QA Criteria IX, X, XI, XII, XIII and XIV.

M. W. Peranich - Facilities Engineer, CO:HQ

Responsible for inspection of licensee conformance with QA Criteria III, IV, V, VI, VII and VIII.

C. Persons Contacted

Southern California Edison Company

| | | |
|---|---|---|
| J. B. Moore | - | Vice President of Engineering and Construction |
| D. J. Fogarty | - | Manager of Engineering |
| C. G. Johnson | - | Senior Quality Assurance Engineer |
| O. J. Ortega | - | Chief Nuclear Engineer (Project Manager) |
| K. P. Baskin | - | Supervising Nuclear Engineer |
| S. V. Tashjian | - | Quality Assurance Engineer (Mechanical) |
| M. Wilms | - | Quality Assurance Engineer (Civil) |
| A. Delgrosso | - | Quality Assurance Engineer (Metallurgy) |
| J. E. Arnold | - | Document Control Clerk (QA) |
| M. D. DuDeck | - | Senior Material Inspector (Construction Engr.) |
| C. J. Lowerison | - | Associate Chief Construction Engineer |
| C. D. Williamson | - | Chief Materials Inspector |
| C. L. Leonard | - | Manager of Construction |
| R. Day | - | Civil Design Supervisor, San Onofre |
| R. L. Miller | - | Assistant Civil Engineer |
| W. E. Lawson | - | Civil Engineer |
| G. P. Dotson | - | Senior Engineering Draftsman |
| D. Shone | - | Assistant Civil Engineer |
| J. E. Nelson Jr. | - | Civil Engineer |
| M. D. Easley | - | Civil Project Liason Engineer |
| G. K. Crane | - | Mechanical Project Liason Engineer |
| J. P. Ramirex | - | Electrical Project Liason Engineer |
| A. King | - | Associate Mechanical Engineer |
| C. Grothues | - | Supervision Mechanical Engineer |
| D. Cox | - | Acting Mechanical Project Supervisor |
| D. Burkhart | - | Junior Mechanical Engineer |
| B. R. Watts | - | Assistant Mechanical Engineer |
| H. F. Saliger | - | Manager of Procurement |
| J. R. Knudsen | - | Procurement Project Coordination, Sr. |
| E. R. Young | - | Purchasing Agent |
| W. F. Traft | - | Senior Buyer |
| B. E. Francis | - | Buyer |
| R. C. Baker | - | Buyer |
| J. D. Hornbuckle | - | Assistant Mechanical Engineer, Nuclear |
| G. C. Smith | - | Administrative Clerk |

Bechtel Corporation - Vernon Office

| | | |
|---|---|---|
| I. Ibsen | - | Start-Up and Quality Assurance Manager |
| V. P. McMahon | - | Chief Quality Assurance Engineer |
| L. Stromberg | - | Project Quality Assurance Engineer |
| W. Holland | - | Assistant Project Engineer |

| | | |
|---|---|---|
| R. A. Snyder | - | Quality Assurance Engineer |
| P. Dragolavich | - | Project Engineer (San Onofre) |
| F. A. Dexter | - | Project Administrator |
| D. A. Bonano | - | Procurement Manager |
| W. Townley | - | Purchasing Supervisor |
| H. Joseph | - | Supervisor, Inspection |
| T. Matsumoto | - | Electrical Group Supervisor |
| P. Speidel | - | Senior Electrical Engineer |
| R. J. Auginstein | - | Senior Electrical Engineer |
| E. L. Morton | - | Librarian |
| R. Kosiba | - | Supervisor, Civil-Structural |
| D. Bird | - | Assistant Civil Engineering Supervisor |
| L. G. Hendelman | - | Chief, Civil-Structural |
| B. Ford | - | Supervisor of Drawing Control |
| T. Kohli | - | Engineering Group Leader, Civil |
| L. Curtis | - | Nuclear Project Supervisor |
| G. H. Rohde | - | Mechanical Group Supervisor |

Bechtel Corporation - Vernon Office (SMUD)

| | | |
|---|---|---|
| L. Brown | - | Mechanical Engineering Supervisor |
| F. Horvath | - | QA Engineer, Design Office |
| M. A. Snead | - | Quality Control Coordinator |
| R. A. Norry | - | Project Administrator |
| P. Hatago | - | Electrical Group Supervisor |
| H. Campus | - | Assistant Electrical Group Supervisor |
| L. Johnson | - | Supervisor of Drawing Control |

D. Documents Reviewed

Appendix "A" and "B" are listings of documents utilized by the inspectors for the evaluation of SCE's and Bechtel's QA programs respectively.

II. Project Status

Bechtel, Vernon Division has an open contract until July 1, 1971 to provide engineering services to SCE for San Onofre Units 2 and 3. Bechtel has provided most of the material for the PSAR and conceptual design. SCE has only given Combustion Engineering a "letter of intent" for the purchase of the NSSS. The final contracts for both the Engineer-Constructor and NSSS are still being negotiated with Bechtel and Combustion Engineering respectively.

SCE will have primary responsibility for vendor and construction surveillance with each individual contractor required to implement the QA programs associated with their contracts. SCE, Source Vendor Inspection, will assign two men, from a group of 10 men for this project. No construction or vendor contracts have been issued to date, but some are in the final stages of negotiations.

Bechtel currently has about 90 engineers or technical personnel assigned full time to the San Onofre project. About 30% of the advanced systems design, less than 5% of the project engineering design, and about 7% of the preliminary drafting and layout have been completed. SCE has not yet received any drawings from Bechtel for approval.

## III. Inspection Findings - SCE

### A. Criterion I - Organization

#### 1. Discussion

Chapter 1 of Appendix A in Amendment 5 of the PSAR and Chapter 1 of the Quality Assurance Manual describe the organizational structure responsible for establishment and execution of the QA program. The ultimate responsibliity for engineering, construction and operation rests with the SCE Senior Vice President, W. R. Gould. The responsibility for the QA program rests with SCE Vice President of Engineering and Construction J. B. Moore who is advised in this area by the Senior Quality Assurance Engineer (SQAE) C. G. Johnson.

The SQAE is responsible to the Vice President of Engineering and Construction for developing, directing and implementing the QA program. He guides SCE's Quality Program Committee and directs the QA Organization. The QA Organization has the responsibility to audit, inspect and appropriately verify the correct implementation of QA activities.

Quality Assurance, Engineering, Construction Engineering, Purchase and Stores, and Power Supply are the five basic SCE organizations implementing the QA program. Each organization is responsible to develop and carry out the QA program in accordance with internal procedures prepared by them. QA has the responsibility to verify and ensure the implementation of the QA programs.

Construction Engineering will be responsible for jobsite construction and startup activities or the control thereof. Construction will also be responsible for design disclosure documentation distribution at the jobsite.

QA functions are to be delegated to the NSSS supplier (Combustion Engineering) and the Engineer-Constructor (probably Bechtel--contract not signed). SCE QA will audit these functions. The NSSS supplier and Engineer-Constructor are special vendors whose work is also subject to SCE inspection and tests.

