

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

Prepared for
Illinois Power Company
Decatur, Illinois

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CLINTON POWER STATION
INDEPENDENT DESIGN REVIEW
REVIEW PLANS

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* System designations indicate which systems are covered by these review plans and are as follows:

HPCS = High Pressure Core Spray System

Class 1E ac = Class 1E ac Electrical Distribution System

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Check List

HIGH PRESSURE CORE SPRAY

Mechanical System

1. FSAR and Related Documents (Section 6.3 and related sections)

- a) Establish and tabulate FSAR design commitments
- b) Review applicable sections, as applicable, of Fire Protection Report, Environmental Report, HELB/MELB Submittal, SER, etc. for additional commitments
- c) Review responses to applicable NRC questions. Tabulate additional commitments
- d) Review Technical Specifications
- e) Review applicable documents to verify commitment compliance and acceptability based on engineering judgement and/or applicable requirements
 - 1) Design criteria
 - 2) P&IDs
 - 3) Equipment specifications
 - 4) General arrangement drawings
 - 5) Loop/logic diagrams and/or electrical schemes
 - 6) Calculations
 - 7) Indices (instrument, valve, etc.), equipment list, line list, etc.

2. Calculations

- a) Verify design bases
- b) Verify reasonableness of assumptions
- c) Verify reasonableness of calculational method/approach
- d) Verify calculational inputs and sources are properly identified
- e) If a computer program was used, is it identified, verified and approved?
- f) Does the calculation have adequate results?
- g) Review against commitments and design output

3. P&ID

- a) Is system design consistent with FSAR?
- b) Is equipment identified and consistent with equipment list?
- c) Are loop/logic diagrams provided for appropriate components?
- d) Are safety/seismic class breaks properly identified?
- e) Check for outstanding drawing change notices

4. Specifications - Review for Commitment Compliance and General Adequacy

- a) Design bases identified and consistent with commitments?
- b) Service conditions specified and consistent with commitments?
- c) Codes and standards specified consistent with commitments and prudent for the component?
- d) Seismic/environmental qualification specified? (check with EQ for adequacy)
- e) Documentation requirement

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Check List

HIGH PRESSURE CORE SPRAY (Cont)

Mechanical System (Cont)

5. Design Criteria (review as a step in the design process)
 - a) Functional requirement for system
 - b) Design requirements
 - c) System component requirements
 - d) Other requirements and interfaces
 - e) References
6. Piping/Equipment Arrangement Drawings
 - a) Review for general understanding
 - b) Review for implementation of specific P&ID requirements
 - c) Review for separation
 - d) Review for fire protection/HELB/flooding/heavy load drop considerations
7. Logic/Loop Diagrams and Electrical Schemes
 - a) Review for general understanding and compliance with commitments
 - b) Check interlocks
 - c) Check any special requirements
8. HELB/MELB Review
 - a) Review FSAR for HELB/MELB commitments
 - b) Review analysis for adequacy of approach and calculational correctness (sample basis)
 - c) Review HELB/MELB analysis for impact on HPCS system operability
 - d) Determine if results are acceptable based on commitments and analysis
9. Fire Protection Analysis
 - a) Review FSAR for fire protection analysis commitments
 - b) Review analysis for adequacy of approach and correctness (sample basis)
 - c) Review fire protection analysis for impact on HPCS system operability
 - d) Determine if results are acceptable based on commitments and analysis
10. Seismic II/I Analysis
 - a) Review FSAR for seismic II/I analysis commitments
 - b) Review analysis for adequacy of approach and correctness (sample basis)
 - c) Review seismic II/I analysis for impact on HPCS system operability
 - d) Determine if results are acceptable based on commitments and analysis
11. Design Interface
 - a) Determine interface control procedures between S&L and other organizations with cognizance over HPCS design
 - b) Verify adequacy of commitments made relative to interface control
 - c) Review process for adequacy (sampling basis as appropriate)

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Check List

HIGH PRESSURE CORE SPRAY (Cont)

Plant Design

1. Criteria Compliance

- a) Compliance with applicable codes and standards
- b) Compliance with applicable NRC reg. guides, IE bulletins
- c) Compliance with FSAR commitments
- d) Outstanding, unresolved and/or unincorporated NRC concerns (IDI and correspondence)

2. Mechanical Design - Pipe Layout

- a) Does pipe layout meet design requirements?
- b) Does pipe/equip. match P&IDs?

3. HELB/MELB - Pipe Layout (inside containment)

- a) Identify and locate high/moderate energy systems
- b) Review and evaluate:
 - 1) HELB/MELB effects on HPCS system
 - 2) HELB/MELB effects on Class 1E ac power system
 - 3) HELB/MELB effects on safety related systems
- c) Verification of HELB design approach for jet impingement effects on safe shut down equipment

4. HELB/MELB - Pipe Layout (outside containment)

- a) Identify and locate high/moderate energy systems
- b) Review and evaluate:
 - 1) HELB/MELB effects on HPCS system
 - 2) HELB/MELB effects on Class 1E ac power system
 - 3) HELB/MELB effects on safety related systems
- c) Identify pipe exceeding moderate energy stress limits
- d) Locate potential through wall leakage points
- e) Identify rooms affected by pipe leaks (flooding)
- f) Check rooms for safety-related equipment

5. Jet Impingement

- a) Identify/locate jet impingement effects on:
 - 1) HPCS system
 - 2) Safety related systems
 - 3) Class 1E ac power systems
- b) Damage assessment report

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Check List

HIGH PRESSURE CORE SPRAY (Cont)

Plant Design (Cont)

6. General

- a) Have current revisions of drawing been addressed/incorporated?
- b) Have all FCRs/ECNs been incorporated?
- c) Have as-built verifications been done?

Check List

HIGH PRESSURE CORE SPRAY (Cont)

Piping Engineering

1. FSAR Commitments

- a) Safety category
- b) Quality class
- c) ASME B&PV Code Section III correlation
- d) 10CFR50 requirements

2. ASME B&PV Code Section III Design Specification (Piping)

- a) System design pressure & temperature
- b) Codes & standards
- c) Code classifications
- d) Materials, fabrication, testing requirements
- e) Cleaning
- f) Certification & stamping
- g) Overpressure protection

3. Piping Procurement Specifications

- a) Codes & standards
- b) Materials & NDE
- c) Fabrication & repairs
- d) Certification & stamping

4. ASME B&PV Code Section III Design Specification (Valves)

- a) Valve types
- b) Ratings
- c) Materials
- d) Operability & test requirements
- e) Inspection & stamping

5. Valve Procurement Specifications

- a) Construction details
- b) Codes & standards
- c) Materials
- d) Seismic & operability requirements
- e) Valve operators
- f) Inspection & stamping

6. Containment

- a) Containment penetrations
- b) Isolation valves

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Check List - -

HIGH PRESSURE CORE SPRAY (Cont)

Piping Engineering (Cont)

7. Documents reviewed

- a) Design specifications
- b) Calculations
- c) Drawings
- d) Reports
- e) NRC questions

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Check List

HIGH PRESSURE CORE SPRAY (Cont)

Stress Analysis

1. System Design Data

- a) Are all significant operating modes - pressures and temperatures, including hot RV-cold pipe, dynamic transients - considered in the analysis?
- b) Is there proper interface with Mechanical discipline for the use of correct system design data in the analysis?
- c) Is there proper interface for vendor information?
 - 1) Nozzle thermal movement for various operating modes
 - 2) Nozzle allowable loads under the various plant operating conditions
- d) Are data input sources properly identified?
- e) Are design data consistent with:
 - 1) P&IDs?
 - 2) Piping line list?
 - 3) Insulation specification?
 - 4) Valve data?
 - 5) Equipment data?
 - 6) Piping design specification?
 - 7) Piping drawings?
 - 8) Analyses of decoupled headers?

2. Piping Configuration

- a) Have the current revisions of drawings been properly incorporated/addressed?
- b) Have all the changes (FCRs/ECNs) been incorporated/addressed?
- c) Has the as-built piping verification been done?
- d) Is there a stress calculation for each piping configuration?

3. Computer Programs

- a) Have computer programs been verified?
- b) Are computer programs identified, including version?

4. Analysis

- a) Was analysis done by rigorous or simplified method?
- b) Is calculation method appropriate?
- c) Are assumptions reasonable?
- d) Have all the branch connections been modeled properly?
- e) Are all support locations and orientations identified and properly documented?

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Check List

HIGH PRESSURE CORE SPRAY (Cont)

Stress Analysis (Cont)

4. Analysis (Cont)

- f) Have the correct stress intensification factors been used?
- g) Are all required valve modeling calculations included?
- h) Are the latest seismic response spectra used for the analysis?
- i) Have the effects of building seismic anchor movement (SAM) on supports and anchors been considered?
- j) Is stiffness of pipe supports considered in the seismic analysis?
- k) Are the correct component/valve weights used?
- l) Have spatial system interaction - seismic II/I considerations been addressed?
- m) Has the proper seismic model been used?
 - 1) Mass point spacing
 - 2) Valve modeling
 - 3) Equipment modeling
 - 4) Coupled/decoupled analysis
- n) Have local stress checks been performed?
- o) Have flange evaluations been performed?
- p) Have pipe break locations based on stress levels been postulated correctly?
- q) Is the computer output included with the calculation?
- r) Does the stress summary cover all loading conditions?
- s) Has a summary of pipe support design loads and displacements been provided?
- t) Is calculation signoff and approval complete?

5. ASME Class 1 Piping Only

- a) Are the latest & complete operating transients (i.e., load histogram) for the lifetime of the plant included?
- b) Is the thermal transient analysis performed for the temperature gradients across the pipe/fitting wall?
- c) Is the film coefficient properly calculated?
- d) Are all the discontinuities with the proper indices considered?
- e) Have the special calculations for Class 1 components (i.e., lugs, thermowells, steady state temperature decay, etc.) been performed?
- f) Are all the stress allowables and usage factors met per code requirements?
- g) Have the Class 1 high energy breaks been postulated?

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Check List

HIGH PRESSURE CORE SPRAY (Cont)

Stress Analysis (Cont)

6. Criteria Compliance

- a) Is there compliance with applicable codes and standards?
- b) Is there compliance with applicable NRC reg. guides/IE bulletins?
 - 1) Are all regulatory and functional capability requirements incorporated or addressed?
 - 2) Have any exceptions been taken to the regulatory requirements and the rationale presented?
- c) Is there compliance with FSAR commitments?
- d) Are environmental parameters, seismic categories and safety classifications addressed?
- e) Are there any outstanding (unresolved and/or unincorporated) NRC concerns?
- f) Have the equipment vendor allowables been met?
- g) Are the valve accelerations acceptable?

Check List

HIGH PRESSURE CORE SPRAY (Cont)

Mechanical Pipe Support

1. Design Criteria and Specifications

Compliance with applicable FSAR commitments, NRC reg. guides, IE bulletins, industrial codes and standards

2. Design Adequacy

- a) Accuracy and application of project design criteria, codes, industrial standards and assumptions
- b) Completeness of design methods, mathematical models and design data
- c) Correctness of methods used to verify the design and documentation of the calculation
- d) Accuracy of implementation of field change requests and engineering change notices in the design
- e) Accuracy of as-built drawing with the latest corresponding design calculation

3. Design Process

- a) Project procedures controlling the design flow
- b) Design change control including field change requests (FCRs), non-conformance reports (NCRs), and engineering change notices (ECNs)
- c) Validated and certified computer programs

4. General - Quality Assurance

- a) Interface with other project participants
- b) Internal design assessments

Check List

HIGH PRESSURE CORE SPRAY and CLASS 1E AC DISTRIBUTION SYSTEMS

Civil/Structural

1. Establish System Boundaries
2. Identify FSAR Sections
3. Identify NRC Concerns (SER and Questions/Answers)
4. Determine Compliance with FSAR Requirements and Commitments
5. Check for the Following Items to Ensure that They are Properly Identified and Addressed:
 - a) Governing codes, standards, reg. guides, references and other criteria (IE bulletins)
 - b) Computer programs and their applicability including verification
 - c) Major design assumptions, environmental parameters
 - d) Major formulas and their sources
 - e) Engineering judgement and assumptions
 - f) Standard design methods
6. Review for Design Interface Compliance within the System Design
7. Review for Proper Safety Classification of Structures per 10CFR50 in FSAR Table 3.2
8. Check Criteria for Seismic Category I Structures/Components for Compatibility with Applicable SRP Requirements
9. Evaluate Adequacy of the Design Process as Follows:
 - a) Are loading combinations and allowables correctly identified?
 - b) Are live loads rational?
 - c) Is the design allowance for piping, HVAC and cable tray supports appropriate?
 - d) Are factors of safety properly identified and correct?
 - e) Is the design approach clearly outlined and suitable for the solution sought?
 - f) Is the design approach acceptable even if different from standard Bechtel practice?
10. Evaluate for Compliance with ASME Section III (Div. 1 & 2) Especially for NF Boundaries Identification
11. Check Compliance of Materials with FSAR Commitments
12. Evaluate Adequacy of the Calculation Documentation
13. Identify Observations of Potential Safety Concerns for Review by the Level-1 Internal Review Committee

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Check List

HIGH PRESSURE CORE SPRAY and CLASS 1E AC DISTRIBUTION SYSTEMS (Cont)

Electrical Layout

1. Criteria Compliance

- a) Compliance with applicable codes and standards
- b) Compliance with applicable NRC reg. guides/IE bulletins
 - 1) Are all regulatory and functional requirements incorporated or addressed?
 - 2) Any exceptions taken to the regulatory requirements and the rationale presented?
- c) Compliance with FSAR commitments
- d) Are environmental parameters, seismic categories and safety classifications addressed?
- e) Are there any outstanding (unresolved and/or unincorporated) NRC concerns?

