Enclosure 2

PUBLIC SERVICE ELECTRIC & GAS CO.

HOPE CREEK GENERATING STATION

INDEPENDENT DESIGN VERIFICATION PROGRAM

WORK SCOPE DOCUMENT

PSEG-12-2559
REVISION 1

PREPARED BY

MULTIPLE DYNAMICS CORPORATION
29200 SOUTHFIELD, SUITE 103
SOUTHFIELD, MICHIGAN 48076
(313) 557-7766

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SUBJECT:	DATE ISSUED	DOC. NO.
HOPE CREEK GENERATING STATION INDEPENDENT DESIGN VERIFICATION PROGRAM - WORK SCOPE DOCUMENT	January 1985	PSEG-12-2559
	REVISION: 1	PAGE i

ABSTRACT

This Work Scope Document defines the Independent Design Verification Program (IDVP) for the Hope Creek Generating Station, being constructed by Public Service Electric and Gas Company (PSE&G) near Salem, New Jersey. PSE&G is performing the IDVP at its own initiative to provide additional, independent assurance of the Hope Creek design and design control adequacy, prior to plant fuel load. A contractor independent from previous Hope Creek engineering and design activities will be selected to perform the IDVP, which will consist of a detailed design review of selected elements of the Hope Creek safety systems.

To provide further independence in this effort, PSE&G contracted Multiple Dynamics Corporation (MDC) to determine IDVP criteria and requirements, select the systems and components to be reviewed, and prepare the Work Scope Document. MDC has had no previous contract relationship with PSE&G or Bechtel Power Corporation, and has completed this Work Scope Document as an independent consultant.

Multiple Dynamics Corporation — Date 1/30/85

by Frank E. Gregor
President

TABLE OF CONTENTS

MULTIPLE DYNAMICS CORPORATION

SUBJECT:	DATE ISSUED	DOC. NO.
HOPE CREEK GENERATING STATION INDEPENDENT DESIGN VERIFICATION PROGRAM - WORK SCOPE DOCUMENT	January 1985	PSEG-12-2559
	REVISION: 1	PAGE 1

I. INTRODUCTION

This document is a work scope description of an Independent Design Verification Program (IDVP) for the Hope Creek Generating Station, being constructed by Public Service Electric and Gas Company near Salem, New Jersey. This Work Scope Document will be used as a reference document by the selected IDVP contractor, Public Service Electric and Gas Co. (PSE&G), Bechtel Power Corporation, General Electric Co., and other parties as necessary, during the performance of the IDVP.

This document provides a definition of Public Service Electric and Gas objectives and requirements in performing the Hope Creek IDVP. Separate sections define the IDVP contractor's requirements, the PSE&G/Bechtel/GE interface with the IDVP contractor, and the technical work scope of the program.

Public Service Electric and Gas is performing the IDVP at its own initiative, to provide additional, independent assurance of Hope Creek design adequacy and thoroughness. This program is also intended to provide assurance of the design interface and control practices among PSE&G, Bechtel, and other contractors. These objectives will be achieved by a limited verification of selected systems' design concepts, detailed engineering and analysis, and implementation into plant construction. These systems include elements of the High Pressure Coolant Injection (HPCI) System, the Automatic

Depressurization System (ADS), and selected auxiliary systems which support the safe operation of HPCI and ADS.

The selection criteria, the choice of systems to be reviewed, and the preparation of this Work Scope Document, were performed by an independent consultant to Public Service Electric and Gas, to meet criteria appropriate to current independent design verification programs underway at other near-term-operating-license nuclear plants.

II. IDVP CONTRACTOR REQUIREMENTS

This section of the Work Scope Document contains general requirements related to performance of the Independent Design Verification Program by the selected contractor. These requirements are established to ensure effective, independent design verification per the technical work scope definition of Section IV, while adhering to PSE&G's schedule.

a. Contractor's Objective

The contractor's objective is to provide additional, independent assurance to Public Service Electric and Gas, that conceptual engineering, detailed design implementation, and design control practices have been adequately performed for the Hope Creek Generating Station, given a limited scope of review of selected systems and components. This objective also includes additional assurance that the design

interfaces among PSE&G, Bechtel, and General Electric have been properly administered and controlled to effect adequate design for the Hope Creek Generating Station.