2. Findings

a. SCE is responsible for the establishment and execution of the QA program through all phases of the project in accordance with Section I of the proposed QA Manual.

b. The proposed QA Manual and PSAR, in general, delineate in writing the duties and authority of QA personnel and organizations. However, the organization charts in both of the above documents show the Quality Program Committee reporting to the SQAE (Senior Quality Assurance Engineer) rather than the Vice President of Engineering and Construction as stated in the PSAR.

c. QA persons and organizations have sufficient authority and organizational freedom to identify quality problems, recommend solutions and verify implementation of solutions. However, SCE QA-QC personnel do not have stop-work authority for vendor or construction activities related to San Onofre. Only the Supervising Construction Engineer has this authority at the jobsite. Contracts as presently written do not provide for SCE stop work authority at vendor shops. The Engineers at the site can only recommend corrective action to the Construction Engineer. The Construction Engineers then recommend corrective action to the Supervising Construction Engineer.

As proposed, QA has audit responsibility at the job site. Other than auditing, QA's authority with regard to vendors has not been defined. However, QA has been requesting corrective action direct from the vendors of deficiencies identified during audits.

d. QA personnel are independent of the individual or group directly responsible for performing specific activities such as Engineering and Construction. However these groups all report to the Vice President of Engineering and Construction. Mr. Moore stated that a management change would be made on March 1, 1971 that would make QA totally independent of Engineering and Construction. As noted in c. above, Quality Control Engineers who will be acting as inspectors for SCE at the job site will not be fully independent of the responsible construction organization since they will be reporting directly to field Construction Engineers who have responsibility for 1) quality, 2) cost and 3) scheduling.

B. Criterion II - Quality Assurance Program

1. Discussion

The QA program for SCE for the San Onofre project has been documented in a proposed Quality Assurance Manual that was out for review and comment by the affected groups in SCE. The proposed Manual contains written policies, procedures, program management, checklists and instructions. Mr. Johnson stated that an approved manual would be issued by April, 1971.

Chapter 2 of the proposed QA manual provides the basis for determining QA classifications. It also refers the reader to Section 2.3.1.1 in Appendix A of the PSAR for an elaboration of quality class. Appendix "B" of the PSAR contains the Quality Class List but has not been referenced by the QA manual. The classification of all equipment items is contained in a "Material Control Schedule" that is currently under review by SCE and Bechtel. This manual has not been referenced by the QA manual either. SCE presently does not plan to incorporate the Quality List per se in the QA manual.

The SCE QA Organizations will conduct QA training of QA personnel. The training of personnel of special vendors (Bechtel and Combustion Engineering) will be verified through SCE audits.

2. Findings

a. It was observed that the proposed manual does not contain the necessary detail required to provide management instructions for full implementation of the QA program.

The following examples illustrate the type of details lacking in the manual.

(1) The manual references a startup manual to be prepared by a cognizant engineer within the Construction Engineering Department. However, the manual lacks clear definition as to the scope of the proposed manual and the interfaces between the various responsible groups such as Design Engineering, Construction Engineering, and Operations.

(2) The stated purposes for several of the QA manual chapters lack sufficient definition to adequately address the provisions of the AEC criteria, e.g., Chapter 16 - corrective action - fails to stress the need for the establishment of measures to assure conditions adverse to quality are promptly identified and corrected. As presently worded, it simply provides that the purpose of the chapter is "to provide a system...to control and preclude significant repetitive nonconformances or deficiencies".

(3) Throughout the proposed manual a certain amount of ambiguity exists as to specific assigned responsibilities and approval authorities, e.g., Chapter 16 - Corrective Action - a provision requires that nonconformance trending studies are to be on the agenda of the monthly meetings of the Quality Program Committee. The manual is silent as to who has the responsibility for performing the trending studies.

b. The QA manual is not specific as to the requirement for the verification of quality by independent inspection (see Section J.).

c. Licensee Quality Class I items have been defined as those items which prevent the consequence of postulated accidents and Quality Class II as those items which mitigate the consequences of postulated accidents, both of which must meet all of the requirements of the AEC QA Criteria. However, the quality program requirement contained in Chapter 2 relating to traceability on parts applies to Quality Class I items only, unless the items conform to ANSI B31.7. Further, source evaluation and selection applies to Quality Class I items only.

d. Activities performed by the QA organization to date that appear commensurate with the status of the project include the following:

(1) Prepared draft version of QA manual.

(2) Reviewed Engineering-Construction negotiation contract for inclusion of QA provisions.

(3) Reviewed NSSS contract for inclusion of quality provisions

(4) Prepared audit plans.

(5) Evaluated prospective QA consultants for NSSS jobsite and fuel fabrications.

(6) Audited P. F. Avery Co., supplier of reactor internals.

(7) Visited Windsor Division of Combustion Engineering to evaluate QA program.

(8) Audited Combustion Engineering, Chattanooga.

(9) Audited SCE Engineering.

(10) Audited Bechtel Engineering.

(11) Reviewed available SCE Engineering Design Review Guides.

(12) Evaluation of prospective vendor QA programs.

(13) Evaluation of supplier and contractor QA qualifications.

(14) Reviewed procurement specifications.

(15) Presented one day QA course to SCE management personnel ($\sim$ 50 people - Engineering, Power Supply, Construction and Purchasing).

C. Criterion III, Design Control

1. Discussion

Chapters 3 of the Quality Assurance Program Plan contained in the PSAR (QAPP) and Quality Assurance Manual (QAM) address the requirements of this criterion. The QAM procedures and

instructions have been reviewed by each engineering discipline and in their preliminary form are being issued as instructions for work in progress. One QAM is presently available to each design discipline.

The QAPP, 3.2.1., states, "The specific drawings that constitute design drawings are established by SCE Engineering in discussions with the various contractors. Since design drawings establish overall structure, system, or component design, these drawings receive the highest level of design control provided by this program." Discussions related to this with the Project Manager clarified this statement as follows:

> In general, each contractor that performs engineering is primarily responsible for the development of design drawings and their technical review. SCE will participate in the initial development of the criteria for the more significant systems, structures, or components. When appropriate to do so, SCE will perform reviews of preliminary criteria and designs prior to their further development and the final drawings are also reviewed prior to release. For the present, general instructions for these reviews exist in a "General Procedure between SCE and Bechtel", dated August 14, 1961, subsection 4.10. In addition, for certain selected systems, structures, or components, SCE will be responsible for all of parts of the engineering and related reviews for each. In either situation, discussions will be held with appropriate engineering groups of each contractor to coordinate and review related engineering efforts.

2. Findings

a. Program

In general, the procedures and instructions in Chapter 3 of the QAM are consistent with the status of the project. Certain areas in which these instructions require further development or clarification due to either the commitments of the QAPP or the project status are as follows:

(1) Design Review Guides require further development.