2. Electrical Separation

- a) Are separation distances established for Clinton in compliance with the FSAR?
- b) Review design documents for separation requirements
- c) Review separation analysis and test results
- d) Review treatment of associated circuits
- e) Review locations of electrical equipment
- f) Review identification of cables, raceway and wiring in panels
- g) Perform walkdown to verify separation in selected areas and on selected equipment

3. Cable and Raceway Design

- a) Are cables properly derated?
- b) Review raceway fill and overfill justification
- c) Review electrical raceway design for proper consideration for seismic movement between walls and floors and between structures
- d) Review ductbank electrical design

4. Common Hazards

Review electrical portions of systems under review for:

- a) Seismic considerations including II/I concerns. Perform II/I walkdown, if necessary
- b) Proper considerations in regard to fire
- c) Analysis of HELB effects including pipe whip, jet impingement and environmental effects. Perform walkdown
- d) Proper considerations in regard to MELB effects

Check List

HIGH PRESSURE CORE SPRAY and CLASS 1E AC DISTRIBUTION SYSTEMS (Cont)

Electrical Layout (Cont)

5. General

- a) Review design process for adequacy for electrical separation, cable and raceway design and hazards
- b) Review design interface with GE and others
- c) Review design change control including performing as-built walkdown
- d) Review S&L design reviews

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Check List

HIGH PRESSURE CORE SPRAY

Electrical System

1. Design Requirements

- a) Determine effective amendment, revisions, dates, etc., for FSAR, NRC reg. guides, and industry codes and standards
- b) Review following references to identify and list safety-related design criteria, commitments and design requirements:
 - 1) FSAR
 - 2) FSAR questions and answers
 - 3) Safety Evaluation Reports (SERs)
 - 4) 10CFR50, General Design Criteria (GDC)
 - 5) NRC regulatory guides (RGs)
 - 6) NRC IE bulletins, notices, circulars, and generic letters
 - 7) NRC Standard Review Plan (SRP)
 - 8) Industry codes and standards
- c) Review exceptions (if any) taken to any of the safety-related requirements, and reasonableness of the rationale for the exceptions
- d) Review IP and S&L applicable procedures and design standards for specifying safety-related licensing commitments and design requirements by comparing design requirements to the inputs used by S&L in developing the following design and other documents. Request for and/or review justifications for apparent differences where design requirements are subject to interpretation
- e) Review the following design and other documents as appropriate to determine if design requirements are suitably reflected
 - 1) System design criteria and functional description
 - 2) Design calculations
 - 3) Construction drawings
 - 4) Procurement specifications
 - 5) Design changes
- f) Discuss differences with S&L key personnel to understand correctly the interpretations of the requirements
- g) Identify and process (potential) observations
- h) Review S&L responses to observations to write completion report
- i) Incorporate results in the report

2. Design Adequacy

- a) System redundancy
Review applicable design documents to ensure that redundancy is reflected with regard to electrical loads, safety action, and power supply and each load has access to both preferred and standby power supply

Check List

HIGH PRESSURE CORE SPRAY (Cont)

Electrical System (Cont)

- b) Independence
Review applicable design documents to ensure that circuits to redundant equipment are electrically independent of each other
- c) Single failure criterion
Review applicable design documents to ensure that the safety function of the system can be accomplished in the event of a single failure
- d) HPCS pump motor design
Review applicable design documents to ensure that the motor is capable of starting at the minimum available starting voltage and accelerating within required time period
- e) Voltage drop
Review design calculations for voltage drop to ensure minimum required voltage at
 - 1) closing and trip coils of 4.16 kV breakers
 - 2) contactor coils of 480 V starters
 - 3) terminals of dc and/or ac solenoid valves
 - 4) terminals of HPCS pump motor
- f) Thermal overload protection
Review applicable design documents to establish trip setpoint with all uncertainties resolved in favor of completing safety-related action for motor operated valves. Alternatively the thermal overload protection must be bypassed by safety signal
- g) Containment electrical penetration protection
Review applicable design documents for backup overcurrent protection for containment electrical penetrations for circuits going inside containment
- h) HPCS deisel generator
Use applicable portion of the Class 1E electrical system DG checklist
- i) Safety classification
Review applicable documents to determine if system components have been properly classified as to safety significance as defined in 10CFR50
- j) Discuss differences with S&L key personnel to understand correctly the interpretations of requirements
- k) Identify and process (potential) observations
 - 1) Review S&L responses to observations to write completion reports
- m) Incorporate results in the report

Check List

HIGH PRESSURE CORE SPRAY (Cont)

Electrical System (Cont)

Note: Design and other documents:

- System design criteria and functional description
- Design calculations
- Design construction drawings
 - single line diagrams
 - logic diagrams
 - schematic diagrams
- Procurement specifications
- Design changes

Review for the latest revision of above documents; consider in-process work where appropriate

3. Design Process

- a) Commitment compliance
Review for consistency of design criteria, drawings, calculations and procurement specifications with design requirements established under Task-1
- b) Design consistency
Review for consistency amongst the various design documents such as design criteria, single line, logic and schematic diagrams, design calculations, procurement specifications, etc.
- c) Design calculations
Review for the following:
 - 1) Verification and identification of computer programs used for calculations
 - 2) Validity and/or verification with actual design information of the assumptions made
 - 3 Reasonableness of the engineering judgements used
 - 4) Adequacy of documentation of calculations
 - 5) Adequacy of S&L internal review of assumptions and input data
- d) Design interfaces
Review for interfaces with
 - other disciplines
 - GE
 - IP
- e) Design change
Review FCRs, ECNs and NCRs for proper review, approval and incorporation
Review for outstanding FCRs and ECNs
- f) System Review
Review S&L internal design review reports at the system level
- g) Identify and process (potential) observations
- h) Review S&L responses to observations to write completion reports
- i) Incorporate results in the report

Check List

CLASS 1E AC DISTRIBUTION SYSTEM

Electrical System

1. Design Requirements

- a) Determine effective amendment, revisions, dates, etc., for FSAR, NRC reg. guides, and industry codes and standards
- b) Review following references to identify and list safety-related design criteria, commitments and design requirements:
 - 1) FSAR
 - 2) FSAR questions and answers
 - 3) Safety Evaluation Reports (SERs)
 - 4) 10CFR50, General Design Criteria (GDC)
 - 5) NRC reg. guides (RGs)
 - 6) NRC IE bulletins, notices, circulars, and generic letters
 - 7) NRC Standard Review Plan (SRP)
 - 8) Industry codes and standards
- c) Review exceptions (if any) taken to any of the safety-related requirements, and reasonableness of the rationale for the exceptions
- d) Review IP and S&L applicable procedures and design standards for specifying safety-related licensing commitments and design requirements by comparing design requirements to the inputs used by S&L in developing the following design and other documents. Request for and/or review justifications for apparent differences where design requirements are subject to interpretation
- e) Review the following design and other documents as appropriate to determine if design requirements are suitably reflected
 - 1) System design criteria and functional description
 - 2) Design calculations
 - 3) Construction drawings
 - 4) Procurement specifications
 - 5) Design changes
- f) Discuss differences with S&L key personnel to understand correctly the interpretations of the requirements
- g) Identify and process (potential) observations
- h) Review S&L responses to observations to write completion report
- i) Incorporate results in the report

2. Design Adequacy

Review appropriate design output documents for the following:

- a) System redundancy
Review applicable design documents to ensure that redundancy is reflected with regard to:
 - 1) Power supply feeders
 - 2) Switchgear arrangement

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Check List

CLASS 1E AC DISTRIBUTION SYSTEM

Electrical System (Cont)

- 3) Loads supplied from each bus
- 4) Power connections to the instrument and control devices
- b) Single failure criterion
Review applicable design documents to determine single-failure-proofness with regard to:
 - 1) Shared standby power system (if any)
 - 2) Interconnections between redundant buses
 - 3) Interconnections between redundant buses and loads
 - 4) Interconnections between redundant buses and power sources
- c) Standby and preferred power systems independence
Review applicable design documents to assure that in the event of a loss of preferred power, the independence of the standby power system is established through prompt opening of isolation-feeder breaker. This review includes:
 - 1) Electrical protective relaying circuits
 - 2) Single failure modes of preferred and standby power supplies
 - 3) Primary and backup protective relaying schemes and their co-ordination and assigned control power supplies
 - 4) Parallel operation of preferred and standby power systems
- d) Standby power supply
Review applicable design documents to assure that the diesel generators have sufficient capacity, capability, and reliability to perform the design safety function. The review includes:
 - 1) Load tabulations showing combined load demand connected to each diesel generator during "worst" operating condition and selection of DG capacity
 - 2) Automatic and manual loading and unloading of each diesel generator
 - 3) Continuous and short-term ratings of each diesel generator and the length of time each load is required
 - 4) DG starting circuits
 - 5) DG testing to demonstrate starting reliability
 - 6) Load shedding and load sequencing circuits
 - 7) Connection of nonsafety-related loads to each DG
 - 8) Sharing of DG between units
 - 9) Starting and accelerating to rated speed all connected loads in required sequence and within the minimum time interval
 - 10) DG loading profile curves, voltage and frequency recovery curves and response time of the excitation system to load variations
 - 11) Interrupting capacity of switchgear, load centers, control centers and distribution panels

Check List

CLASS 1E AC DISTRIBUTION SYSTEM (Cont)

Electrical System (Cont)

- 12) Grounding requirements
 - 13) Electrical protective relaying circuits including their coordination and assigned control power for each DG
 - 14) Protective trip circuits of DG sets
 - 15) Use of DG sets for peaking
 - 16) Control power circuits voltage drops
 - 17) Technical specifications limitations
- e) Safety classification
Review applicable documents to determine if system components have been properly classified as to safety significance as defined in 10CFR50
- f) Discuss differences with S&L key personnel to understand correctly the interpretations of requirements
- g) Identify and process (potential) observations
- h) Review S&L responses to observations to write completion reports
- i) Incorporate results in the report

Note: Design and other documents:

- System design criteria and functional description
- Design calculations
- Design construction drawings
 - single line diagrams
 - logic diagrams
 - schematic diagrams
- Procurement specifications
- Design changes

Review for the latest revision of above documents; consider in-process work where appropriate

3. Design Process

- a) Commitment compliance
Review for consistency of design criteria, drawings, calculations and procurement specifications with design requirements established under Task-1
- b) Design consistency
Review for consistency amongst the various design documents such as design criteria, single line, logic and schematic diagrams, design calculations, procurement specifications, etc.
- c) Design calculations
Review for the following:
- 1) Verification and identification of computer programs used for calculations
 - 2) Validity and/or verification with actual design information of the assumptions made

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Check List

CLASS 1E AC DISTRIBUTION SYSTEM (Cont)

Electrical System (Cont)

- 3 Reasonableness of the engineering judgements used
- 4) Adequacy of documentation of calculations
- 5) Adequacy of S&L internal review of assumptions and input data
- d) Design interfaces
 - Review for interfaces with
 - other disciplines
 - GE
 - IP
- e) Design change
 - 1) Review FCRs, ECNs and NCRs for proper review, approval and incorporation
 - 2) Review for outstanding FCRs and ECNs
- f) System Review
 - Review S&L internal design review reports at the system level
- g) Identify and process (potential) observations
- h) Review S&L responses to observations to write completion reports
- i) Incorporate results in the report

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Check List

HIGH PRESSURE CORE SPRAY

Control Systems (I&C)

1. Base Reference Documents

- a) FSAR
- b) SER
- c) Design criteria (GE)
- d) Design specifications (GE)
- e) Installation specification (I&C specific) (GE)
- f) Applicable reg. guides, notices and bulletins
- g) S&L standards, project instructions and QAM

2. Review for Compliance

- a) Licensing and design commitments are consistent between FSAR and design specification
- b) Licensing and design commitments have been incorporated in design documents issued for fabrication and construction
- c) Design criteria, specifications and installation requirements have been implemented in design documents issued for fabrication and construction
- d) Regulatory guidance has been followed and incorporated in the design, or alternate methods have been used and adequately justified
- e) Applicable sections of the S&L quality assurance program and related project instructions have been complied with