The contractor will make his determination by reviewing engineering and design data, and related engineering procedures and practices, and where necessary performing independent calculations and analyses. The contractor will also consider in this determination the input of interviews and meetings held with design personnel and management of the affected organizations, and the results of on-site physical inspections of constructed components.

The basis for determination of design adequacy shall be the design criteria and limitations defined in the Hope Creek Final Safety Analysis Report, including all Federal regulations, industry codes, and licensing commitments encompassed therein. The basis for determination of design control and interface adequacy shall be the PSE&G and Bechtel procedure manuals referenced in this Work Scope Document.

b. Contractor's Corporate Qualifications and Project Team

1. The IDVP contractor as a corporate entity shall be clearly independent from previous Hope Creek engineering and design activities associated

with systems, components, and design aspects identified in the technical work scope of Section IV. This independence shall include any contractual relationships with PSE&G, Bechtel Power Corporation, or General Electric related to the Hope Creek Generating Station design and engineering activities discussed in this Work Scope Document.

2. The "key" employees of the IDVP contractor, as defined in Item 4 below, shall also be clearly independent from previous Hope Creek engineering and design activities associated with systems, components, and design aspects identified in the technical work scope of Section IV. This shall include current employment with the IDVP contractor, and previous employers where such previous employment provided a direct engineering involvement with these Hope Creek engineering and design activities in the last five years.

3. The IDVP contractor shall have successfully performed an IDVP of a similar nature on another nuclear plant, to provide evidence of the requisite experience and familiarity with the scope of work. Alternatively, the IDVP contractor must be a large, multi-disciplined architect-engineering firm with experience in

complete, integrated design of a nuclear power plant.

4. The IDVP contractor shall assemble a review team with the following requirements:

   . A Program Manager will be designated who will coordinate and monitor all work of the contractor. The Program Manager will be the primary technical and commercial interface contact with PSE&G, Bechtel, and other affected organizations per the communications protocol of Paragraph II(d) below. The resume of the proposed Program Manager shall be reviewed and approved by PSE&G prior to award of this contract. The IDVP contractor will not remove the Program Manager from his responsibilities under this work scope for the duration of this contract, unless such removal is caused by events beyond the contractor's control. Should such removal occur, PSE&G shall review and approve the resume of the proposed replacement prior to his assignment as Program Manager.

   . "Key" employees of the IDVP contractor will be identified, covering all appropriate disciplines to be reviewed, per the technical Work Scope of Section IV. These key employees will be responsible for technical matters in

their areas under the direction of the Program Manager. The resumes of key employees shall be reviewed and approved by PSE&G prior to the award of this contract. The IDVP contractor will strive to maintain these key employees on this work scope through the duration of the contract. PSE&G shall review and approve the resumes of replacement key employees prior to their assignment to this contract.

. Resumes of the Program Manager and key employees assigned to this contract will be reviewed to determine:

- Individual's experience in nuclear power plant systems, regulatory requirements, methods of design verification and control, and task management skills.

- Individual's independence from previous Hope Creek engineering and design activities related to the scope of work.

. The IDVP contractor will assemble a "Senior Review Committee", composed of senior engineering and/or management personnel not directly involved with the day-to-day IDVP program, who will be responsible for reviewing and dispositioning observations and potential findings as discussed in Item II(d) below.

- The IDVP contractor will assemble a total project team consisting of only full-time, bona fide employees of the contractor. No part-time employees, subcontractors, or outside consultants will be utilized without prior, written approval of PSE&G. The contractor will strive to hold this team together for the duration of this contract. The contractor will provide an organization chart showing the overall project team.