(2) The SCE Design Control and Review Summary Reference Table does not recognize the general content of engineering control and review of technical factors for either the coordinated reviews accomplished with other contractors or for engineering documents produced by SCE.

(3) The Design Verification release form does not satisfy all the signature approvals for various documents displayed on Figure 2.1 in the QAM since it does not include provision for QA approval.

(4) The QAM did not specifically address the review by SCE or the control of reviews performed by contractors of design documents for the accessibility requirements of in-service inspection, maintenance and repair.

(5) The control of design changes requires further definition in the manual in order to be consistent with the commitment in the Application under 3.4 of the QAPP.

b. Implementation

The implementation of the QAM and Criteria III requirements were generally found to be acceptable. Areas that require further attention for a complete program were as follows:

(1) Neither the Civil or mechanical engineering disciplines have ready access, within their functional areas, to all the appropriate reference codes and standards. For example, the ASME, Section III, and Pump and Valve Code for mechanical, and ACI Manual of Concrete Practice Part 1, 2, and 3 for civil engineering groups were not available in each group area. The SCE technical library maintained one copy of each code or standard (ASME, ACI, ASTM, IEEE 279, etc.) for the complete SCE engineering organization.

(2) For Class I and II calculations available, it was noted that technical reviews by SCE of Bechtel engineering and SCE engineering were documented. Calculations were identified to the system structure or component but were not "SCE Class identified".

(3) Each engineering discipline inspected was preparing preliminary instructions for use when performing or reviewing engineering efforts in accordance with the procedures and instructions of the QAM. The reviews performed appear to meet the requirements of this criterion but the status of the written procedures were not consistent with the commitment of section 4.2.3 of the QAPP.

## D. Criterion IV, Procurement Document Control

### 1. Discussion

#### a. General

Chapter 4 of the QAPP and QAM address the requirements of this criterion. Procurement documents developed by SCE or other project contractors are reviewed and approved by engineering and quality assurance organizations to assure that regulatory requirements, design basis, and the requirements for an adequate QA program have been specified.

The status of the major contracts for the NSSS and Engineer-Constructor (E-C) referred to in the QAPP were stated as being in the final stages of negotiations. To provide for preliminary engineering, in support of the application for an AEC Construction Permit, instructions have been provided to Bechtel by issuing a Phase II Work Order (Phase I was for support of PSAR preparation) using an established SCE-Bechtel basic work order, approved by engineering management. The Phase II Work Order does not impose a requirement on Bechtel for a QA program for engineering services.

Negotiations also are under way for Bechtel to control the procurement activities for some class I items. When appropriate, changes will be made to the QAPP and QAM to address this contractual commitment.

For the NSSS, a letter of intent has been issued to Combustion Engineering (CE) to proceed with preliminary requirements based on CE's proposals numbers 1469 N. S. and 1469 N. F., both dated November 21, 1969.

### 2. Findings

#### a. Program

In general, the QAM appears consistent with the requirements of this criterion and the QAPP.

#### b. Implementation

(1) Instructions were not included in the Phase II Work Order (procurement document) to require Bechtel to provide a QA program consistent with regulatory requirements.

(2) Engineering and Quality Assurance reviews for those specifications sampled were performed in accordance with the procedures of the QAM.

(3) The group providing the quality input to the specification was Engineering rather than QA as required by the QA manual, Section 4.2.6.

(4) The recorded comments of the QA engineer who reviewed the containment liner plate system indicated that a thorough evaluation for quality was made.

(5) Objective evidence was not available to assure that the QA organization had reviewed interim procurement document instructions provided to major contractors for content of quality requirements.

E. Criterion V, Instructions, Procedures and Drawings

1. Discussion

Chapter 5 of the QAPP and QAM were developed to address the requirements of this Criterion. The QAM primarily relates to instructions that are required after the release of primary SCE or contractor engineering documents.

2. Findings

a. Program

SCE's involvement in the engineering and procurement process requires additional recognition of internal qualitative and quantitative instructions to assure implementation of the procedures within the QAM. The instructions for documenting intended PSAR deviations prior to the release of design disclosure documents have not been defined in the QAM.

b. Implementation

Internal instructions delineating the detailed items that a auditor, checker, or reviewer shall consider when performing reviews of drawings, specifications, or procurement documents were under preparation in the engineering disciplines. Audit instructions and design review data sheets of engineering effort were noted as available and in use by the QA organization.

F. Criterion VI, Document Control

1. Discussion

Chapters 6 of the QAPP and QAM address the requirements of this criterion.

2. Findings

a. Program

In general, the procedures and instructions of QAM Chapters 3, 4 and 6 provide controls and assure reviews and approvals of quality documents. Areas of the program requiring further clarification were as follows.

(1) The QAPP, 6.2.4 states, "The configuration control system (for change to design disclosure documents) shall include provisions for review and approval by those responsible for review and approval of the original design disclosure documents, as shown by Figure 5" (Figure 3.1 of the QAM). The following items appear not to meet the requirements of this statement.

(a) Configuration Change Notice (Exhibit 6.2) does not have provisions for approval by the Quality Assurance Organization.

(b) Subsection 6.1.5 of the QAM appears to indicate that changes at the job site can proceed without the engineering review as required by Fig. 3.1., if the Supervising Construction Engineer is cognizant of the change.

(2) Exhibit 4.1 or Figure 3.1 of the QAM do not provide instructions to control the review of quotations by such groups as Procurement, Engineering, or the Quality Assurance organizations, prior to approval for contract award.

(3) The procedures or instructions of the QAM in Chapter 6 do not address the control and identification of SCE Class I or II documents and the controls

that are applied to assure the coordinated assembly of appropriate safety related documents from the temporary files to the final Documentation Control Center.

b. Implementation

(1) No control instructions were available to assure that the Quality Assurance organization would review or be aware of the internal instructions developed by each engineering discipline. The QA group did have a copy of the internal instructions developed by the nuclear engineering discipline.

(2) File indexes were implemented to control the Engineering and QA files. These indexes were not identical or easily correlated to the Quality Class List contained in Appendix B of the QAPP. Difficulty was experienced when sampling the quality related technical documents in folders of the engineering files to assure that appropriate safety related documents could be readily identified and retrievable for future filing in the Documentation Control Center.

(3) For the specifications sampled, the QA organization did not review or approve the specifications after Engineering and QA comments were submitted to the originator. This does not appear consistent with the control requirements of Figure 3.1 of the QAM for design release (sign-off).

G. Criterion VII, Control of Purchased Material, Equipment, and Services

1. Discussion

The procurement documents of SCE for this project will be coordinated through the Procurement Project Coordinator under the direction of the Manager of Procurement and Purchasing Agent. The buying and coordination of procurement activities will be the responsibility of each buyer whose procurement assignments have been defined by the Purchasing Division Procurement Assignments, dated February 16, 1970. Procurement by SCE will originate from either the General or Alhambra offices in accordance with 1.4.10 and 1.4.18 of the QAPP.