3. System Specific Review Items

- a) I&C components and devices purchased by S&L are in conformance with GE specification/data sheet
- b) Control logic diagrams (GE or S&L) have been correctly implemented in S&L schematic diagrams
- c) Instrument impulse line slopes satisfy GE requirements
- d) Instrument impulse line installation for seismic requirements is adequate based on Clinton-specific floor spectra using ASME B&PV Code, Section III NC-3650
- e) Instrument impulse line code class assignments and class breaks are consistent with the intent of Reg. Guide 1.151
- f) Instrument seismic mounting requirements have been satisfied
- g) Electrically redundant instruments do not share a common process tap and separation requirements have been satisfied
- h) Safety related instrument setpoints have been documented to satisfy Reg. Guide 1.105
- i) Bypass and inoperative equipment status is indicated in accordance with Reg. Guide 1.47

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Check List

HIGH PRESSURE CORE SPRAY AND CLASS 1E AC DISTRIBUTION SYSTEM

Equipment Qualification

1. FSAR Commitments
 - a) Construction license date
 - b) Applicable reg. guides and revision
 - c) Applicable industry standards-issue date
2. Qualification Specifications
 - a) Environmental
 - b) Seismic
3. FSAR-Questions from and Responses to NRC; Status
4. SER Items-Status
5. Environmental & Seismic Qualification Submittals to NRC
 - a) Format
 - b) Detail
 - c) Audit status
6. Qualification Report Review Procedures
 - a) Check list (SQRT, SCEWS)
 - b) Requirements
 - c) Signoff
 - d) Closeout of comments
7. Q List
 - d a) How sorted (system or purchase order)
 - b) How is list developed (input sources)
 - c) What is not included
 - d) Q items installed or purchased-qualification pending
 - e) Class 1E-safety related-environmental
 - f) Important to safety-environmental
 - g) Mechanical-environmental
 - h) Seismic
8. PVORT (see separate checklist)
 - a) General
 - b) Pumps
 - c) Valves

Clinton-IDR

Check List

HIGH PRESSURE CORE SPRAY AND CLASS 1E AC DISTRIBUTION SYSTEM (Cont)

Equipment Qualification (Cont)

9. Operability Other Than PVORT
 - a) Electrical
10. Reg Guide 1.97 - How addressed
11. Plant Specific Conditions
 - a) Format - location
 - b) Applicable response spectra
12. Drawing Systems
 - a) P&ID equivalent
 - b) Isometrics
 - c) Electrical power source designation (1E, non-1E) (single line drawing)
13. Equipment Indices
 - a) Instrument index
 - b) Purchase order index
14. Equipment Installation Field Verification (Walkdown)
 - a) Environmental
 - b) Seismic
 - c) Extent
15. Field Purchase Items
 - a) How tied in to EQ process

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Check List

HIGH PRESSURE CORE SPRAY

Preliminary Equipment List

1. Active & Passive Valves
2. Operators for Active Valves
3. HPCS Pump
4. Pump Motor
5. Motor Control Center
6. Electrical Transformer
7. Battery & Charger
8. Diesel Generator
9. Controls & Instrumentation

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Check List

CLASS IE AC DISTRIBUTION SYSTEM

Preliminary Equipment List

1. Switchgear
2. Load Centers
3. Motor Control Centers
4. Miscellaneous Distribution panels
5. Transformers
6. Cables
7. Field Purchase Items
3. Interface Items:
 - a) Splices
 - b) Connectors
 - c) Lugs

Check List

HIGH PRESSURE CORE SPRAY AND CLASS 1E AC DISTRIBUTION SYSTEM

Pump and Valve Operability Review Team

1. Equipment Name and Tag Numbers
2. Documents Reviewed
3.
 - a) Equipment supplier
 - b) Model number
 - c) Type
 - d) Driver
 - e) Model number
 - f) Type
 - g) Power source max/min/normal
4. Functional Accessories
5. Operability Demonstrated:
 - a) By test/analysis
 - b) During/after seismic event
6. Applicable Design Codes & Standards Used in Qualifying this Component
7. Have Operability Acceptance Criteria been Established in the Test Plan or Analyses for the Component?
8. Are Margins Identified in the Qualification Document?
9. Was the Qualified Component an Actual Assembly/Scale Model?
Qualified as an Assembly/Component(s)?
10. Were all Anomalies Addressed and Closed Out?
11. Fundamental Frequency
12. Minimum Maintenance Interval

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Check List

HIGH PRESSURE CORE SPRAY AND CLASS 1E AC DISTRIBUTION SYSTEM

Dynamic

General

1. Equipment Name & Tag Numbers
2. Documents Reviewed
3. Active/Non-Active but Designated 1E/Passive
4. Equipment Supplier/Report Source
5. Applicable Design Requirements & Standards
6. Test/Analysis
7. All Comments Closed Out
8. Checklist/SQRT Completed
9. Report Status/Indicated per Status Summary Report
10. Operability Verified against Approved Criteria

Testing

1. Type of Test - Appropriate & Justified
2. TRS Enveloped RRS with Correct Damping
3. Function Monitored
4. Mounting Simulated
5. OBE Prior to SSE
6. Aged End-of-Life Condition

Analysis

1. Method - Frequency
2. Accelerations/Spectra Used (Acceptable)
3. Damping Appropriate
4. Operating/Nozzle
5. Allowable Stress Criteria Designed
6. Mounting Details Simulated & Adequate
7. Computer Program Referenced & Verified

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Check List

HIGH PRESSURE CORE SPRAY AND CLASS 1E AC DISTRIBUTION SYSTEM

Environmental

General

1. Equipment Name and Tag Numbers Qualified by Report
2. Document Reviewed/Equipment Tested or Evaluated
3. Active/Non-Active but Designated 1E/Passive
4. Equipment Supplier/Report Source
5. Applicable Design Requirements & Standards
5. Test/Analysis
7. Comments Closed Out
8. Checklist Completed
9. Report Status/Indicated Status per Status Summary Report
10. Operability Verified Against Approved Criteria

Analysis

1. Specific Features, Postulated Failure Modes, or the Failure Effect Analyzed
2. Assumptions, Empirically Derived Values, and Mathematical Models Used Together with Appropriate Justification for Their Use
3. Description of Analytical Methods or Computer Program Used
4. Summary of Analytically Established Performance Characteristics and Their Acceptability
5. Basis for the Extrapolation Where Test Data or Operating Experience Data Have Been Extrapolated
6. Why Qualified by Analysis/Method Used/Basis

Testing

1. Test Sequence per IEEE 323-1974 and/or Daughter Standard
2. Margins Addressed/Test Condition Instrument Accuracy Provided
3. Synergistic Effects Addressed
4. Maintenance/Replacement Schedule

Clinton-IDR

Check List

HIGH PRESSURE CORE SPRAY AND CLASS 1E AC DISTRIBUTION SYSTEM (Cont)

Environmental (Cont)

General (Cont)

5. Test Conditions Envelop Qualification Requirements -
6. Humidity Effects Addressed
7. Installation Simulated
8. Power Supply Extremes (High/Low) Addressed
9. Operability Established (Before/During/After)
10. Equipment Disassembled and Inspected Post-Test

Operability Experience

1. Was Operating Environment Determined by Measurement
2. Effects of Noncontinuous Measurement Justified by Analysis
3. Electrical Equipment Performance Determination
4. Trend Data (replacement, maintenance including adjustments and calibration, inspection) Provided
5. Operating Experience Data Envelops Qualification Requirements

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. W. Dick	Programs Manager
D. B. 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 Writer
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

JOHN M. AMARAL

POSITION Manager of Quality Assurance

EDUCATION BS, University of Southern California, Industrial Management/Engineering, 1954.

PROFESSIONAL DATA Registered Professional Engineer, California; ASQC Certified Reliability Engineer; Senior Member, American Society for Quality Control (ASQC); Past Chairman, ASQC Energy Division; Member, Atomic Industrial Forum Subcommittee on Quality Assurance; Member, General Requirements Subcommittee of the ASME Committee on Nuclear Quality Assurance; Member, NRC QA Review Panel to enhance the assurance of quality in design and construction of power reactors

AWARDS ASQC Energy Division QA Person of the Year for 1982

 1983 American Nuclear Society (ANS) Special Award for distinctive quality assurance achievement in the nuclear energy field

SUMMARY 10 years: Manager of Quality Assurance
 2 years: Deputy Manager, Division Quality Assurance
 1 year: Manager, Quality Systems
 13 years: Program Manager/Quality Engineer
 7 years: Engineering Department Head

EXPERIENCE Mr. Amaral is Manager of Quality Assurance (QA) for Bechtel Power Corporation, responsible for advancing the effectiveness of the QA program and directing its implementation in all divisions. He formulates QA policies and coordinates division QA activities. He also coordinates quality control and related activities of the Engineering, Procurement, and Construction departments, and other support organizations. In this position, Mr. Amaral also serves as QA Manager for the work performed under the Independent Design Review for the Byron Generating Station.

 Prior to his present assignment, Mr. Amaral served as the Manager of Quality Assurance for the Gaithersburg Power Division.

 Before this, Mr. Amaral was Deputy Manager, Division Quality Assurance, SFPD, responsible for assisting the manager in the administration of the QA program.

 Earlier, Mr. Amaral was QA Manager on the Fast Flux Test Facility project (a 400 MWt liquid-metal fast breeder reactor - LMFBR) responsible for developing and implementing the project QA program.

JOHN M. AMARAL (Continued)

EXPERIENCE
(Cont)

Prior to joining Bechtel, Mr. Amaral was Manager of Quality Systems for the Aerojet Nuclear Systems Company. He served as a consultant on reliability, quality systems, and nondestructive testing. He also developed the quality system for Aerojet's work in support of their LMFBF program.

Before this, Mr. Amaral was Program Manager, Advanced Technology, with the Aerojet General Corporation responsible for conducting research and development programs in nondestructive testing and reliability. Prior to this, Mr. Amaral held successive positions as Quality Engineer; Field Quality Engineer; Manager, Quality Engineering; Associate Manager and, later, Manager of Reliability and Quality Assurance.

Earlier, Mr. Amaral was a chief engineer with the Burndy Corporation responsible for supervising production engineering and control and quality control.

ALAN M. APPLEFORD

POSITION Assistant to Chief Civil Engineer

EDUCATION BS, Civil Engineering, University of California, Berkeley, 1951
MS, Civil Engineering, Massachusetts Institute of Technology, 1951

PROFESSIONAL DATA Registered Professional Civil Engineer, California
Member, American Society of Civil Engineers

SUMMARY 1/2 year: Assistant to Chief Civil Engineer
1 year: Project Engineer
2 years: Civil Engineering Coordinator
18 years: Civil Engineering Group Supervisor
and Assistant Project Engineer
3 years: Civil Engineer
8 years: Structural Design Engineer

EXPERIENCE Mr. Appleford has been assigned to assist the Chief Civil Engineer, Bechtel Power Corporation, where his duties include the civil-structural review of the South Texas Project. He is currently loaned to the Research and Engineering Department, investigating structural aspects of a modular HTGR plant. Mr. Appleford is also serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for structural activities.

Previously, Mr. Appleford was a Project Engineer in the Research and Engineering Department for the Los Alamos HTGR Feasibility Study. He was also a civil engineering consultant for the Diablo Canyon Nuclear Power Plant. He analyzed special problems and organized programs for their solution, including the civil discipline effort to resolve seismic interaction of non-safety systems and safety-related systems (Seismic II/I), pipe whip restraints, and the effect of heavy loads on safety-related systems (NUREG 0612).

Earlier, Mr. Appleford was Civil Engineering Coordinator for Bechtel Power Management, responsible for coordinating activities of the Chief Civil Engineers and Chief Architects in the five Power Divisions, as they relate to overall Bechtel Corporate policy. He reviewed design guides and guide specifications for interdivisional use. He participated as the civil discipline member of the Midland Project Independent Design Review team.

Prior to this assignment, Mr. Appleford was Civil Engineering Group Supervisor, and later Assistant Project Engineer on the Limerick Project. His responsibilities included interface with the Owner, field construction, the NSSS supplier, and interdisciplinary coordination and discipline guidance.

ALAN M. APPLEFORD (Continued)

EXPERIENCE
(Cont)

Mr. Appleford was Civil Engineering Group Supervisor for the Palisades Plant (PWR) and Tarapur (twin BWR), responsible for all civil and architectural aspects of these projects.

Earlier, Mr. Appleford provided civil discipline input into studies for boiling and pressurized water nuclear power plants and for a nuclear fuel reprocessing plant. He was also structural design engineer for Dresden 1 Nuclear Power Station and later Civil Engineering Group Supervisor. He also provided structural design for fossil power plants and smelter projects.