- The IDVP contractor will commit to start the work immediately upon contract award, provide personnel to ensure steady and timely progress, and complete the final report by June 29, 1985.

c. Contractor's Interface Requirements

The IDVP contractor will interface with PSE&G's Contract Administrator, with engineering and design personnel at PSE&G's Newark headquarters and Site Engineering Division at Hope Creek, with Bechtel Power Corporation at the San Francisco and Hope Creek site Resident Engineering offices, with Bechtel Construction Corporation Field Engineering at the Hope Creek site, and with General Electric at their San Jose headquarters and Hope Creek site offices. The IDVP contractor may also have a limited interface with Bailey Controls for the

instrumentation and controls segment of the review. The affected organizations' interface structures are detailed in Section III of this Work Scope Document.

The IDVP contractor shall submit a program plan, stating assumptions on how these interfaces will be accomplished. Specifically, PSE&G has the following expectations regarding the approach to be taken in performing the IDVP scope:

1. The bulk of engineering and design data review and analysis will be performed in the IDVP contractor's home office. All data consolidation, observation and potential finding dispositioning, and report preparation will be performed in the IDVP contractor's home office.

2. There will be a one-day IDVP "kickoff" meeting in Bechtel's San Francisco office at project commencement, to review with all affected parties the intent, scope, and administration of the IDVP. Bechtel will provide an overview of Hope Creek design and construction status, and identify areas where incomplete design and construction may have a bearing on the IDVP contractor's observations (e.g., system walkdowns and as-built reconciliations currently in progress by Bechtel).

3. The IDVP contractor will need to make a minimum number of visits to Bechtel's San Francisco and Hope Creek offices, to PSE&G's Newark and Hope Creek offices, and to General Electric's San Jose and Hope Creek offices, for technical data collection, data review, interviews, meetings, and follow-up actions. The contractor will state his assumptions on the expected number, duration, manpower requirements and nature of these visits, based on the technical work scope of Section IV.

4. The IDVP contractor will state his assumptions regarding visits to the Hope Creek site for plant familiarization tours, system walkdowns, and construction measurements, which may involve direct plant access, in a manner similar to Item 3 above.

5. The IDVP contractor will state his assumptions on meetings among PSE&G, Bechtel, and the contractor concerning the reporting of observations and potential findings, and their dispositioning, in a manner similar to Item 3 above.

6. There will be a final one-day meeting at PSE&G's Newark headquarters to review with PSE&G management the final results of the IDVP.

d. Contractor's Methods of Communication (Communications Protocol)

The IDVP contractor shall establish and maintain a communications protocol among himself, PSE&G, Bechtel, and other affected organizations to ensure the following objectives:

- The independence of the IDVP contractor's investigations, analyses, and determinations is not compromised.

- The IDVP contractor creates and retains a documented and auditable trail of communications to provide assured evidence of the independent verification.

- The generation of observations and potential findings, and their disposition, represent correct interpretation of data provided, or allow identification of data not provided which is relevant to the observation or finding.

To meet these objectives, the IDVP contractor shall abide by the following communications and record keeping procedures:

1. Written correspondence on contract commercial matters, budget, schedule, and other issues not related to the technical work scope shall be

addressed to the PSE&G Contract Administrator, with no copies to other parties.

2. Written correspondence for data requests shall include a tabulation of data requested, and be addressed to the PSE&G Contract Administrator (cc: Bechtel Task Leader) for data requested from PSE&G, to the Bechtel Task Leader (cc: PSE&G Contract Administrator) for data requested from Bechtel, and to the designated General Electric Project Manager (cc: PSE&G Contract Administrator and Bechtel Task Leader) for data requested from General Electric.

3. Meetings between the IDVP contractor and PSE&G, Bechtel or GE shall be scheduled at least one week in advance, and shall be preceded by a written meeting notice with agenda and names of contractor personnel attending. Meeting minutes shall be taken and prepared by the IDVP contractor, with copies provided to the PSE&G Contract Administrator, the Bechtel Task Leader and the GE Project Manager (if affected).

4. Telecons may occur between the IDVP contractor and PSE&G, Bechtel and/or General Electric for the purposes of data gathering. The substance of these telecons shall be recorded in telecon notes by the IDVP contractor, and copies provided similar to meeting minutes.