Of the major contractors listed, the NSSS (CE) has procurement responsibilities defined under 2.4.1 of the QAPP. The E-C (Bechtel) has not yet been assigned any procurement responsibilities.

Chapter 7 of the QAPP and QAM have been developed to address the requirements of this criterion. The provisions within procurement documents that provide for a means to implement the site-related quality requirements of this criterion were inspected under Criteria III and IV. Inspection plans, typified by Exhibits 7.1, 10.2, and 10.3 of the QAM are presented as instructions for the implementation of the inspection and surveillance requirements of this criterion.

2. Findings

a. Program

In general, the procedures and instructions of Chapter 7 of the QAM provide for the requirements of this criterion. Other findings are listed below.

(1) The instructions in Chapter 7 of the QAM do not indicate what documentary evidence is required to provide assurance that material and equipment conforms to the procurement specifications prior to installation and use. The instructions in Chapter 17, Documentation Control Center, do not appear to satisfy this requirement of criterion VII.

(2) The instructions in the QAM do not make reference to the review of bids or quotations as a measure to assure that purchased material, equipment, and services conform to procurement documents.

b. Implementation

(1) The responsible procurement buyer is required to send bid response documents to Engineering for evaluation. No instructions exist to assure that the Quality Assurance organization is required to review the bid response documents when "alternates," involving quality of materials or components, to the original bid document are presented by the selected bidders. This is not consistent with 6.2.4 of the QAPP.

(2) For a few initial procurement documents, bids are being requested from vendors not prequalified to nuclear requirements. The vendors used had been prequalified by SCE based on the older standards and are now being evaluated for their capability on nuclear projects concurrently with the request for bids.

H. Criterion VIII, Identification and Control of Materials, Parts, and Components

1. Discussion

Chapters 8 of the QAPP and QAM address the requirements of this criterion. This criterion was inspected consistent with the status of this project. The inspection of this was accomplished under Criteria III and IV requirements.

2. Findings

a. Program

The general instructions of the QAM appear consistent with the requirements of this criterion.

b. Implementation

Refer to criterion III and criterion IV for appropriate design phase findings.

I. Criterion IX - Control of Special Processes

1. Discussion

Special processes including welding, heat treating, and nondestructive testing are to be controlled through appropriate contract provisions with contractors and vendors and by establishing written procedures accompanied by appropriate checklists to govern routine inspection of the identified processes. Upon award of a particular contract, the proposed QA manual requires a cognizant construction engineer or inspector to develop the routine inspection requirements as required by PSAR Commitments, Procurement Specification and SCE Internal

Procedure No. 900. SCE's Procedure No. 900 was found to be a detailed procedure outlining the requirements necessary to establish appropriate controls to ensure that special processes are conducted by qualified personnel in accordance with approved procedures. The object of the procedure was stated to ensure that procedures are written in accordance with applicable codes and specifications; are qualified as required; and then are applied in the manufacture, fabrication and installation of Quality Class I and II structures, systems and components.

2. Findings

a. Proposed procedural requirements, approval and inspection to be implemented to assure appropriate control of special processes during construction of the units appear to adequately satisfy the provisions of 10CFR50, Appendix B, Criterion IX.

b. Bid specifications for installation of the containment liner were found to include appropriate conditions related to standards governing welding and nondestructive testing.

J. Criterion X - Inspection

1. Discussion

The role of SCE's QC type inspection activities will be limited. The Construction Engineering Organization plans to assign a graduate engineer for each major discipline to follow each major activity on site to assure that SCE's contractors and subcontractors implement inspection activities commensurate with the provisions of 10CFR50. In addition, SCE's inspection group will perform source inspection as requested by the Engineering Department of SCE. Supplementing the currently assigned two source inspectors, plans included use of outside qualified code inspectors to witness designated activities performed in a vendors shop. These inspectors then will be required to submit a formal report of their findings to the SCE inspection branch. Responsibility for indepth inspection of the contractors and vendors QA-QC programs has been assigned to the SCE QA organization.

2. Findings

a. The proposed SCE QA manual is not specific as to:

(1) The requirement that inspections be performed by others than those performing the work.

(2) Requirements for inspection of SCE designated Class I and II components.

(3) Requirements for designating or establishing mandatory hold points which require independent witnessing or inspecting by SCE's designated representative.

b. The bid specifications for the containment liner included the requirement that the contractor must implement a QA program consistent with the provisions of 10CFR50, Appendix B.

K. Criterion XI - Test Control

1. Discussion

Provisions in the QA manual related to a test program to assure performance of appropriate proof tests, and preoperational tests of structures, systems and components require a cognizant startup engineer to identify the appropriate tests to be performed from the design documents and the PSAR. All tests are to be conducted pursuant to written procedures which have been reviewed by QA personnel. A startup manual is to be prepared that will include all required tests to be performed. Previous plant startup manuals, including the program used for startup of San Onofre Unit No. 1, will be used as guides for preparing the manual.

Operational tests are to be developed by SCE's operations personnel consistent with the operating license provisions, therefore that phase of test control has not been addressed in the current QA provisions under development.

2. Findings

a. Provisions in the QA manual are silent as to the evaluation of test results.

b. The QA manual does not specifically provide that the developed test procedures must include provisions concerning prerequisities for a given test, availability and use of test instrumentation and suitability of environmental conditions.

c. The bid specifications for the containment liner included conditions concerning leakage rate tests to be performed prior to acceptance of the liner by SCE. Other than the contract conditions imposing a QA program consistent with the AEC Criteria, no specific requirements concerning test control for leakage rate tests were found in the specifications. However, a requirement that test procedures must be submitted to the Engineer for approval was incorporated specifically in the proposed contract.

L. Criterion XII - Control of Measuring and Test Equipment

1. Discussion

Provisions in the QA manual require that measuring and testing devices are to be controlled to comply with governing regulations, codes and standards. To assure the devices are adequately controlled, a cognizant engineer is to be designated the responsibility of establishing updated calibration manuals for the pertinent devices along with appropriate records to show the calibration status of each device.

2. Finding

a. Provisions in the QA manual are adequate to provide for implementation of procedures to assure consistency with the requirements of Criterion XII.

b. Imposing the AEC QA criteria by way of a contract condition on contractors and vendors provides the mechanism whereby SCE implements the requirements of their program.

M. Criterion XIII - Handling, Storage, Shipping and Preservations

1. Discussion

Engineering has been charged with the responsibility for defining special handling, storage, shipping, preservation and cleaning processes in the design disclosure documents. SCE has not as yet determined whether or not receiving and storage of materials at the site will be performed by SCE or by an independent contractor. In any event, the QA manual sets forth requirements for SCE surveillance concerning receiving and storage activities.

2. Findings

a. The Materials Inspection Department of SCE was found to be in the process of developing detailed procedures with accompanying surveillance checklist to be used for receiving and storage of materials at the site.

b. The general provision contained in the QA manual coupled with the development and implementation of the detailed procedures for surveillance of materials should satisfy the requirement of Criterion XIII.