DR. SIDNEY A. BERNSEN

POSITION Assistant Project Manager, Quality Activities

EDUCATION BS, Mechanical Engineering, 1950
 MS, Mechanical Engineering, 1951
 Ph.D, Mechanical Engineering, 1953

PROFESSIONAL DATA Registered Professional Nuclear and Quality Assurance Engineer, California
 Member, American Society of Mechanical Engineers
 Original Chairman of N45-3.7 Work Group that prepared ANSI N45.2-1971. Original Chairman of N45.2 Subcommittee that assumed responsibility for nuclear power plant quality assurance in 1970. Vice Chairman of American National Standards Committee N45. Current Member of the American Society of Mechanical Engineers Board on Nuclear Codes and Standards and the ASME Board on International Standardization. First Chairman of the ASME Nuclear Quality Assurance Committee. Representative of the American National Standards Committee N45 on the Ad Hoc task group that prepared Revision 1 to American National Standard N18.7 "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants". Original member of the Executive Committee of the American National Standards Committee Z-1; a committee responsible for the general quality assurance standards within the United States. U.S. representative on ISO Technical Committee 85, Subcommittee 3 Work Group 8 on Quality Assurance and actively participated in the development of the ISO Standard on Quality Assurance. U.S. coordinator for Quality Assurance on the Nuclear Technical Advisory Group (NTAG) of ANSI; and currently, is Chairman of NTAG.

SUMMARY 3/4 year: Assistant Project Manager, Quality Activities
 1-1/2 years: Assistant Project Manager - Technical
 7 years: Manager of Nuclear Engineering and Chief Nuclear Engineer
 2 years: Manager of Quality Assurance
 11 years: Various assignments, including Manager of Quality Assurance, Engineering Manager, Assistant Manager, Chief Engineer, Project Manager
 2 years: Manager of Nuclear Development
 2 years: Research Staff Member
 5 years: Associate Mechanical Engineer

EXPERIENCE Dr. Bernsen is currently assigned as Assistant Project Manager, Quality Activities, Midland Project, responsible for coordinating the Bechtel Quality Program activities on behalf of Project Management, and serves as the management interface with the Owner's Quality Assurance organization. He is also a member of the Level-2 Internal Review Committee for the Byron Independent Design Review.

SIDNEY A. BERNSEN (Continued)

EXPERIENCE
(Cont)

Prior to assuming this position, Dr. Bernsen was Manager of Quality on the Zimmer Project, responsible for all Bechtel quality assurance, quality control, and quality engineering functions.

Previously, Dr. Bernsen was Assistant Project Manager - Technical, on the South Texas Project. He was responsible for overview and direction of system design, special studies, licensing, quality performance and project procedures.

Earlier, Dr. Bernsen was Manager of Nuclear Engineering and Chief Nuclear Engineer, with responsibilities for coordinating nuclear engineering activities of the four Power Divisions of Bechtel Power Corporation.

Prior to that assignment, Dr. Bernsen served as Manager of Quality Assurance, Bechtel Power Corporation, and earlier as Manager of Quality Assurance for the Power and Industrial Division, with responsibilities for functional direction of the quality assurance program.

Earlier positions at Bechtel included Engineering Manager in the San Francisco Power Division, Assistant Manager for Power Technology, Chief Engineer in the Scientific Development Department, and Project Manager for design of the Spacecraft Propulsion Research Facility for NASA's Lewis Research Center.

Prior to joining Bechtel, Dr. Bernsen was Manager of Nuclear Development for the Advanced Technology Laboratory, a Division of American Standard Corporation, responsible for design studies on boiling and pressurized water reactors. Dr. Bernsen was a Research Staff Member of the General Atomic Division of the General Dynamics Corporation, and earlier, an Associate Mechanical Engineer at the Argonne National Laboratory.

ALAN L. CAHN

POSITION Bechtel Power Management Consultant

EDUCATION B.S., Mechanical Engineering, University of California

PROFESSIONAL DATA Registered Professional Engineer, California
Member, American Society of Mechanical Engineers

SUMMARY

3 months:	Consultant
6 years:	Manager of Engineering
6 years:	Chief Mechanical Engineer
9 years:	Manager of Steam Power Engineering/ Engineering Manager for Fossil-Fueled Power Plants
1 year:	Chief Mechanical Engineer
5 years:	Project Engineer
4 years:	Mechanical Group Supervisor
3 years:	Engineer
2 years:	Junior Mechanical Engineer
1/2 year:	Design Engineer
3 years:	U.S. Navy
1 year:	Test Engineer

EXPERIENCE Mr. Cahn recently was Manager of Engineering for Bechtel Power Management, responsible for providing coordination between all power division offices and for providing direction and guidance in establishing and achieving corporate goals and objectives. He is also a member of the Level-2 Internal Review Committee for the Byron Independent Design Review.

Prior to that assignment, Mr. Cahn was Chief Mechanical Engineer, Bechtel Power Corporation, coordinating the activities of the Chief Mechanical Engineers and the Chief Plant Design Engineers in all of the Bechtel offices in the U.S., Europe and Mexico. His responsibilities included standardization of equipment specifications and system design, and establishment of policy positions.

As Manager of Steam Power Engineering and Engineering Manager, Mr. Cahn was responsible for the engineering of all fossil fueled power plants in the Power & Industrial Division.

Previously, Mr. Cahn was Chief Mechanical Engineer and before that Project Engineer for the Power & Industrial Division.

Earlier, Mr. Cahn held various positions including Assistant Engineer, Engineer, Job Engineer, Senior Engineer and Mechanical Group Supervisor.

Mr. Cahn was a Junior Mechanical Engineer with Bechtel Brothers-McCone developing designs and layouts of pumping stations and pipelines.

ALAN L. CAHN (Continued)

EXPERIENCE
(Cont)

Mr. Cahn was an Engineer at Link-Belt Company involved in design and drafting screw conveyors and bucket elevators, as well as design and layout of a friction drive cable hauling system for freight cars.

Earlier, Mr. Cahn was a Lieutenant in the U.S. Navy and participated in ship salvage operations.

At Bethlehem Steel Ship Building Corporation, Mr. Cahn designed, performed and analyzed tests on equipment.

After graduation, Mr. Cahn worked in the M.I.T. Radiation Laboratory, with responsibility for performing vibration tests on radar equipment.

ROBERT S. CAHN

POSITION Assistant to Chief Nuclear Engineer

EDUCATION B.S., Engineering (aeronautics and astronautics),
University of Washington, Seattle, 1968
Naval Nuclear Power School, Mare Island, California, 1969
Naval Reactor Prototype Training, Idaho Falls, Idaho, 1969

PROFESSIONAL DATA Registered Professional Mechanical Engineer, California

SUMMARY 6 months: Assistant to Chief Nuclear Engineer
3-1/2 years: Engineering Supervisor
2 years: Nuclear Group Supervisor
6 months: Radwaste Engineer
5 years: Nuclear/Mechanical Engineer
1-1/2 years: Senior Nuclear Engineer
4 years: Naval Officer

EXPERIENCE Mr. Cahn is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. Responsibilities during this review include: developing licensing commitment lists; member of committee reviewing potential observations (Level-1 Committee); technical coordination and review of all observations and the observation process.

Mr. Cahn also holds the position of technical assistant to the Chief Nuclear Engineer of Bechtel Power Management, responsible for coordination with all Division Chief Nuclear Engineers on generic technical/licensing issues. He also provides technical assistance to Bechtel Power Corporation Management on nuclear engineering related areas and coordinates with other Bechtel entities and outside organizations, i.e., EPRI, AIF, on nuclear related matters.

Prior to his present position, Mr. Cahn was an Engineering Supervisor on the Diablo Canyon Nuclear Power Plant Project. His duties included coordination of the verification program with responsibility for management of the interface between the Project and the Independent Design Verification Program.

Previously, Mr. Cahn was assigned as Nuclear Group Supervisor on the Lemoniz Nuclear Power Plant Project in Bilbao, Spain. In this capacity, he was responsible for the overall management of the nuclear group in conjunction with his client counterpart.

ROBERT S. CAHN (Continued)

EXPERIENCE
(Cont)

Earlier, Mr. Cahn was assigned to the San Francisco Power Division Nuclear Staff Radwaste Group involved with solid radwaste systems design reviews.

Mr. Cahn spent five years on the Pilgrim Unit 2 Project in various capacities, including licensing engineer, nuclear steam supply system coordinator, and inservice inspection coordinator. He was also involved with radwaste systems activities, reactor vessel cavity design, and coordinated development of the new reactor vessel head assembly and associated components.

Prior to joining Bechtel, Mr. Cahn was a Senior Nuclear Engineer at Combustion Engineering, Inc. with responsibilities in the areas of chemical control and purification systems, steam generator and secondary control systems, and other related areas in the systems design and analysis group.

Mr. Cahn was an officer in the Navy Nuclear Program, qualified as submarine officer of the deck and engineering officer of the watch.

ALLEN W. DAVIS

POSITION Control Systems Staff Engineering Specialist

EDUCATION U.S. Army Signal Corps. Electronic School, Fort Monmouth,
New Jersey, 1948.

PROFESSIONAL
DATA: Registered Professional Control Systems Engineer,
California
Nuclear Reactor Operator License USAEC OP-135

SUMMARY 8 years: Engineering Supervisor
4-1/2 years: Senior Engineer
1 years: Assistant Manager Nuclear Materials
3 years: Supervisor Instruments and Controls
14 years: Senior Field Engineer/Supervisor

EXPERIENCE Mr. Davis is currently an Engineering Specialist on temporary
assignment to the Independent Design Review Team reviewing the
Sargent and Lundy design of the Byron station essential
service water and component cooling water systems under
contract to Commonwealth Edison. He is permanently assigned
to the San Francisco Power Division Control Systems Staff. He
coordinates with all nuclear projects on their progress,
reviews safety-related documents and drawings, keeps
up-to-date on industry standards and regulatory guides and
prepares staff responses for "Q" correspondence.

As Engineering Supervisor, he served as Control Systems Group
Supervisor on the Susquehanna Nuclear Project, Units 1 & 2,
for 5 years and as the Deputy Group Supervisor for 2-1/2 years.

As a Senior Engineer assigned to the Duane Arnold Nuclear
Project, he specified control valves and primary sensors and
installation details. He also had responsibility for
interdiscipline coordination for subcontractor supplied
control systems.

As Assistant Manager of nuclear materials at Aerojet General
Corp., Mr. Davis was responsible for physical control and
accountability of the SSM used to fabricate the second fuel
load for EBR II.

Mr. Davis held various engineering and supervisory positions
during his 14 years with Aerojet General Nucleonics Corp.
These included design of the control system for the AGN Model
201 and 211 training reactors and Senior Field Engineer during
operational testing of the U.S. Army ML-1 Portable Nuclear
Power Plant.

July 1984

CHARLES W. DICK

POSITION Project Manager

EDUCATION BS, Electrical Engineering, California Institute of Technology
MS, Electrical Engineering, Stanford University

PROFESSIONAL DATA Registered Professional Electrical, Mechanical, and Nuclear Engineer, California, New York and Pennsylvania
Senior Member of the IEEE
Served on numerous IEEE Committees
Was Coordinator of the Bechtel Task Force for TPO Engineering Procedures
Was Member of the Divisional Engineering Practices Subcommittee
ANSI N45.2.11

SUMMARY 2-1/3 years: Project Manager
1/2 year: Manager of Engineering and Licensing
2 years: Manager of Quality Assurance
3 years: Manager of Engineering
4 years: Engineering Manager
8 years: Project Engineer
6 years: Project Reactor Sales Specialist
11 years: Engineer

EXPERIENCE Mr. Dick is currently the Project Manager for the Independent Design Review, which is reviewing the Sargent & Lundy design of the Byron Generating Station for Commonwealth Edison. As such, he is responsible for managing the ongoing work of the review team including its investigations, reports, and program development.

Previously he was on special assignment, managing studies of new engineering design concepts for nuclear power plants. The studies included technical, economic, and marketing analyses of small and mid-sized PWR plants (up to 500 MWe).

Prior to these assignments, Mr. Dick was Manager of Engineering and Licensing for the Zimmer Nuclear Plant completion project with responsibilities including management of design-contractors and providing support for quality verification.

Earlier, Mr. Dick was assigned as a Project Manager for the two-unit, Diablo Canyon completion project, with special responsibilities for quality assurance and scheduling, and served as Deputy Completion Manager.

Previously, Mr. Dick was Manager of Quality Assurance with responsibility for managing quality assurance activities in the San Francisco Power Division and providing program direction for 12 nuclear projects of varying sizes.

CHARLES W. DICK (Continued)

EXPERIENCE
(Cont)

Earlier, Mr. Dick was Manager of Engineering with responsibility for management of project engineering work on all projects in the San Francisco Power Division (approximately 30 projects, foreign and domestic). His responsibilities included staff management (60-80 member staff) and engineering support for Business Development.

Prior to this assignment, Mr. Dick was Engineering Manager with responsibility for the management of 8 nuclear fossil-fuel power plants. He was the coordinator of the Task Force for the preparation of TPO Engineering Procedures and leader of the 1974 Task Force on Engineering Planning and Control.

Previously, Mr. Dick was Project Engineer on a number of nuclear power plant and power system planning engineering studies. Special responsibilities included nuclear fuel and operating cost trends, nuclear licensing and proposal preparation.

Prior to joining Bechtel, Mr. Dick was responsible for nuclear power marketing activities for the General Electric Company. His responsibilities included sales of nuclear power equipment, turnkey plants, fuels, services, and development programs. He also performed application engineering contract negotiations, proposal preparation, and managed seminars.

