

## QUALITY ASSURANCE PROGRAM

## INDEPENDENT DESIGN REVIEW OF CLINTON POWER STATION, UNIT 1

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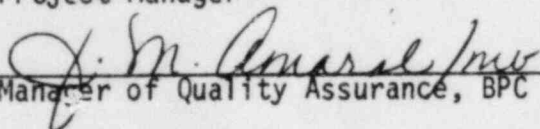
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Approved by

  
 Project Manager

Date

7/19/84

  
 Manager of Quality Assurance, BPC

Date

7/19/84

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## INDEPENDENT DESIGN REVIEW OF THE CLINTON POWER STATION, UNIT 1

## QUALITY ASSURANCE PROGRAM PLAN

1.0 INTRODUCTION1.1 Scope

This plan establishes the quality assurance program requirements for work performed by Bechtel on the independent design review of the Clinton Power Station, Unit 1. This plan provides controls for quality related activities commensurate with the scope of Bechtel services, defined in the contract documents.

1.2. Quality Program

The quality assurance program meets the applicable requirements of 10 CFR, Part 50, Appendix B, as described in the NRC approved Bechtel Topical Report, BQ-TOP-1, "Bechtel Quality Assurance Program for Nuclear Power Plants," Revision 3A. This program plan describes provisions for compliance with the applicable criteria of 10 CFR, Part 50, Appendix B. These criteria are organization, design control, document control, and audits.

Bechtel personnel participating in the quality program are provided with indoctrination and training covering the general quality assurance program and specific project procedures applicable to their work. Quality assurance auditors are qualified to

ANSI N45.2.23. Records are maintained showing completion of indoctrination, training and qualification. The indoctrination, training, and qualifications are conducted in accordance with written procedures.

### 1.3 Program Documents

In addition to this program plan, procedures for implementing this plan are listed in the Quality Program Document List. Procedures are prepared and controlled by the cognizant department which issues the procedure. The program plan and procedures, when approved and issued, are controlled documents subject to the controls of the Document Control section of this plan.

## 2.0 ORGANIZATION

The organization chart of the Clinton Review Team is depicted in the Program Plan, Independent Design Review of Clinton Power Station, Unit 1 (IDR).

### 2.1 Review Team Management

The Project Manager is the leader of the design review team and is responsible for the overall execution of the review activities, including the direction, coordination, and communication necessary to reflect client requirements, Bechtel policies, and implementing procedures. The Project Manager reports to the Programs Manager, BPC. The Project Manager provides direction to the design review

team which includes personnel from engineering disciplines to accomplish the independent design review tasks. The Project Quality Assurance Engineer is also a member of the design review team, but his relationship with the Project Manager is one of coordination.

## 2.2 Engineering Personnel

The organization and responsibilities of the engineering personnel in the design review team are described in the IDRP.

## 2.3 Quality Assurance Personnel

The quality assurance program defined in this program plan is directed and controlled by the Project Quality Assurance Engineer (PQAE). The PQAE reports to the BPC Manager of Quality Assurance, who is responsible for approval of the quality assurance program plan for this design review effort. The functions of the PQAE include:

- 1) Coordinate the establishment of the project quality assurance program.
- 2) Monitor and/or perform audits to determine conformance of quality related activities to the quality assurance program.
- 3) Review and approve quality related procedures for quality assurance program compliance.
- 4) Prepare written action requests as necessary to obtain remedial action on deficiencies noted during QA monitoring activities.
- 5) Maintain a QA activity log.

### 3.0 DESIGN CONTROL

#### 3.1 General

The design review shall be controlled by the requirements of this program plan. The activities shall be performed in accordance with approved plans and/or procedures, which include the necessary control elements for the use of the design review organization. The contents of the plans/procedures shall clearly state the requirements, describe the practices and identify the personnel responsible for taking action. The plans/procedures shall meet the requirements of ANSI N45.2.11 for the applicable design control, interface, and review activities. Preparation and issuance of the plans/procedures shall precede the start of the related design review activity. The plans/procedures shall be approved by the Project Manager and reviewed by the PQAE for compliance with quality program requirements prior to issuance.

#### 3.2 Requirements

The following activities shall be described in design review plans and/or procedures:

- 1) Preparation and control of design review plans and/or procedures.
- 2) Determination of system design compliance with FSAR requirements.
- 3) Evaluation for the adequacy of the system design.