N. Criterion XIV - Inspection, Test and Operating Status

1. Discussion

The QA manual identifies and outlines the required use of systems of stamps, tags and signs to be implemented to identify the quality status of items on the project site. The systems also are used to identify the operating status of structures, systems and components to prevent inadvertent or unauthorized operation of equipment, etc.

2. Findings

Adequate provisions have been incorporated in the proposed QA manual to assure implementation of appropriate measures to satisfy the requirements of Criterion XIV.

O. Criterion XV - Nonconforming Materials, Parts or Components

1. Discussion

Chapter 15 of the proposed QA manual defines the system for controlling materials, parts, components or work performances that do not conform to requirements in order to preclude their inadvertent use or installation. The manual chapter makes provisions for identifying, documenting, disposition, notification of affected organizations,and the review, acceptance, rejection, repair or rework of nonconforming items. Hardware oriented nonconformance will be documented and then routed for review and disposition on a NONCONFORMANCE REPORT. Paper oriented nonconformance will be documented for review and corrective

action on a DEFICIENCY REPORT. As a minimum, the report formats require review by QA, the involved department, and the original designer.

2. Findings

a. The program does not include provisions for the segregation of nonconforming material as required by Criterion XV.

b. The QA manual does not require that "reject" materials be documented on a Nonconformance Report to assure that project management is aware of supplier and/or constructor performance for the purpose of evaluating trends affecting quality items and to provide assurance of prompt disposition of rejected materials.

c. The manual does not require that "rework on the spot" be documented on a Nonconformance Report but rather that the pertinent inspection operation be stamped "Reject" on the Data Sheet and the item tagged yellow. The rework ordered is then to be described on the Data Sheet and stamped "Accept" when the rework has been accomplished. The manual has not defined the term "rework on the spot" as to scope of rework or time to accomplish same. Further, the term "REWORK" as defined in the glossary of the manual is listed as a Construction Engineer's dispostion rather than an Inspector's disposition of a nonconforming item. This is inconsistant with the provisions contained in Chapter 15 of the manual.

P. Criterion XVI - Corrective Action

1. Discussion

Chapter 16 of the QA manual provides a system for issuing management directives to all departments and contractors involved with project activities in order to control and preclude significant repetitive nonconformances or deficiencies. Chapter 15 of the QA manual establishes the measures used to promptly identify and correct conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformance.*

* See Section O.

For significant conditions adverse to quality, measures have been established by provisions in the manual to assure that 1) cause is determined (part of NONCONFORMANCE and DEFICIENCY REPORTS), 2) corrective action is taken to preclude repetition (audit reports, nonconformance trending studies, and QA program compliance will be reviewed by the Quality Program Committee), and 3) documentation of cause and corrective action is achieved and reported to management in a timely manner (nonconformances in regard to critical characteristics of Quality Class I or II times are immediately brought to the attention of the SQAE who will promptly distribute a copy of the report to the Quality Program Committee). Whenever deficiencies cannot be resolved by the cognizant project personnel, they will be brought to the attention of the Quality Program Committee who will then recommend the appropriate corrective action to the Vice President of Engineering and Construction.

2. Findings

a. While the manual chapter requires trending studies for review, it does not specify who will make these trending studies.

b. The QA manual procedures for corrective action were found to be consistent with the requirements of AEC Criterion XVI and the PSAR excepted as noted above in item a.

Q. Criterion XVII - Quality Assurance Records

1. Discussion

A Documentation Control Center has been established at the General Office in accordance with Chapter 17 of the QA manual. When construction begins, the Center will be moved to the construction site and appropriately housed in a fireproof building.

Chapter 17 describes the procedures to be established for the collection, compilation, retrieval and control of design disclosure documents and records to provide objective evidence of activities affecting quality for the project. A QA System File Index has been established to assure compilation of records relating to the AEC QA criteria. The "Master Index" established

in accordance with the manual showed that the records to be maintained will include operating logs, results of reviews, inspections and tests (inspector, data recorder, type of observations, results, acceptability and action taken on noted deficiencies), audits, monitoring of work performance, material analysis, qualifications of personnel, procedures and equipment.

A QA Document Clerk has been assigned the responsibility for establishing and maintaining the files. A chronological log for incoming and outgoing documents has been proposed to maintain control of quality documents.

The PSAR states that the records shall be maintained at the Documentation Control Center for the life of the project. The record retention period has not been specified in the QA manual.

Other organizations in SCE have established QA record centers that include filing system indexes in accordance with the PSAR. These organizations are Project Administration, Project Civil-Structure, Project Electrical, Project Mechanical and Project Nuclear. The PSAR states that procurement documents will require contractors, subcontractor and vendors to be responsible for establishing and implementing procedures to ensure that they maintain sufficient records to furnish evidence of quality in activities affecting safety related functions of Class I and II structures and systems. At the completion of projects, the PSAR requires that all records be turned over to the QA Document Control Center.

2. Findings

a. The QA manual has not specified a retention period for QA records as required by the PSAR.

b. The QA manual does not specifically require organizations other than QA to establish and implement procedures to ensure that they maintain sufficient records to provide objective evidence of quality as required by the PSAR.

c. While the QA manual is deficient as stated above, the program as implemented for the status of the project was consistent with the requirements of Criterion XVII.

## R. Criterion XVIII - Audits

### 1. Discussion

Chapter 18 of the QA manual defines a system of auditing that has been formulated to communicate QA deficiencies to management on a timely basis to provide a systematic method of corrective action. These audits are planned and being performed in accordance with a periodic inspection schedule consistent with work progress, contract awards and vendor evaluations. The audits are performed by QA personnel who are independent of the activity being audited and are required to be conducted in accordance with an audit plan that has been previously approved by the SQAE. The Supervisors of project activities audited are required by the QA manual to provide prompt corrective action of deficiencies identified in the audit reports. Follow-up audits are required to determine the effectiveness of the corrective action performed. Audit planning and findings are required to be recorded on the Audit Report.

### 2. Findings

Audits have been performed of SCE, Bechtel and Combustion Engineering commensurate with the status of the project in accordance with the QA manual. The QA audit program appears to be consistent with and was being implemented in accordance with the requirements of Criterion XVIII.

## IV. Inspection Findings - Bechtel

### A. Criterion I - Organization

#### 1. Discussion

Bechtel presently has a contract to supply SCE with engineering services for San Onofre Units 2 and 3. Currently, only the Quality Assurance and Engineering organizations are active in this endeavor. Procedure No. 1 of Bechtel's Project Quality Program Manual describes the organizational structure for QA that will direct Bechtel management resources and its contractors for the preliminary engineering phase of the project through completion of the plant should Bechtel be named Engineer-Constructor.