Earlier at General Electric, Mr. Dick was responsible for test engineering and performance of power system studies. He provided engineering consultation services for the application of power generation, transmission, and distribution apparatus.

Mr. Dick has also served as a naval officer on destroyers and a cruiser, where his duties included those of Engineer Officer and Staff Division Operations Officer.

DANIEL B. HARDIE

POSITION Assistant Project Engineer

EDUCATION Aeronautical Engineering, Massachusetts Institute of Technology, 1951

PROFESSIONAL DATA Registered Professional Engineer in New York, California, and Michigan

SUMMARY

2-1/3 years:	Assistant Project Engineer
5 years:	Supervisor, Quality Engineering
2 years:	Project Quality Engineer
12 years:	Marketing Engineer
2 years:	Employment Manager
1 year:	Cost Reduction/Profit Improvement Administrator
8 years:	Wind Tunnel Test Engineer

EXPERIENCE Mr. Hardie is currently a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for developing and implementing the engineering segment of the quality assurance program, and review of the Sargent & Lundy design control process.

Mr. Hardie has also been assigned to the Diablo Canyon Completion Project as Assistant Project Engineer - Quality. In this position, he was responsible for developing and implementing the quality assurance program for engineering. Prior to this assignment, Mr. Hardie was supervisor of engineering administration, responsible for coordinating and implementing administrative functions for the chief engineer.

Previous assignments include: Assistant Project Engineer on the Susquehanna Project; Supervisor of Quality Engineering for the San Francisco Power Division, responsible for developing and maintaining the engineering quality assurance program; Project Quality Engineer on the Hope Creek Generating Station Units 1 and 2; and Project Quality Engineer on the Quanicassie Power Station Project.

Before joining Bechtel, Mr. Hardie worked for Williams Research Corporation and was responsible for developing and coordinating major proposals. Previously he was Manager of Marketing Operations for the Aerospace Systems Division of the Bendix Corporation, where he was responsible for reviewing and handling requests for proposals and coordinating division marketing plans and activities. While at Bendix, he was Manager of Employment for two years and Cost Reduction/Profit Improvement Administrator for one year, while participating in a management development program.

Mr. Hardie was also with Cornell Aeronautical Laboratories, as a project engineer in the Transonic Wind Tunnel Department.

July 1984

CHANDULAL M. HAZARI

POSITION Electrical Group Supervisor

EDUCATION B.E., Electrical Engineering, Bombay University, India, 1953
B.E., Mechanical Engineering, Bombay University, India, 1953

PROFESSIONAL DATA Registered Professional Electrical Engineer, California and
Massachusetts
Registered Professional Control Systems Engineer, California

SUMMARY 2 years: Electrical Group Supervisor
 1 year: Program Supervisor and Deputy Manager
 10 years: Group Supervisor and Group Leader
 2 years: Senior Engineer
 16 years: Engineering Positions in India

EXPERIENCE Mr. Hazari is currently serving as a member of the Independent
Design Review Team for the Byron Generating Station, which is
reviewing the Sargent and Lundy design, under contract to
Commonwealth Edison. He is responsible for reviewing the
electrical system design for CCW, ESW and dc distribution
systems.

 Mr. Hazari was Supervisor of the Electrical Group on Diablo
Canyon Nuclear Power Plant Unit 2 where he was responsible for
the overall direction and completion of the plant electrical
design and resolutions of independent design verification
findings for electrical design.

 Previously, Mr. Hazari was Program Supervisor and Deputy
Manager for the Equipment Qualification (EQ) Group where he
wrote design guides for EQ and reviewed EQ documents for the
Hope Creek Project.

 Prior to that, Mr. Hazari was assigned to the Pilgrim 2
Nuclear Power Plant. His responsibilities increased from
Schematics Group Leader through System Design Group Leader,
Deputy Group Supervisor, and Electrical Group Supervisor.

 Earlier, Mr. Hazari was Deputy Group Supervisor on the
Mendocino Nuclear Power Plant Project. He was also Electrical
System Design Group Leader, responsible for design of power
plant auxiliary power distribution system, licensing, and
procurement of electrical equipment.

 On the Monticello Nuclear Power Plant Project, Mr. Hazari was
Senior Electrical Engineer with responsibilities in the areas
of system design and control schemes.

EXPERIENCE
(Cont)

Mr. Hazari was briefly assigned as Senior Electrical Engineer on Gerald Andrus Fossil Power Plant with responsibility for studies, engineering calculations, and equipment sizing.

Prior to joining Bechtel, Mr. Hazari worked for 15 years in India in positions of increasing responsibility, leading to deputy superintending engineer. For 12 years he worked in responsible positions in fossil power plant construction, handling project work in the mechanical, electrical, and control systems disciplines.

WILLIAM R. HINTZ

POSITION Senior Engineer

EDUCATION B.S., U.S. Naval Academy, 1948

PROFESSIONAL DATA Registered Professional Mechanical Engineer, California

SUMMARY

4 months:	Senior Engineer
1-1/2 years:	Engineering Supervisor
6 months:	Consultant
9-1/2 years:	Engineering Supervisor/Specialist
11 years:	Senior Engineer
1 year:	Supervisor
4-1/2 years:	Engineer

EXPERIENCE Mr. Hintz is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for review of stress engineering.

Prior to this, he was Engineering Supervisor assigned to the Stress Group on the Plant Design Staff. He was responsible for specification preparation and review, interface with the Pipe Support Group, pump alignment problems, and engineering support for projects.

Earlier, for 6 months, Mr. Hintz worked for International Bechtel, Inc. in Johannesburg, South Africa as a Consultant to the Republic of South Africa Atomic Energy Board. Mr. Hintz was responsible for the licensing review of stress reports for primary system piping and components for the Koeberg Nuclear Power Plant.

Prior to this assignment, as an Engineering Specialist/Supervisor, Mr. Hintz was Stress Group Leader assigned to the Skagit, Susquehanna and Arkansas Nuclear One projects.

Earlier, he was a Senior Engineer in the stress group on the Mendocino and Pilgrim Power Plant projects.

Before working for Bechtel, Mr. Hintz was a Senior Engineer working on pipe stress analysis for nuclear submarines and special engineering services for General Dynamics Corp., Electric Boat Division, and a supervisor in the production of technical manuals for ANCO Technical Writing Services.

ALFREDO T. JOCSON

POSITION Senior Engineer

EDUCATION BS, Mechanical Engineering, Mapua Institute of Technology,
Manilla, Philippines, 1966

SUMMARY 9 years: Senior Mechanical Engineer
7 years: Mechanical Engineer
1 year: Junior Mechanical Engineer

EXPERIENCE Mr. Jocson is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for reviewing the process design of the essential service water system.

Previously, Mr. Jocson was assigned to the Hope Creek Nuclear Project as balance-of-plant deputy group leader and cognizant engineer for the normal/emergency service water system; P&ID development and procurement of pumps, strainers, and heat exchangers; mechanical design of the safety related intake structure; sump model tests and hydraulic transient analyses. He was also responsible for reactor and turbine auxiliaries cooling systems and circulating water systems, in addition to ALARA study for turbine valve surveillance, main steam, condensate/feedwater systems and feedwater transient analysis and FSAR sections preparation.

Prior to this assignment, Mr. Jocson was assigned to the Peach Bottom Nuclear Project with responsibilities for design calculations, cooling water systems design, service water and component cooling water systems. He was also responsible for sizing, specifications and bid evaluation for pumps and heat exchangers and coordinating the seismic documentation review program. He was also involved with review of IFRs, startup problem resolution, and moisture separator drain system test program evaluation.

Prior to joining Bechtel, Mr. Jocson worked for the Manila Electric Company where he was responsible for the design and selection of mechanical equipment for two 330 MW fossil fuel-fired power plants. His duties included feasibility studies, flow diagrams, P&IDs, control logic diagrams, equipment specifications and material requisitions, equipment layout, sizing of steam, water and fuel oil piping and relief valves, and field inspection of engineering work.

Previously, Mr. Jocson worked for the Naval Shore Establishment in the Philippines as a junior mechanical engineer responsible for assisting in the supervision of the maintenance and repair of naval ships, including conversion and general overhaul of mechanical equipment.

July 1984

CHARLES (CHUCK) W. JORDAN

POSITION Chief Electrical and Control Systems Engineer

EDUCATION BSc, Electrical Engineering, Heald Engineering College,
San Francisco, California, 1959
MBA, Golden Gate University, San Francisco, California, 1983

PROFESSIONAL DATA Registered Professional Electrical Engineer, California
Member: IEEE, IEEE Power Engineering Society, San Francisco
State University Industrial Advisory Board, California State
University, Sacramento, Electrical Power Education Institute
Advisory Board, and University of California, Berkeley, MESA
Program Industrial Advisory Board.

SUMMARY 1 year: Chief Electrical & Control Systems Engineer
6 years: Chief Electrical Engineer
17 years: Senior Engineer, Electrical Engineering
Supervisor, Project Engineer, Assistant
Chief Electrical Engineer

EXPERIENCE Mr. Jordan is currently Chief Electrical and Control Systems
Engineer for Bechtel Power Management. In this capacity, he
is responsible for coordinating technical standards and
positions for the five Power Division offices. He is also
serving as a team leader on the Independent Design Review Team
for the Byron Generating Station, which is reviewing the
Sargent & Lundy design. under contract to Commonwealth Edison.

Prior to this assignment, Mr. Jordan was Chief Electrical
Engineer, responsible for scheduling and allocation of
manpower for project electrical groups, as well as for the
technical quality of electrical engineering on all San
Francisco Power Division projects. Previously, he was Chief
Electrical Engineer for the Petroleum and Chemical Eastern
Division in London.

Mr. Jordan's earlier assignments included Senior Engineer,
Electrical Engineering Supervisor, Project Engineer, and
Assistant Chief Electrical Engineer. In these positions he
worked with increasing supervisory responsibilities on various
projects, including a high temperature gas reactor, two
boiling water reactors, and a pressurized water reactor.

Prior to joining Bechtel, Mr. Jordan was an electrical
engineer with a consulting engineering firm, where he
participated in the design of a variety of industrial and
commercial projects.

PETER KARPA

POSITION Manager of Engineering

EDUCATION BS, Civil Engineering, University of Texas

PROFESSIONAL DATA Registered Professional Civil Engineer, Texas, California, Oregon, and Wisconsin

SUMMARY 5 months: Manager of Engineering
 3 years: Manager of Division Engineering
 6 years: Manager of Engineering
 1 year: Project Manager
 4 years: Project Engineer
 3 years: Supervising Engineer
 1 year: Consulting Engineer
 1 year: Resident Engineer
 3 years: Field Project Engineer

EXPERIENCE Mr. Karpa is serving as management sponsor of the Independent Design Review Team, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for overall management of the review effort.

 Mr. Karpa is also Manager of Engineering, responsible for overall management of Bechtel Power Corporation engineering efforts.

 Previously, he was Manager of Division Engineering, responsible for overall management of the San Francisco Power Division's engineering efforts on power plant projects.

 His previous position was that of Manager of Engineering for the Jubail Industrial Complex where he was responsible for all of the engineering activities performed by the Saudi Arabian Bechtel Company.

 Mr. Karpa was also Manager of Division Engineering for the Hydro and Community Facilities Division where he was responsible for all the division's engineering activities related to airports, transportation systems, water treatment and waste disposal facilities, railroads, and commercial and industrial buildings.

 Earlier, Mr. Karpa was Manager of Engineering for the Los Angeles Power Division with the responsibility for all engineering activities on the division's power plant projects in the United States and abroad. Before that, he was Manager of Engineering in the Ann Arbor Area Office where he had similar responsibilities.

 Mr. Karpa was Project Manager of the Trojan Nuclear Power Plant Project where he was responsible for overall management of the project. Earlier, he was project engineer for the same project responsible for administering site selection studies, bid evaluation for the nuclear steam supply and the turbine generator, plant design, and procurement.

PETER KARPA (Continued)

EXPERIENCE
(Cont)

Mr. Karpa's previous position was that of supervising engineer on the Tarapur Nuclear Power Plant Project where he was in charge of the Bombay engineering office.

As a senior engineer, Mr. Karpa was a technical assistant to the chief civil engineer responsible for researching special problems. Before that he was a civil group supervisor on two 66 MW power plant projects. He began his career with Bechtel as a job engineer responsible for the structural design and drafting of industrial plants, ore beneficiation facilities, and power plants.

Prior to joining Bechtel, Mr. Karpa was a consulting engineer responsible for designing structural steel and concrete structures and performing land surveys. He was a resident engineer for the Texas Highway Department, responsible for designing and layout of freeway interchanges and bridge approaches.

Mr. Karpa began his career as field project engineer with the Chicago Bridge and Iron Company, performing field layout of construction of refineries and industrial plants.