- 4) Evaluation for the adequacy of the system design process, including the use of engineering judgements and assumptions, and standard design methods.
- 5) Evaluation for the adequacy of the documentation of design calculations.
- 6) Review for design interface compliance within the system design.
- 7) Review for proper safety classification of systems, structures and components per 10CFR50.
- 8) Evaluate for adequacy of the design change control process, including FCRs, NCRs and ECNs.
- 9) Assess the effectiveness of the design review performed by the originator of the system design and the review process used.
- 10) Identify potential safety concerns in the system design and notify IP of these concerns.
- 11) Conduct of field as-built walkdown.

#### 4.0 DOCUMENT CONTROL

##### 4.1 General

Each organization is responsible for the preparation and control of the manuals, plans, procedures, and policies which identify the methods and practices used in the implementation of the quality assurance program. Table 4.0-1 lists the manuals, plans or procedure sets of the quality assurance program documents and defines the originator, review and approval authority for these documents. Changes to these documents shall require the same review and approval as the original document. These documents shall be approved by quality assurance prior to issuance.

Preliminary and final reports of the design review activities shall be prepared by the design review team. The reports shall be approved by the Project Manager prior to issuance to IP.

#### 4.2 Document Control

Each organization that prepares manuals, plans, procedures, and policies to implement the quality assurance program shall provide measures for controlling the following elements:

- 1) Preparing, approving, issuing, and revising these documents.
- 2) Identifying the controls of the procedure sets or manual (e.g., Table of Contents).
- 3) Controlling distribution of documents to cognizant organization/personnel who perform the prescribed activity.
- 4) Establishing effectivity (e.g., dates) of manuals and procedures including revisions thereto.

#### 4.3 Document Turnover

A plan for the turnover of program documents shall be established by the Project Manager. The turnover of documents may be done progressively upon issuance of the document or at the time of completion of the design review effort. The turnover plan shall be concurred with by IP.

Bechtel retention of these documents shall be determined by the Project Manager.

TABLE 4.0-1

## QUALITY ASSURANCE PROGRAM DOCUMENTS

<u>Document</u>	<u>Originating Authority</u>	<u>Review for QA Program Compliance</u>	<u>Authorizing Approval</u>	<u>Contents</u>
Quality Assurance Program Plan	PQAE	Manager of QB-BPC	Project Manager(1)	Quality Assurance program policies
Engineering Procedures	Designated Individual	PQAE	Project Manager	Responsibilities and practices for engineering activities
Project Quality Assurance Procedures	PQAE	PQAE	QA Manager	Procedures for conducting Project QA activities (2)
Independent Design Review Plan - Clinton Station, Unit 1	Designated individual	PQAE	Project Manager	Responsibilities and practices for design review activities

(1) Authorizes application on project

(2) PQAE activities, per Section 5.0



## 5.0 AUDITS

### 5.1 General

The audit program includes both quality assurance monitoring of design review activities and formal quality assurance audits, as appropriate. Quality assurance audits and monitoring activities are planned, scheduled, performed, reported, and closed under the cognizance of the Project Quality Assurance Engineer (PQAE). Monitoring activities are not intended to be as wide in scope as QA audits, but will be in-depth for the particular area monitored. The PQAE is independent from the activities it is responsible for auditing and monitoring; is provided access to appropriate levels of management; and is provided access to documents and personnel necessary for the planning and performance of audits and monitoring activities. The PQAE has the discretion to perform either monitoring or auditing activities to verify effective implementation of the quality assurance program.

### 5.2 Audit Requirements

Quality assurance audit activities shall be performed in accordance with the following procedures:

- 1) Audit personnel qualification per QADP B-8
- 2) Perform quality assurance audit per QDAP C-5.

### 5.3 Monitoring Requirements

Quality assurance monitoring activities shall be performed in accordance with the following procedures:

- 1) Perform quality assurance monitoring per QADP C-1.
- 2) Documenting monitoring activities per QADP C-3.
- 3) Requesting action per QAP B-10.

APPENDIX C

SUMMARY OF  
BECHTEL QUALIFICATIONS  
FOR  
INDEPENDENT DESIGN REVIEWS

SUMMARY OF  
BECHTEL QUALIFICATIONS  
FOR  
INDEPENDENT DESIGN REVIEWS

This summarizes Bechtel's experience and qualifications in the nuclear power industry, in general, and in engineering design reviews, in particular.