The responsibility for Bechtel QA functions associated with the San Onofre project is assigned to the Vice President and Division Manager of Utility and Industrial Operations, J. H. Goodell. Personnel assigned to the San Onofre project have defined responsibilities and the organizational freedom to institute necessary QA requirements, identify quality problems and to pursue prompt corrective action. The "Division of Engineering" and "Startup and Quality Assurance" are separate groups, both of which report at the Manager level to Mr. Goodell, Vice President. QA now has a full-time QA Engineer assigned the responsibility for auditing the San Onofre Engineering Design Group. At this phase of the project QA is responsible for the following:

a. Perform all QA activities associated with design review.

b. Perform periodic audits of quality program.

c. Maintain Document Control Center.

d. Perform QA training.

Engineering is responsible for the following activities:

e. Define configuration of San Onofre Nuclear Generating Station in drawings and specifications.

f. Perform design review.

g. Determine QA classifications.

h. Review and evaluate vendor drawings.

2. Findings

The Bechtel QA organization for the engineering effort related to the San Onofre project appears to be consistent with Criterion I and the Organization as described in the PSAR.

B. Criterion II - Quality Assurance Program

1. Discussion

The QA program as it applies to the design engineering effort has been documented in an approved Project Quality Program Manual. Only those criteria directly related to Bechtel's project responsibility have been included in the manual. However, a complete manual has been prepared for a full QA program should Bechtel be awarded the Engineer-Constructor contract. The QA program establishes a system of drawing and specification generation that requires an independent review of all design disclosure documents to assure design adequacy, inspectability, testability and compatability with the PSAR to assure the inclusion of appropriate QA provisions.

Procedure No. 4 defines the procedure to be followed for the preparation, review, approval, control and audit of the Quality Classification List (Q-List). Engineering Group Supervisors review each system, structure or equipment item involved in their areas of design for the purpose of identifying the items to be placed on the Q-List. Items are listed to indicate the quality and seismic classifications and the regulatory code or standard under which design, procurement, manufacture, fabrication and installation are to take place. The Bechtel generated Q-List is approved by the Chief Engineers of each engineering discipline. Additions and changes to the Q-List are issued by memo and are subsequently summarized in revisions and issued periodically to supplement the original listing.

2. Findings

a. A draft of the Q-List for San Onofre has been generated but was being reviewed by SCE for client approval.

b. The QA program for current activities and as planned when the scope of the contract is increased appears to be consistent with Criterion II.

C. Criterion III, Design Control

1. Discussion

The Project Engineer stated that Bechtel's arrangement with SCE was to provide the preliminary engineering for the San Onofre project. All design effort is considered preliminary, especially so, since the final seismic values are pending further study by the AEC and subject to re-evaluation. Refer to Criterion V for QA program discussion.

2. Findings

a. Program

In general, the instructions of the San Onofre Units 2 and 3, Project Quality Program Manual, dated February 22, 1971, and the Vernon Division Quality Program Manual (QPM) meet the requirements of this Criteria. Instructions for engineering reviews to assure compliance with inservice inspection, repair, or maintenance requirements were not available at this time.

b. Implementation

Consistent with the status of design effort accomplished, the civil engineering discipline was selected for inspection of this and other assigned criteria. The Nuclear, Electrical and Mechanical disciplines were also inspected for selected implementation of criteria requirements. The containment liner and post tension specifications, presently in the procurement bid phase, were utilized to verify the implementation of the quality process within the civil engineering discipline. All project design drawings were stated to be in the development phase and not subject to reviews. Drawings included in the specifications out for procurement were noted as not reviewed on the drawing itself, but were stated to be reviewed as part of the specification review. Additional findings are as follows:

(1) The specifications released to SCE have been reviewed by the civil engineering and quality assurance organizations. Records existed to verify these reviews.

The specification reviews performed by engineering did not fulfill all the quality review items specified in the QPM. Approximately 10% were omitted. Actual

review records for drawings and specifications were not established.

Instructions pertaining to the quality review of specifications by the QA engineer were not available for inspection.

(2) The process for reviews, performed by the engineering discipline supervisors and specialists, appears to meet the technical and management review requirements of this criterion.

(3) The Vernon Division QAP, procedure 20.8, item 3.1.1. requires a code and standard list to be established. This requirement is to be part of the Project Design Manual referenced in the PSAR (also referred to as the Design Criteria Manual). The code list was inspected in the civil engineering group. The following summary findings are presented:

(a) This document was stated to be in the final phase of review and approval.

(b) The codes and standards incorporated were listed but were not related to the individual safety related system or structure in the PSAR. They did appear to be a summary of all PSAR requirements for civil engineering except, it was noted that ACI 301, a requirement of the PSAR, was not listed as a reference.

(c) Even though all of the codes and standards designated for the containment liner and tendon specifications may have been included in the Preliminary Design Criteria Manual, it was not apparent that it would be useful to the engineer when verifying that correct codes have been designated in the specifications. The PSAR was used for this purpose.

(d) The Project Engineer stated the Project Design Manual was not a requirement for the preliminary engineering phase, but was required as part of the E-C contract, presently in the final stages of negotiations.

(4) Calculation books existed in all engineering disciplines. The calculations sampled in Electrical, Mechanical, and Nuclear disciplines were noted to have been reviewed. None of the calculations in the Civil-Structural group, which were stated to be preliminary, were documented as reviewed or approved. This included the calculations that were developed to establish the initial technical requirements of the containment tendon specification presently in the procurement bid phase.

(5) The Bechtel QA program does not define "when", in the design process, calculations and drawings are to be reviewed, except it does state they are reviewed and approved prior to their release for construction.

(6) For those SCE Class I or Class II procurement documents out for bid or pending award, the Bechtel QPM did not have any procedures or instructions that would assure that the "quality loop" would be closed if changes were required to preliminary calculations when these reviews were finally performed.

It was noted that the QAP did require the vendors to submit engineering documents subject to the technical requirements of the original specifications for Bechtel engineering review.

## D. Criterion IV - Procurement Document Control

### 1. General

Bechtel's activities with regard to procurement documents for San Onofre were found to be minimal at this time. Therefore Procurement activities and policies with regard to the Rancho Seco Nuclear Power Plant for the Sacramento Municipal Utility District were reviewed. Included in the review was the procurement document for the pipe fabrication contract.

### 2. Discussion

The procurement document procedures have been specified in the Quality Program Manual by Policy No. 1.0 Procedure IV. The technical aspects of procurement documents are prepared by the project engineering group in accordance with written procedures.

Requirements necessary to obtain adequate quality of the finished product are developed for inclusion in the procurement package during the preparation of the drawings and specifications. The procurement package is reviewed by QA prior to issue to verify that quality requirements are properly identified.

The request for proposal submitted to prospective suppliers and subcontractors for procurement of critical items includes a requirement for submittal of a written quality program plan with the bid proposal. A section is included in the engineering specifications that identifies the quality program requirement to which a bidder must be responsive and include in the plan he submits.

Quality plans are reviewed in conjunction with the bid evaluation by the project engineering team to determine adequacy of the plan submitted to meet the quality requirements stipulated in the specifications or request for proposal. Established procedures included in the Bechtel Quality Program Manual are followed in evaluating the plan submitted to verify that the plan meets the requirements of the specifications. The adequacy of the quality program plan submitted by the bidder is taken into consideration when making an award.