RICHARD J. LODWICK

POSITION Engineering Supervisor

EDUCATION BS, Nuclear, University of Michigan, 1970
JD, University of San Francisco, 1982

PROFESSIONAL DATA Registered Professional Mechanical Engineer, California
Registered Professional Engineer, Michigan
Member, American Nuclear Society and California State Bar

SUMMARY 4 years: Mechanical/Nuclear Group Supervisor
1/2 year: Consultant
1 year: Nuclear Engineering Group Supervisor
1 year: Senior Engineer
1 year: Licensing Engineer
2-1/2 years: Nuclear Systems Group Leader
2 years: Engineering Supervisor
4-1/2 years: Test Engineer

EXPERIENCE Mr. Lodwick is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for review of the process design of the essential service water system.

Previously, Mr. Lodwick was assigned as Mechanical/Nuclear Group Supervisor for the MHI Project, responsible for performance of engineering services and the transfer of U.S. nuclear power plant technology to the Japanese under a long-term technology transfer contract. In this capacity, Mr. Lodwick directed and performed on-project design activities, and coordinated the activities of off-project support.

Prior to this assignment, Mr. Lodwick worked for a consulting engineering firm, responsible for client contact, project management and technical efforts in the areas of risk assessment, nuclear and environmental licensing, and nuclear waste management.

Earlier with Bechtel, Mr. Lodwick was Nuclear Engineering Group Supervisor for the Waste Isolation Pilot Project, responsible for engineering, licensing and safety analysis for a geologic nuclear waste repository, including scheduling and budgeting of work scope, ensuring adequate staffing, and supervising engineering personnel.

Previously, Mr. Lodwick directed the acquisition, organization and utilization of technical material to support Bechtel's defense and counterclaims in a nuclear plant contract dispute. He developed and implemented procedures, ensured adequate staffing, supervised engineering personnel, and worked with counsel.

EXPERIENCE
(Cont)

In an earlier assignment, Mr. Lodwick participated in a spent nuclear fuel disposal study. Before that, he was assigned to Bechtel's Ann Arbor Office as Licensing Engineer responsible for obtaining the necessary permits and licenses for construction and operation of the Midland units. In this capacity, he prepared and approved technical material, met with the U.S. NRC and other governmental agencies, participated in the preparation for and conduct of licensing hearings before administrative bodies, directed activities of the project licensing group, and ensured adequate licensing support from the various engineering disciplines.

Previously, Mr. Lodwick was the Nuclear Systems Group Leader for the Sayago Project in Spain, where he directed design of nuclear safety systems for a single unit nuclear plant, developed applicable design criteria, and ensured adequacy of design by the Spanish architect/engineer. In addition, he trained Spanish engineering personnel in the performance of nuclear-related design activities.

With the Ann Arbor Office, Mr. Lodwick was an Engineering Supervisor responsible for directing a technical group in support of counsel on a technical lawsuit filed against Bechtel. He also directed the technical and administrative support effort associated with a construction permit "show-cause" hearing before an Atomic Safety and Licensing Board panel for the Midland units.

Earlier, Mr. Lodwick directed a technical study for use by a utility in an air pollution control tax exemption administrative action, and coordinated the contract between the reactor vendor, utility and Bechtel for the Quanicassee Nuclear Station.

Prior to joining Bechtel, Mr. Lodwick was S5W Shift Test Engineer for Puget Sound Naval Shipyard where he directed activities for overhaul, repair, and refueling of naval nuclear submarines.

WAYNE D. LOWE

POSITION Plant Design Group Layout Supervisor

EDUCATION Architectural Engineering, San Francisco City College,
University of California, Berkeley

SUMMARY 2 years: Engineering Group Supervisor
1 year: Layout Supervisor
2 years: Deputy Group Supervisor
3 years: Group Leader - Supervising Designer
3 years: Senior Designer
6 years: Designer
2 years: Piping Designer/Drafter and Field Checker

EXPERIENCE Mr. Lowe is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for the review of high and moderate energy line break (HELB/MELB) considerations in the design of selected systems in accordance with criteria compliances (i.e., FSAR, codes, standards, NRC regulatory guides and concerns), and the review of piping and equipment layout to meet the FSAR commitments.

Prior to this, Mr. Lowe was Engineering Group Supervisor on the Kashiwazaki Unit #5, 1100 MW nuclear power plant for the Hitachi project. The project task effort involved designing and modeling the turbine plant portion of a boiling water reactor (BWR) nuclear generating plant in Japan. Mr. Lowe's primary responsibility was supervising the design team consisting of 34 engineering/design personnel, monitoring budgets and schedules, and preparing specifications and reports. This involved engineering coordination meetings with the client for technological transfer of information.

Earlier, Mr. Lowe was Plant Design Group Layout Supervisor for Limerick Units #2 and #3, an 1100 MW nuclear generating plant project. His primary duties entailed supervising and coordinating the design effort consisting of 35 engineering and design personnel, and budgeting and scheduling tasks.

Prior to this, Mr. Lowe was Plant Design Deputy Group Supervisor and Discipline Quality Engineer (DQE) assigned to Pilgrim Unit #2, an 1100 MW pressurized water reactor (PWR) nuclear power plant. His duties also included project hanger coordinator, with responsibility for monitoring and approval of all support design locations, design optimization, and elimination of structural interferences. He prepared plant design engineering procedures and conducted engineering coordination meetings.

EXPERIENCE
(Cont)

Mr. Lowe was also Layout Supervisor in charge of a group of approximately 50 engineers and design staff members. In addition, he held the position of Deputy Plant Design Group Supervisor.

Mr. Lowe began his project career as a designer for the turbine building systems, responsible for designing piping using a 3/8" scaled plastic design model. He was then assigned as senior designer/checker for the turbine systems, thereafter assuming responsibilities of Turbine Building Group Leader (supervising designer position).

Mr. Lowe was also Piping Layout Designer assigned to the Duane Arnold Nuclear Power Plant (BWR) project. He was responsible for the equipment layout and pipe routing for the radwaste and auxiliary boiler systems.

Earlier, he was Piping Layout Designer assigned to the Peach Bottom Nuclear Generating Plant, an 1100 MW boiling water reactor. His primary duties were to lay out equipment and design piping for the turbine, radwaste, and auxiliary boiler systems.

Prior to this Mr. Lowe's responsibilities included design, drafting, and preparation of technical specifications for piping systems for fossil fuel power plants.

Mr. Lowe was earlier engaged in subcontract work at Mare Island and Hunters Point Naval Shipyard. Duties included research and technical writing for damage control books for surface vessels and nuclear submarines. Work included piping design drafting, resolution of construction discrepancies, and checking installation.

DEBRA L. LUBIN

POSITION Technical Writer/Editor

EDUCATION BA, Northeastern University, Boston, Massachusetts, 1971

SUMMARY	3-1/2 years	Technical Writer/Editor
	1 year	Publications Department Specialist
	5 years	Technical Editor
	3 years	Publications Department Coordinator

EXPERIENCE Ms. Lubin is assigned as the Staff Technical Writer/Editor for Bechtel Power Management. Her present duties include the editing and formatting of the Byron Independent Design Review reports. She has recently edited the Independent Design Review reports for the Midland, Vogtle and South Texas projects. Ms. Lubin also has the responsibility for coordinating and editing the standard specifications and the Nuclear Newsletter, and technical reports and presentations as applicable. She is also the system administrator for the Department's Wang Word Processing System.

Prior to this assignment, Ms. Lubin was employed by the Lawrence Livermore National Laboratory as the Publications Department Specialist, responsible for coordinating and distributing the work to word processors, proofreaders and layout artists under her supervision. She also performed special assignments and research projects as requested.

Earlier, Ms. Lubin was the Lead Technical Editor on the Millstone 3 project for Stone & Webster Engineering Corporation in Boston, Massachusetts. She managed the total publications effort, including administrative supervision, cost estimating, and scheduling. Ms. Lubin also set the project publications standards, format, and cover design. Prior to that, Ms. Lubin worked on the Jamesport project wherein she performed support activities for licensing hearings, as well as editorial support for the Environmental and Safety Reports.

Earlier, as Publications Department Coordinator for American Science and Engineering, Inc., Ms. Lubin was responsible for scheduling all illustrating, photography, and printing work coming to the Publications Department, including estimating and setting priorities.

July 1984

ALBERT S. MEYERS

POSITION	Engineering Specialist
EDUCATION	BS, Marine Engineering
PROFESSIONAL DATA	Associate, Institute of Marine Engineers Chief Engineer's License, United Kingdom
SUMMARY	30 years: Engineering Specialist 7 years: Senior Engineering Officer, Merchant Marine, United Kingdom 3 years: Manufacturing Plant Manager, West Indies
EXPERIENCE	<p>Mr. Meyers is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for piping engineering review.</p> <p>Mr. Meyers was assigned as an Engineering Specialist in the Plant Design Group of Bechtel Power Corporation. His duties have included the specifying and purchase of piping components and valves for nuclear and fossil steam power plants, writing test procedures, and reviewing and approving vendor procedures, drawings and documentation.</p> <p>Prior assignments at Bechtel have included Field Engineer during construction involved in the solution of on-site problems relating to Plant Design areas, especially in valves and piping.</p> <p>Prior to joining Bechtel, Mr. Meyers was engaged for 13 years doing similar work at C.F. Braun, R.M. Parsons Company and other manufacturing plants. He was involved in the application of ASME Codes in the design and construction of pressure vessels, piping and mechanical specialties for petrochemical and missile facilities.</p> <p>Mr. Meyers attained senior rank in the Merchant Marine. In addition to regular watch on main propulsion machinery, he was responsible for the repair and maintenance of valves, pumps, fans and similar auxiliary machinery, and development and implementation of spare parts procedures for various types of vessels.</p>

POSITION Engineering Supervisor/Specialist

EDUCATION BS, Civil/Structural, Ain Shams University, 1962
 MASC, Structural Engineering, University of Windsor, 1970
 MBA, Business Management, Golden Gate University (Currently
 enrolled)
 Ph.D, Engineering Mechanics, University of Toronto, 1972

PROFESSIONAL DATA Registered Professional Civil Engineer, California, Georgia, Michigan and Ontario, Canada. Member of ANS and ASCE.

SUMMARY	6 years:	Supervising Engineer
	2 years:	Engineering Specialist
	1 year:	Project Field Engineer
	2 years:	Senior Structural Engineer
	1-1/2 years:	Area Office Manager for San Francisco consulting firm
	6 years:	Consulting Engineer
	2 years:	Assistant Professor (Toronto and Michigan)

EXPERIENCE Dr. Michail is presently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for civil/structural activities.

Dr. Michail is also a Supervising Engineer/Specialist, responsible for civil/structural activities such as rupture restraints, seismic qualification of equipment, evaluation of field and shop welds on the Diablo Canyon Independent Design Verification Project. He is heavily involved in the project's NRC reviews and allegations of the Diablo Canyon Project.

Previously he was engineering group leader on the Susquehanna, Hope Creek and Grand Gulf Projects in charge of containment design, seismic and dynamic analysis, Mark I, II and III hydrodynamic loads, cable trays, ducts and duct supports, block walls and seismic qualification of equipment. He made several technical presentations to the NRC and was a member of the BWR, Mark II owners group committee for 4 years.

Dr. Michail was also a project field engineer for the Metropolitan Atlanta Rapid Transit Project.

Earlier, he was a lead engineer and group leader at Bechtel's Ann Arbor Office in charge of design of PWR prestressed concrete containments.

DR. MOE G. MICHAIL (Continued)

EXPERIENCE
(Cont)

At the Hydro and Community Facilities Division, Dr. Michail was a group leader for Riyadh Airport in Saudi Arabia. As a consulting engineer, he was involved in several commercial, industrial, petroleum projects as well as Navy and Airforce projects including reinforced and prestressed concrete and structural steel design.

During his career in the U.S., Dr. Michail was the area office manager for a San Francisco based corporation dealing with several subcontracts in the power and commercial industries. He is also an author or co-author of several technical papers published at SMIRT and ASCE conferences.

GORDON L. PARKINSON

POSITION Assistant Project Manager

EDUCATION BS, Mechanical Engineering, Detroit Institute of Technology
Nuclear Engineering, University of Michigan

PROFESSIONAL DATA Registered Professional Engineer, California, Iowa, Michigan,
Minnesota, Pennsylvania, Wisconsin
Member, American Society of Mechanical Engineers

SUMMARY 3 months: Assistant Project Manager
1 year: Project Manager
1 year: Assistant Project Completion Manager
3 years: Project Manager
6 years: Project Engineer
4 years: Project Manager
4 years: Project Engineer
3 years: Staff Member
6 years: Project Engineer
10 years: Draftsman and Design Supervisor

EXPERIENCE Mr. Parkinson is currently serving as Assistant Project
Manager of the Independent Design Review Team for the Byron
Generating Station, reviewing the Sargent & Lundy design,
under contract to Commonwealth Edison. He is responsible for
assisting with overall management of the review effort.

Prior to this, Mr. Parkinson was Project Manager for the
proposed design and construction of an 87 MWe cogeneration
facility.

Previously, he was Assistant Project Completion Manager for
the Diablo Canyon project jobsite managing and coordinating
activities to prepare the plant for low-power licensing.