Bechtel has been involved in the nuclear power industry since its inception. This permits bringing significant experience to bear on the Clinton Independent Design Review, related to the engineering, construction, costing/scheduling and startup of nuclear power plants. The experience also includes design-reviews, federal and local licensing assistance, industry standards, quality assurance and quality control, and project management. Bechtel will soon reach the milestone of significant involvement in the development of 200,000 MWe of generating capacity for nuclear and fossil-fired units. The nuclear plant involvement includes 112 units representing over 90,000 MWe. There are currently 29 nuclear units under design and/or construction by Bechtel.

The design review experience covers detailed engineering design, design process evaluations, quality assurance and FSAR licensing commitments. These reviews have covered systems, components, and structures and have ranged from detailed in-depth technical reviews to partial system reviews. Bechtel's experience with the review process, both as the reviewer and the reviewee, will provide a perspective which will be of particular benefit to the

Clinton Independent Design Review effort. In addition, Bechtel has been similarly involved in reviews of construction quality which further adds to its ability to assess adequacy of design.

The accompanying Tables C1 and C2 contain a summary of Bechtel involvement in independent design reviews.



Table C1  
INDEPENDENT DESIGN REVIEWS  
PERFORMED ON BECHTEL PROJECTS BY OTHERS

<u>PROJECT</u>	<u>DATE</u>	<u>REVIEWER</u>	<u>TYPE/COMMENTS</u>
Susquehanna	1982	Teledyne Engineering Services (TES)	Feedwater system (vertical review)
Diablo Canyon	1982 and 1983	TES - Review Manager Stone & Webster R.L. Cloud Assoc. R.F. Reedy	Systems review - 3 systems (vertical) Seismic review - all aspects QA review - design process
San Onofre	1981	Torrey Pines	Review of selected critical systems and components
Midland	1983 - Present	TERA	Three systems (vertical)
Callaway (SNUPPS)	1982	NRC	Integrated design investigation (IDI) of aux. feedwater system
South Texas	1983 - Present	Stone & Webster	Ongoing design review (assessment) of selected systems and components
Grand Gulf	1982	Cygn	General FSAR review
Palo Verde	1982	Torrey Pines	QA review of design process
Maanshan (Taiwan)	1982	NUS Corp.	General licensing review (PSAR/FSAR)

Table C2  
INDEPENDENT DESIGN REVIEWS  
PERFORMED BY BECHTEL

<u>PROJECT</u>	<u>DATE</u>	<u>TYPE/COMMENTS</u>
Midland	1982	Design review of important systems and structures (horizontal and vertical, for selected areas)
Vogtle	1982	Design review of important systems and structures (horizontal and vertical, for selected areas)
South Texas	1983 - 1984	Design review of important systems and structures (horizontal and vertical, for selected areas)
Diablo Canyon	1982 - Present	Review of power plant seismic design and other safety-related features (both as reviewer and reviewee)
Zimmer	1983	Design completion and overall adequacy
Byron	1984	Design review of three key systems (vertical)

APPENDIX D

RESUMES

## RESUMES

Resumes for the principal personnel on the Review Team and the Internal Review Committees are indicated herein.

Listed below, in alphabetical order, are names of people covered by these resumes.

J. M. Amaral	Quality Assurance Management
A. M. Appleford	Structural Engineering
S. A. Bernsen	Project Manager, BPC
A. L. Cahn	Bechtel Power Management Consultant
R. S. Cahn	Licensing - Commitments
A. W. Davis	I & C Engineering
C. J. Dick	Programs Manager
D. G. Hardie	Quality Engineering
C. M. Hazari	Electrical System Engineer
W. R. Hintz	Stress Engineering
A. T. Jocson	Process Design
C. W. Jordan	Electrical Systems Group Leader
P. Karpa	Management Sponsor
R. J. Lodwick	Process Design
W. D. Lowe	Plant Design
D. L. Lubin	Technical Editor
A. S. Meyers	Piping Engineering
M. G. Michail	Structural Engineering
G. L. Parkinson	Project Manager
R. S. Powell	HPCS Systems Group Leader
K. G. Purcell	Administrator
R. P. Schmitz	Chief Nuclear Engineer, BPC
H. Shah	Pipe Support Design
B. S. Shicker	Structural Engineering
J. A. Shoulders	Process Design
L. S. Spensko	Quality Engineering
J. M. Strohm	Environmental Qualification
A. Valachovic, Jr.	Fire Protection
C. R. Whitehurst	Seismic Qualification
D. W. Wolfe	Quality Assurance Engineer
G. K. Young	Electrical Systems Engineering