After an award has been made, the bidder's Quality Program Plan is continuously monitored to verify compliance with quality requirements. Where necessary, evaluations of procurement sources are conducted to ascertain quality compliance, and notices are given the supplier or subcontractor when corrective action is required.

3. Findings

a. The review of Bechtel's procurement activities for Rancho Seco disclosed that they were following the stated policies.

b. Bechtel's program for Procurement Document Control appears to be consistent with Criterion IV.

E. Criterion V, Instructions, Procedures, and Drawings

1. Discussion

Bechtel's commitments for this project are identified in Attachment 1 and 2 of the QAPP. To implement the present contractual commitments, the Project Engineer has issued a Project Quality Program Manual (PQPM) for San Onofre Units 2 and 3, dated February 22, 1971, which contains the following

six applicable sections: (1) Organization; (2) Design Review; (3) Configuration Control; (4) Quality Classifications (Q-List); (17) Corrective Action; (19) System Auditing.

The instructions of the other Bechtel manuals referenced in the PSAR or those available to the project design group would support the use of the PQPM.

The Bechtel Manuals that are applicable to this project are listed in the PSAR, Attachment 2. Those that are considered applicable based on their definitions in the PSAR and present project status are: (1) Project Design Manual; (2) Project Reference Manual; and (3) Quality Program Manual.

2. Findings

The Project Design Manual (also referred to as Design Criteria Manual) has not been issued. It is stated to be in the final stages of review. Aside from this, the program and its implementation for instructions, procedures and drawings appears to be consistent with the requirements of Criterion V for the current status of the project at this time.

F. Criterion VI - Document Control

1. Discussion

The Bechtel San Onofre Units 2 and 3 project group will utilize a central files area that controls the filing and release of final engineering documents. A Project Administrator who will be reporting to the Assistant Project Engineer (a group of four people) will assist in developing document Controls for this project. The instructions of the San Onofre Project Quality Program Manual dated February 22, 1971, had just been issued to the group.

2. Findings

a. Program

Controls for drawings and specifications are presented in procedures 21.1 and 21.2, and calculations are developed and controlled in accordance with procedure 20.5. These procedures are contained in the Bechtel, Vernon Division, QAP. Control of changes of the initial engineering document are presented under procedure No. 4, Configuration Control of the QPM.

b. Implementation

(1) Specific instructions for the control of engineering documents for this project have not been issued to Central Files at this time. However, in determining how documents are presently controlled, it was noted that the Supervisor of Drawing Control had implemented an effective temporary system. Provisions did exist on the temporary control sheets for retrieval and subsequent conversion to the requirements of the final document control instructions.

(2) Engineering specifications were not safety class identified on the document itself. However, identification is made on an approval document.

(3) In general, individual calculations were not safety class identified. Three of the four engineering disciplines inspected had summary indexes for their calculations books. Two of these indexes did identify the safety class of the calculations.

(4) Calculations were to be retained by Bechtel, Vernon Division. To date no instructions had been issued by SCE to Bechtel for maintaining the availability of Class I or II calculations for the life of the nuclear plants.

G. Criterion VII - Control of Purchased Material, Equipment and Services

1. General

Bechtel's activities with regard to the control of purchased material, equipment and services for San Onofre were found to be minimal at this time. In accordance with the PSAR and a statement by the Project Engineer, Bechtel does not have any procurement responsibilities for this project at this time. Therefore, these activities and associated governing policies that are being followed for the Rancho Seco Nuclear Power Plant (SMUD) were reviewed. Included in the review were the Procurement Department Inspection Manual, Circulating Water Pipe Specifications, Miscellaneous Demineralizer Specifications, Source Inspection Data Reports, Source Inspection Plans and a Procurement Document.

2. Discussion

A Qualified Source List (QSL) of suppliers, fabricators, and subcontractors is maintained by the Procurement Department.

The QSL comprises sources prominent in the industry, who have previously demonstrated their ability to perform in compliance with design requirements by providing quality material, equipment, or services on schedule.

When currently listed sources expand their operations to provide new materials, equipment, or services, suitable surveys of technical, quality, and financial responsibilities are made to re-evaluate their capabilities. Such sources are subject to the same intensive survey that applies to new sources.

Companies not on the QSL are subject to close examination by survey before they are added to the QSL. Surveys are conducted at the company's facility to ascertain its ability to comply with Bechtel standards. Depending on the scope and magnitude of the materials or item, the survey may consist of an inspector, or a survey team comprising representatives from Procurement, Quality Assurance, Project Engineering and Construction. The survey team reviews the company's quality program procedures to ascertain that they are adequate to provide the quality product desired.

Surveillance and audit of the in-process functions are made to verify the effectiveness of supplier quality controls. Adequacy of documentation, sufficient supervision, and effectiveness of performance are surveyed for adherence to requirements in the procurement package.

Copies of documents required from the source to verify and record quality actions, which may include material certifications, process sheets, special process reports, radiographs, performance curves, test reports, nameplate date, or other required documentation, are obtained and forwarded to the responsible parties for review and approval. Performance of the source is measured and becomes part of QSL supporting data. Approved source quality documentation is maintained by the Quality Assurance Group in the Documentation Control Center Files.

3. Findings

Bechtel has established and implemented plans for the control of purchased material, equipment and services that appear to be consistent with Criterion VII.

## H. Criterion XVI - Corrective Action

### 1. Discussion

Procedure No. 17 in the Project Quality Program Manual defines the system for identifying, reporting, initiating corrective action, approving actions taken, and controlling procedural deficiencies to assure that conditions adverse to quality are promptly identified and corrected.

Quality Deficiency Reports are prepared upon the discovery of a deficiency in the implementation of the QA program. The individual or group to which a deficiency report is directed reviews the stated deficiency, takes appropriate action, and prepares a Quality Deficiency Reply identifying the corrective action taken. The completed and approved reply is forwarded to QA for review and acceptance. Corrective actions are audited by a QA engineer to verify implementation and effectiveness of solution or corrective action.

A Quality Deficiency Report Log is maintained by QA to identify the status of identified deficiencies. Copies of the log are transmitted monthly to the Project Engineer, Project Superintendent, Supervisor of Inspection and the Chief QA Engineer.

### 2. Findings

The QA program for corrective action for design engineering appears to be consistent with Criterion XVI.

## I. Criterion XVII - Quality Assurance Records

### 1. Discussion

The procedures for the Documentation Control Center have not yet been included in the Project Quality Program Manual. However, a Documentation Control Center has been established by the QA Engineer in conformance with Bechtel's Quality Program Manual. The QPM requires the filing and controlling of records that provide documentary evidence of the quality status of aspects of the project from inception until turnover to the client. Documentation is reviewed by QA for completeness of content prior to filing in the Documentation Control Center. QA ascertains that all nonconformances with respect to procedures, drawings, specifications, and other related project data are documented. A QA File Index has been established to assure that records have been identified and are retrievable.