Mr. Parkinson was Project Manager for the design and
construction of additions and upgrading of a fuel handling and
emissions control project for the 4-unit 3000 MWe coal-fired
Monroe Power Plant for the Detroit Edison Company.

Mr. Parkinson spent two years as Project Engineer on fossil
plant siting and design studies for a 400 MWe coal-fired unit
for Wisconsin Electric Power Company, and was Resident Project
Engineer providing general management of third party
engineering on 260 MWe utility plant for the Syncrude project
in Alberta, Canada and led the Bechtel staff engineering
development of an in-service inspection program manual for
nuclear power plants.

Prior to that, Mr. Parkinson was Project Engineer on the
Pennsylvania Power & Light Company Susquehanna Steam Electric
Station, Units 1 & 2 during the licensing period leading to
the acquisition of the NRC construction permit.

GORDON L. PARKINSON (Continued)

EXPERIENCE
(Cont)

As Project Manager, Mr. Parkinson was responsible for engineering, procurement and construction of Duane Arnold Energy Center 540 MW BWR, for Iowa Electric Light & Power Company.

Mr. Parkinson was also Project Engineer on the 540 MW Monticello Nuclear Generating Plant for Northern States Power Company.

Prior to joining Bechtel, Mr. Parkinson was a Staff Member of General Atomic providing engineering liaison with architect-engineers on high temperature gas-cooled reactors, including jobsite residency on Peach Bottom Atomic Power Station, Unit 1.

Mr. Parkinson was a Project Engineer on the design and construction of the nuclear piping systems and components for the fast breeder, sodium-cooled, 60 MW Enrico Fermi Atomic Power Plant.

Mr. Parkinson started his engineering career at the Detroit Edison Company performing as draftsman through design supervisor designing power piping systems on 11 fossil units, 125 to 340 MWe.

ROBERT S. POWELL

POSITION Principal Engineer

EDUCATION B.S., Mechanical Engineering, University of California,
Berkeley

PROFESSIONAL DATA Registered Professional Engineer, California

SUMMARY 2 years: Principal Engineer
 9 years: Chief Plant Design Engineer
 7 years: Assistant Project Engineer
 16 years: Various engineering positions

EXPERIENCE Mr. Powell is currently serving as a Team Leader of the
Independent Design Review Team for the Byron Generating
Station, reviewing the Sargent & Lundy design, under contract
to Commonwealth Edison.

Mr. Powell is also assigned as a Principal Engineer on the
staff of the Manager of Engineering, Bechtel Power Management.

Prior to this assignment, Mr. Powell was the Chief Plant
Design Engineer for the San Francisco Power Division.

Previously, Mr. Powell was Assistant Project Engineer on the
Limerick Generating Station, Units 1 and 2 and the Mendocino
Power Plant, Units 1 and 2. He was also Mechanical Group
Supervisor for Tarapur Nuclear Power Station, Units 1 and 2
and Peach Bottom Atomic Power Station, Units 2 and 3.

Earlier, Mr. Powell spent 11 years in the field and 5 years in
the San Francisco design office with duties of increasing
responsibility. His field experience included the supervision
of piping engineers at the Dresden Nuclear Power Station,
Unit 1. He was responsible for various phases of mechanical
design work for oil, gas, and coal fired conventional power
plants and for boiling water, pressurized water, and sodium
cooled reactor nuclear plants.

KATALIN G. PURCELL

POSITION Principal Administrative Assistant

EDUCATION BA, San Francisco State University, 1972

SUMMARY 3 months Project Administrator
2 years: Principal Administrative Assistant
2 years: Senior Administrative Assistant
3 years: Administrative Assistant
5 years: Secretary

EXPERIENCE Ms. Purcell is currently a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design under contract to Commonwealth Edison. She is responsible for administering and coordinating the review effort.

Prior to this, Ms. Purcell was Principal Administrative Assistant to the Chief Nuclear Engineer San Francisco Power Division, with responsibilities for personnel, salary, and department budget administration, as well as employee relations, coordination and administration of overall staff office functions, development and implementation of staff policies and procedures, implementation of company policies and procedures, and supervision of staff secretarial support.

Specific duties included recommendations and forecasts of department salary actions and promotions, coordination of personnel actions, including transfers, reassignments, terminations, administration of employee performance evaluations, and maintenance of department personnel records. Also forecasted department budget and monitored expenditures, prepared manpower reports, and forecasted EEO/AA yearly goals and timetables.

Duties have also included coordination of recruiting and interviewing, including preparation of job applicant salary offers, and recommendations for position and grade level. Ms. Purcell was also responsible for supervision of secretarial staff, including interviewing, hiring, recommending salary level, training and conducting performance evaluations and career counseling.

Previous duties at Bechtel have included secretary to the Chief Nuclear Engineer, project secretary for the Monticello Nuclear Generating Plant Project, and other various secretarial positions.

July 1984

R. P. SCHMITZ

POSITION	Chief Nuclear Enigneer
EDUCATION	BS, Chemical Engineering, University of Missouri at Rolla, 1950
PROFESSIONAL DATA	Registered Professional Chemical Engineer, Missouri Registered Professional Nuclear Engineer, California Certified by the National Council of Engineering Examiners Member of American Nuclear Society Member of Health Physics Society (Associate)
SUMMARY	2 years: Chief Nuclear Engineer 2 years: Technical Consultant 4 years: Manager of Engineering and Materials 7 years: Chief Nuclear Engineer 10 years: Research and Engineering 3 years: Project Engineer 2 years: U.S. Army 4 years: Engineer
EXPERIENCE	<p>Mr. Schmitz is currently assigned as Chief Nuclear Engineer responsible for overall coordination of nuclear activities in the Bechtel Power Corporation. He is also a member of the Level-2 Internal Review Committee for the Byron Independent Design Review Group. As a member of Bechtel Power Management, he has general overview responsibilities for the Byron Station Review.</p> <p>Previously, Mr. Schmitz was assigned to the United Kingdom Pressurized Water Reactor Project in Leicester, England, responsible for technical consulting and activities concerned with the Sizewell B public inquiry.</p> <p>Prior to that assignment, Mr. Schmitz was Manager of Engineering and Materials in Bechtel's Research and Engineering Department with responsibility for Bechtel's advanced power developmental activities on breeder reactors, fusion, geothermal, solar and wind, and for Bechtel's energy planning activities. He was also responsible for metallurgical and welding activities.</p> <p>Mr. Schmitz was Chief Nuclear Engineer in the San Francisco Power Division and progressed to Corporate Chief Nuclear Engineer, responsible for the safety, licensing, and environmental aspects of nuclear projects in Bechtel's six design offices for power projects.</p>

R. P. SCHMITZ (Continued)

EXPERIENCE
(Cont)

Earlier, Mr. Schmitz was in Bechtel's Research and Engineering operation, associated with safety analysis, licensing and nuclear design aspects of the Peach Bottom Unit 1 HTGR, San Onofre Unit 1, and Palisades. Other assignments were with the FARET fast reactor test facility, the NASA environmental test facility at Houston, and a proposed NERVA engine test facility in Nevada.

With the U.S. Atomic Energy Commission, Division of Reactor Development, Washington, D.C., Mr. Schmitz was Project Engineer responsible for coordination of the technical and budget aspects of the AEC's organic cooled reactor programs.

Mr. Schmitz was in the U.S. Army, Quartermaster Corps, Research and Development Agency.

Mr. Schmitz was with General Electric Company, Hanford Atomic Products Operation. He was in the Pile Technology Group responsible for fluid flow and heat transfer experiments associated with increased reactor power levels.

HARENDRA SHAH

POSITION: Engineering Group Supervisor

EDUCATION: BS, Mechanical Engineering, S.V. Regional College of
Engineering, Surat, India
Graduate Study for MSME, Worcester Polytechnic Institute

PROFESSIONAL DATA: Registered Professional Mechanical Engineer, California

SUMMARY: 4-1/3 years: Staff Supervisor - Technical
2 years: Project Group Leader
4 years: Pipe Support Engineer
1 year: Piping Layout Draftsman

EXPERIENCE: Mr. Shah is currently a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent and Lundy design under contract to Commonwealth Edison. He is responsible for reviewing pipe support design.

Mr. Shah is also currently a staff supervisor, responsible for pipe support design standards, solving project technical problems, developing pipe support computer programs, interpreting codes and standards, and developing and updating design manuals. Additionally, he assists in personnel evaluations, salary administration, staffing, and organizing project teams and recruiting new employees.

Prior to this, Mr. Shah was the pipe support group leader on the Hope Creek Project - a two unit 1000 MW boiling water reactor.

Earlier, Mr. Shah worked as resident pipe support designer at the Trojan Project site and as group leader on the Syncrude Project.

Before joining Bechtel, Mr. Shah designed and checked seismic pipe supports utilizing the "STRUDL" computer program.

His initial work assignment was as a draftsman in piping systems design.

July 1984

BRONISLAW (BRON) S. SHICKER

POSITION Consultant to Civil Group

EDUCATION BS, Civil Engineering, London University, England, 1953
AS, Military Engineering, Military Engineering College, Poland,
1939

PROFESSIONAL DATA Registered Professional Civil Engineer, California,
Massachusetts, South Dakota, Washington
Associate of British Institute of Engineering Technology
Member of ASCE

SUMMARY 1 year: Consultant to Civil Group
7 years: Assistant Project Engineer
2 years: Project Engineer
10 years: Civil/Structural Group Supervisor
6 years: Senior Civil/Structural Design Engineer
1 year: Structural Group Supervisor
3 years: Structural Group Leader
7 years: Officer with Corps of Engineers,
Polish/British Army

EXPERIENCE Mr. Shicker is currently serving as a member of the Independent
Design Review Team for the Byron Generating Station, reviewing
the Sargent & Lundy design, under contract to Commonwealth
Edison. He is responsible for review of the civil/structural
design.

Mr. Shicker was recently a Coordinator of the independent
project review of the Diablo Canyon Nuclear Project, and of the
FSAR update.

Previously, he was an Assistant Project Engineer on the Hope
Creek Nuclear Project in charge of the auxiliary building
facility, consisting of the structures, auxiliary diesel
generators, HVAC system, radwaste, machine shops, dc system,
diesel oil storage, and the cable spreading room.

Prior to that, Mr. Shicker was the Project Engineer in charge
of a proposal for the Spent Fuel Storage Facilities for TVA.

During an earlier assignment, Mr. Shicker was the Project
Engineer for BWR MkI nuclear containment-pool swell in charge
of study and modifications of wetwells for 17 plants in the US
and 3 plants in Japan.

BRONISLAW (BRON) S. SHICKER (Continued)

EXPERIENCE
(Cont)

As a Civil Group Supervisor, he was in charge of civil-structural design involving yard work, circulating water system, roads and railways, foundations and structures, equipment foundations, reactor containments, chimneys, cooling pond, coal handling structures, and ac-dc converter station. The projects were Pilgrim 1, Skagit, Big Stone, Lovet No. 5, and The Dalles.

As a Design Engineer he designed yard work, CWS structures and piping, power plant structures, turbine-generator pedestals, reactor containments, ventilation stack, and water tanks. The projects were Peach Bottom 1, FARET, Nasa-Apollo, Kahe 3, Everglades, and Hallam.

As an officer with the Corps of Engineers (WWII) he was involved with water storage and distribution, and road and bridge construction.

JACK A. SHOULDERS

POSITION Engineering Group Supervisor

EDUCATION BS, Oceanography, University of Washington; 1968
 Naval Submarine School, Connecticut; 1969
 Naval Nuclear Power School, California; 1969
 Naval Reactor Prototype Training, Idaho; 1970

SUMMARY 4 years: Engineering Group Supervisor
 5 years: Nuclear Group Leader
 2 years: Nuclear/Mechanical Engineer
 4 years: Nuclear Submarine Officer, U.S. Navy

EXPERIENCE Mr. Shoulders is currently a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design under contract to Commonwealth Edison. He is responsible for the mechanical process review of the component cooling water system and the review of three systems for the effects of high and moderate energy line breaks.

Prior to his present position, Mr. Shoulders was nuclear engineering group supervisor on the Nuclear Staff. In this capacity, he supervised the design or design review of several nuclear safety and radwaste treatment systems. This work included reviewing system designs for major nuclear power plant projects; keeping up-to-date on governmental design criteria, transportation and disposal criteria, and available vendor equipment; and performing technical and economic studies of alternative gaseous and liquid radwaste treatment systems, solidification systems, and volume reduction processes. These activities were performed for new nuclear power plants as well as for currently operating plants.

Mr. Shoulders recently worked on a detailed off-project review of a pressurized water reactor liquid radwaste system; an economic and technical bid evaluation for a boiling water reactor volume reduction and solidification system, an interoffice design review of the Palo Verde Nuclear Plant, response to problems experienced in the design and startup of the San Onofre 2 & 3 plants; and performed the design of the auxiliary feedwater system for the Japanese advanced PWR design.