2. Findings

a. The Project Quality Program Manual has not included requirements for the control of quality documents as required by Criterion XVII.

b. A Documentation Control Center has been established in accordance with Bechtel's Quality Program Manual.

c. Drawing specifications were not being maintained in the Control Center but rather QA has required Engineering to maintain files of these documents.

J. Criterion XVIII - Audits

1. Discussions

Procedure No. 19 establishes a system for auditing the project quality program at Vernon. The audits are performed by QA Engineers who are independent of the organization being audited. The audit findings are coordinated with project personnel and responsible management to identify acceptable operations, report deficiencies, recommend improvements and obtain appropriate corrective action taken. Follow-up audits are performed to determine adequacy and effectiveness of the corrective action taken. Records pertaining to audits are maintained in the Documentation Control Center. The audits are performed in accordance with an approved plan on a periodic schedule.

2. Findings

a. A full-time QA Engineer has been assigned to audit the design engineering group for San Onofre. He has made two quarterly audits of all of engineering disciplines. Deficiency reports have been prepared and responded to in accordance with the corrective action procedure. Follow-up audits have been performed to verify corrective action.

b. The audit program for Bechtel's design engineering effort for San Onofre appears to be consistent with Criterion XVIII.

## V. The Generic Inspection of Bechtel for Drawing and Specification Change Control (Selection of SMUD Documents)

### A. Criteria III, V, and VI

#### 1. General Discussion

The Bechtel program for Construction, Drawing Specification Changes, Section 11.0 of the SMUD Project Reference Manual (PRM) was selected for inspection.

The system for controlling a design drawing change originating from the engineering office, Drawing Change Notice (DCN), was inspected by reviewing the Drawing Control files for the process used to note and record changes to drawings. DCN No. 4 affecting Drawing C-548 was selected. The drawing inspection showed that DCN-4 was incorporated on DWG-C-548-Rev. 8 as a Rev. 7 change.

To sample the control over changes originating from the field, the Configuration Change Document (CCD) Files were searched for field originated changes involving a Class I component or system. A CCD was selected for review that involved a change to reduce the horizontal main bus current ratings of a group of Motor Control Centers. The engineering activities of the group responsible for approving the change were inspected. This included the specification master drawing and computer record associated with one of the panels being changed. Also, the engineering QA files were inspected for the adequate filing of this change notice. The following documents were reviewed in the process of this inspection of CCD No. 53-E6, dated 5/4/70:

a. DWG. E-105-SH 8

b. DWG. E-105-SH 9

c. Computer Load Study for MCC-2A-1 dated 8/1/70

d. General Electric Vendor Drawing for MCC-52A-1 (Motor Control Center) dated 2/10/71

e. Specification E.7.2

f. QA Files for Specification E.7.2

g. Contract Change No. 1, dated 7/2/70

h. SMUD Project Reference Manual

The documents from the field are processed in the following order: (1) QA Engineer for Design; (2) Quality Control Clerk; (3) Engineering discipline concerned, for review and appropriate action and Drawing Change Notice issuance if required. The Project Engineer also reviews all CCD's.

2. Findings

a. The program satisfies the requirements of Criteria III, V and VI for change document control of CCD's and DCN's.

b. Implementation

The preparation, review, control, and engineering evaluation of the change document reviewed met the criteria requirements. The ability to evaluate following changes against the effect of previous changes also existed even though it involved the review of many documents rather than one "as built" drawing and/or master specification.

APPENDIX "A"
SCE DOCUMENTS

The following tabulation lists the significant documents utilized by the inspectors for the evaluation of SCE's QA program.

| Document | Applicable Criterion |
|---|---|
| Quality Assurance Manual | All |
| QA Audit Log | 2, 18 |
| Audit of Bechtel | 18 |
| Audit of Combustion Engineering | 18 |
| Audits of SCE Engineering (3) | 5, 18 |
| PSAR as Amended (QA Program Plan - QAPP) | All |
| Material Control Schedule | 2 |
| Design Review Guide | 2 |
| Internal Procedure 900 | 9, 10 |
| Construction Engineering Organization Resumes | 9-13 |
| Containment Liner Bid Specifications | 3-12 |
| Audits of Bidders (Containment Liner) | 9-13 |
| Receiving Inspection and Surveillance Procedure | 10-13 |
| Specification Control Log | 17 |
| Design Verification (Post Tension System) | 17 |
| Master Index | 17 |
| Engineering Reviews (4) | 17 |
| Quality Assurance Reviews (3) | 3-6, 17 |
| Reactor Vessel Specifications | 17 |
| Containment Post Tensioning System Specification | 3-8 |
| Specification SO23-407-1 (Stainless Steel Valves) | 3, 4 |

APPENDIX "A" (cont.)

| Document | Applicable Criterion |
|---|---|
| Design Review of Salt Water Cooling Pumps | 3-5 |
| Procurement Assignments | 6, 7 |
| Functional Responsibility Summary for Purchasing Major Projects | 5-7 |
| Procurement Request for Engineering Review | 5-7 |
| Procurement Request for QA Review | 5-7 |
| Procurement Request for Review of Vendor Prequalification | 5-7 |
| Procurement Policies and Procedures | 7 |
| Items Designated to Be Purchased by Bechtel | 5-7 |
| Bechtel Preliminary Engineering Assignment | 2, 5 |
| Post-Tensioning System Bid Specification Evaluation | 4, 5, 7 |
| Off Shore Circulating Water System Specifications | 5, 6 |
| Standard Code ACI-318 | 3, 4 |
| Project File Index | 6 |
| Folder in Project File No. A.3.01.18 | 5, 6, 17 |
| Codes Contained in SCE Library | 3, 4, 6 |

APPENDIX "B"
BECHTEL DOCUMENTS

The following tabulation lists the significant documents utilized by the inspectors for the evaluation of the Bechtel, Vernon Division, QA program as it applies to Criteria 1-8 and 16-18.

| Document | Applicable Criterion |
|---|---|
| Project Quality Program Manual | A11 |
| Quality Program Manual | A11 |
| Quality Deficiency Report Log | 2, 6, 16, 18 |
| QA Documentation Distribution | 4, 17 |
| QA File Index | 17 |
| QA Audit Checklists (Audits) | 18 |
| QA Standards Manual | 1 |
| Material Control Schedule | 2 |
| Quality Deficiency Reports | 16, 18 |
| Quality Deficiency Reply Reports | 16, 18 |
| Rancho Seco Program QA Manual | 3-8 |
| Procurement Department Purchasing Manual | 4, 6 |
| Procurement Department Inspection Manual | 4, 6 |
| Project Engineers Manual | 3 |
| Computer Structural Analysis Program (11 test cases) | 3 |
| Calculations for Containment Tendon Specifications | 3 |
| Engineering Group Supervisors Manual | 3 |
| Design Criteria Manual | 3, 5 |
| Drawing Control File Index Book | 6 |
| Civil Structural Standard Procedures Manual | 3 |
| Engineering Department Procedures Manual | 3 |