Prior to this, Mr. Shoulders spent 7 years working on two nuclear power plant projects in positions of increasing responsibility. During this time, he had either direct engineering responsibility or supervisory responsibility for the nuclear safety and radwaste systems on the following projects: the Lemoniz nuclear power plant project (two 919 MWe Westinghouse units) in Spain, the Trojan plant (one 1200 MWe Westinghouse unit) in the U.S. As nuclear group leader on these projects, his duties included nuclear steam supply system coordination, detailed design of nuclear safety and radwaste systems, procurement of components, licensing, and high and moderate energy line break effects.

JACK A. SHOULDERS (Continued)

EXPERIENCE
(Cont)

With the United States Navy, Mr. Shoulders served on the USS Permit, supervising a team in the actual operation of a PWR. For two years he was an officer of a nuclear division in the Engineering Department supervising technicians in the proper maintenance of the nuclear mechanical and electrical systems. During an extensive ship refueling overhaul, he supervised the ship's crew and civilian shipyard workers during a complete nuclear core refueling and in the repair and testing of all the nuclear systems.

LEO S. SPENSKO

POSITION	Project Quality Engineer
EDUCATION	Electrical, U.S. Navy, 1948
PROFESSIONAL DATA	Registered Professional Quality Engineer, California
SUMMARY	9 years: Project Quality Engineer 2 years: Senior Quality Assurance Engineer 23 years: Aerospace Industry
EXPERIENCE	<p>Mr. Spensko is currently assigned to the Independent Design Review Team for the Byron Generating Station, which is reviewing the Sargent & Lundy design under contract to Commonwealth Edison. He is responsible for quality engineering functions on project. This task includes a review of S&L comments to 10CFR50, Appendix B, ANSI N45.2, ANSI N45.2.11 [1974] and ANSI N45.2.13 [1976], and verification that these comments have been translated into Sargent & Lundy programmatic quality assurance procedures, and implemented into the design control process. Mr. Spensko also provides training and guidance to IDR team members on project procedures and S&L design process flow and interface-control.</p> <p>Mr. Spensko was previously assigned to several Bechtel projects: Susquehanna, Trojan, Limerick, Hope Creek jobsite, Point Beach/Monticello, Pebble Springs, and Boardman in the same capacity. His duties included developing and maintaining the Project Quality Program, providing training and guidance to project engineering, discipline group supervisors and quality coordinators. Additionally he was responsible for issuing and modifying Engineering Department Procedures.</p> <p>Earlier, Mr. Spensko was Senior Quality Assurance Engineer on the Ayeska Project where he originated the Ayeska Quality Assurance during Construction Manual and supervised the quality engineering functions on the project in San Francisco.</p> <p>Prior to that assignment, Mr. Spensko was Senior Quality Assurance Engineer on the FFTF Project with responsibilities for developing effective inspection techniques and methods for accomplishing quality assurance program needs.</p> <p>Before joining Bechtel, Mr. Spensko held various positions in the aerospace industry in the areas of quality engineering, manufacturing, quality control, tool and gage design.</p>

July 1984

J. M. STROHM

POSITION Supervisor - Equipment Qualification Group

EDUCATION BANE (Aeronautical Engineering), University of Florida

SUMMARY 3 years: Equipment Qualification Group
9 years: Principal Valve Engineer
2 years: Development/Test Engineer
12 years: Test Engineer

EXPERIENCE Mr. Strohm is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing the Sargent & Lundy design, under contract to Commonwealth Edison. He is responsible for Environmental Qualification.

Mr. Strohm is also assigned as an Equipment Qualification Group Supervisor. He is responsible for technical direction and coordination of equipment qualification review work on the various projects being reviewed by the San Francisco office.

He has also been involved in developing seminar material for general equipment qualification instruction and in preparing various equipment qualification positions for client presentation to the NRC. His work with equipment qualification has included an extended field assignment where he set up and directed the completion of an in-situ static operability test program for the plant's active valves.

Prior to this assignment, Mr. Strohm was the principal valve engineer on the Chief Plant Design Engineer's staff. In this capacity, he prepared the standard specifications for valves and actuators, including the seismic and environmental test requirements. He also performed all Plant Design generic qualification report reviews and worked in conjunction with the stress group in reviewing all vendor supplied valve seismic static analyses. He has been involved with establishing component and assembly qualification requirements and evaluating submitted procedures to meet these requirements, and monitoring the test efforts (both seismic and environmental). He participated in developing and monitoring a test program undertaken to obtain the actual resonant frequency data for valve upper structures for the extended frequency range of interest associated with hydrodynamic loads.

Mr. Strohm has also acted as the SFHO project representative for the Mark II Owners Motors Test Group which was formed to generically qualify Limitorque motor actuators for the new hydrodynamic loads over the extended frequency range of interest.

Before joining Bechtel, Mr. Strohm worked for Douglas Aircraft and McDonnell Douglas on rocket propulsion systems design and testing.

July 1984

ANDREW VALACHOVIC, JR

POSITION: Engineering Specialist (Fire Protection)

EDUCATION: Mechanical Engineering, University of the City of New York;
Mechanical Engineering, New Mexico State University;
Diploma, Petroleum Refinery Engineering, Pennsylvania State
University Extension; Diploma, Sanitary Engineering, I.C.S.:
Heating, Ventilating, Refrigeration, Air Conditioning, I.C.S.;
Management, Marketing, Research and Data Analysis, Portland
State University

PROFESSIONAL: Registered Fire Protection Engineer, California
DATA: Registered Mechanical Engineer, Delaware and Oregon
Registered Civil Engineer, California
Registered Sanitary Engineer, New York, New Jersey, and
Pennsylvania; Member, National Fire Protection Association

SUMMARY: 30 years: Fire Protection Engineering
12 years: Fire Protection Engineering specifically
related to nuclear and fossil-fired power
plants

EXPERIENCE: Mr. Valachovic is currently serving as a member of the
Independent Design Review Team for the Byron Generating
Station, reviewing the Sargent & Lundy design, under contract
to Commonwealth Edison. He is responsible for fire protection
review.

Mr. Valachovic is also an engineering specialist on the
Mechanical Staff of Bechtel's San Francisco Power Division.
In addition to being a member of NFPA and ANSI/ANSI national
standard committees developing standards on nuclear power
plant fire protection, he is responsible for the development
of advanced fire protection engineering concepts and fire
hazard analysis methodology for nuclear and fossil power
generating stations in the United States, Canada, Europe, and
the Far East. He is also responsible for the implementation
of Corporate procedures addressing design standardization of
these systems. Mr. Valachovic is the author of a Corporate
guide for fire protection, the instructor of a Bechtel course
on fire protection, and has been directly involved with
developing industry standards for fire protection of nuclear
and fossil-fired power plants.

He was involved in the fire protection design, review, and
evaluation, together with Appendix R separation studies, for
the following nuclear power generating stations: Trojan,
Pilgrim I, Duane Arnold, Monticello, Arkansas Nuclear One,
Units 1 and 2, Susquehanna, Limerick, Hope Creek, Palo Verde,
San Onofre Units 2 and 3, and the South Texas Project,
together with conceptual design of the fire protection systems
for Kashiwazaki 1 and 2, in Japan.

July 1984

CHARLES RICHARD WHITEHURST II

POSITION Civil/Structural Engineer

EDUCATION BS, Civil Engineering, University of the Pacific, 1980
MS, Civil Engineering, Stanford University, 1981

PROFESSIONAL DATA Regis'ered Professional Civil Engineer, California

SUMMARY 3 years: Civil/Structural Engineer
1/2 year: Field Engineer
3/4 year: Construction Inspector
1/4 year: Engineering Trainee

EXPERIENCE Mr. Whitehurst is currently serving as a member of the Independent Design Review Team for the Byron Generating Station, reviewing Sargent & Lundy equipment qualification, under contract to Commonwealth Edison.

Prior to that, Mr. Whitehurst was a civil/structural engineer responsible for electrical and mechanical equipment qualification for the Limerick, Diablo Canyon, Hope Creek, and Trojan projects. His duties included extensive computer based dynamic analyses of equipment and supporting structures. Application programs included BSAP, NASTRAN, STRUDL, and BSEIM. He also participated in several equipment testing programs for Limerick and Diablo Canyon and was responsible for developing the dynamic testing specifications.

Mr. Whitehurst has also participated in construction support for the Susquehanna project, where his responsibilities included design and analysis of structural fixes for pipe restraints and jet impingement barriers for equipment protection.

Prior to joining Bechtel, Mr. Whitehurst was a field engineer for a consulting firm, where he was the engineer's representative for construction of earth-fill dam. Work included soils testing of fill for field density and moisture; surveying and grade setting for fill, construction documentation, and representing the firm during state inspections.

Earlier, Mr. Whitehurst was a construction inspector for the U.S. Bureau of Reclamation. His duties included preparing blasting plans for foundation excavation and quarry of large earth-fill dam.

Mr. Whitehurst was an engineering trainee with the Washington State Department of Transportation, where he was responsible for preparing cost estimates and preliminary designs of Park-and-Ride lots. He also compiled design reports and environmental assessments for several project locations.

July 1984

DEAN W. WOLFE

POSITION Quality Assurance Supervisor

EDUCATION BS, Mechanical Engineering, California State Polytechnic
College, 1970

SUMMARY 1 year: Lead Quality Assurance Engineer
 2 years: Quality Assurance Supervisor
 1 year: Senior Quality Assurance Engineer
 1 year: Sales Engineer
 2 years: Senior Quality Engineer
 1 year: Associate Quality Assurance Engineer
 3 years: Engineer
 3 years: Reactor Plant Shift Test Engineer

EXPERIENCE Mr. Wolfe is currently assigned to the Byron Independent
Design Review Team as Project Quality Assurance Engineer
responsible for all Quality Assurance activities, under
contract to Commonwealth Edison. He also is currently
assigned as Lead Quality Assurance Engineer responsible for
performing all QA activities for engineering and procurement
of the Susquehanna Steam Electric Station construction and
operational phases.

Mr. Wolfe was previously assigned as staff assistant to the
Manager, Quality Assurance - Projects. He was responsible for
preparing QA programs and participated in QA management audits
of nuclear EPC projects. He also developed and implemented an
inter-divisional computerized generic problem tracking system.

Earlier, Mr. Wolfe was assigned to the Hope Creek Project
where his duties included auditing and monitoring of Home
Office engineering, procurement and administration activities
for conformance to the Hope Creek Bechtel Nuclear Quality
Assurance Manual.

Prior to joining Bechtel, Mr. Wolfe worked as a Sales Engineer
for TransAmerica Delaval, Inc. with responsibility for
coordinating technical and administrative bid request
evaluations, preparing technical and pricing proposals and
providing factory support and selling strategy to field sales
personnel.

Earlier at TransAmerica Delaval, Mr. Wolfe was Senior Quality
Engineer, responsible for the quality and documentation
aspects for delivery of a nuclear power plant emergency
standby diesel generating unit.

Previously, Mr. Wolfe was an associate quality assurance
engineer at Southern California Edison Company. His duties
included auditing and surveillance of major plant
modifications in the areas of refueling, radiation protection,
maintenance and equipment startup and testing.

DEAN W. WOLFE (Continued)

EXPERIENCE
(Cont)

Mr. Wolfe was an engineer in the Quality Assurance Department of Nuclear Service Corporation. Assignments included developing and writing quality assurance programs and procedures for compliance to 10CFR50 Appendix B, the ASME Boiler and Pressure Vessel Code, and ANSI N45.2.

At Mare Island Naval Shipyard, Mr. Wolfe was a reactor plant shift test engineer responsible for the coordination and direction of shop, ship's force and inspection personnel for the safe completion of shipboard reactor plant electrical, mechanical and physics testing.

GREGORY K.K. YOUNG

POSITION Electrical Group Leader

EDUCATION BSEE, University of Santa Clara, 1972

PROFESSIONAL DATA Registered Professional Electrical Engineer, California

SUMMARY 2 years: Electrical Group Leader
 4 years: Senior Engineer
 6 years: Engineer

EXPERIENCE Mr. Young is currently serving as a member of the Independent Design Review Team for the Byron Generating Station (PWR), reviewing the Sargent & Lundy electrical design, under contract to Commonwealth Edison.

 Prior to that, for two years, Mr. Young served as Electrical Group Leader on the Limerick Generating Station, Units 1 and 2, a BWR nuclear plant. He led a group responsible for licensing, equipment qualification, and system completion which coordinated, monitored and scheduled all electrical design activities in support of startup. Also, as a senior electrical engineer he was responsible for reviewing all GE NSSS design and for licensing the electrical design portion of the Limerick plant.

 Before that, Mr. Young worked in Iowa Electric's office providing Bechtel engineering support for the operating Duane Arnold nuclear plant (BWR) and for the design and construction of three gas turbine units.

 Mr. Young has varied electrical design experience as an electrical engineer on the Pebble Springs (PWR), Bowline Point (gas/oil-fired plant) and Mendocino (BWR) power plants, dating back to 1972. This design experience encompasses all stages of electrical power plant design including electrical contract, system design, equipment procurement and engineering support at the jobsite. Mr. Young was also on a rotational assignment where he published a Division manhour manual.