5. Oral conversations may occur between the IDVP contractor and PSE&G, Bechtel and/or General Electric outside the setting of a formal meeting or telecon. Such conversations shall be recorded in written notes by the IDVP contractor, if substantive information is exchanged, and transmitted in a manner similar to meeting minutes.

6. After analysis of data and review of Hope Creek plant design and construction, the IDVP contractor may develop "observations" or "potential findings" related to perceived inadequacies in design or design control. Observations will not require a formal written response for the final report. Potential findings must have a PSE&G/Bechtel response to allow the IDVP contractor to determine the validity of the finding.

   Potential findings and observations shall be communicated in the following manner:

   . The IDVP contractor may seek additional data via telecons, written data requests, or meetings, to internally resolve or confirm the observation or potential finding prior to release.

. The IDVP contractor shall forward a written statement of the observation or potential finding to the PSE&G Contract Administrator and the Bechtel Task Leader concurrently. The Bechtel Task Leader will forward to General Electric and/or other affected organizations those potential findings requiring review and response by them.

. Affected organizations' responses, other than those generated by PSE&G, will be forwarded to the Bechtel Task Leader, for subsequent forwarding to the PSE&G Contract Administrator. Bechtel's internal responses will also be forwarded to the PSE&G Contract Administrator, who will forward all responses to the IDVP Contractor. These responses will include any corrective actions to be implemented by PSE&G, Bechtel, or General Electric.

. The IDVP contractor shall review the responses, and shall notify the PSE&G Contract Administrator and the Bechtel Task Leader via telecon of its agreement or disagreement with the response provided. PSE&G and/or Bechtel may choose to amend the response provided or let the response stand.

. The IDVP contractor shall utilize its internal "Senior Review Committee" to review all

observations and potential findings, and disposition them on an individual basis to be "valid" or "invalid". All valid and invalid observations and findings, and the corresponding PSE&G/Bechtel responses where applicable, shall be incorporated into the draft and final reports discussed in Item II(f) below.

7. Copies of all written correspondence, meeting minutes, telecons, observations and potential findings transmittals, and findings responses, including drafts, between the IDVP contractor and PSE&G, Bechtel, and GE shall be kept on file by both the IDVP contractor and the interfacing organizations, until directed by PSE&G.

e. Contractor's Utilization of Data

1. The IDVP contractor will be provided access to all design data, drawings, and related design/engineering procedures, required for the IDVP effort. This access will be coordinated by the interface contacts listed in Section III of this Work Scope Document.

   The IDVP contractor must be able to accept design data and drawings in the following forms: hardcopy, microfiche (correspondence, data), aperture cards (drawings), and telecopier

(correspondence, data). Data may be provided in any or all of these forms.

The IDVP contractor shall develop a log of all data received for this contract, and shall maintain a controlled document storage and retrieval system for this contract separate from his other contract files. The IDVP contractor shall be required to return all data after contract completion as directed by PSE&G. The contractor shall also destroy or return any working copies made from original data, as directed by PSE&G.

2. Public Service Electric and Gas recognizes that in performing work on the Independent Design Verification Program, the IDVP contractor may be required to obtain, review, and analyze proprietary design codes, information, or methods from Bechtel, General Electric, or other engineering or equipment firms. Therefore, the IDVP contractor shall agree to hold such information in strictest confidence, not to make use of such information other than for performing the Independent Design Verification Program work, to release it only to contractor employees requiring such information, and not to release or disclose it to any other party.

PSE&G reserves the right to require that the IDVP contractor sign written agreements implementing this provision, upon the written request of other firms involved in this verification program, provided such written agreements are acceptable to PSE&G.

f. Contractor's Work Output Requirements

The IDVP contractor shall provide the following documents as work output over the course of this contract:

1. A Program Plan which details project organization, resumes, overall approach to the task, positive statements indicative of compliance with the requirements in this Work Scope Document, and exceptions/clarifications to this Work Scope Document clearly highlighted. The Program Plan shall provide evidence of a systematic approach (checklists, observation records, potential finding report, etc.) to be utilized by the IDVP contractor.

2. A bi-weekly status report to the PSE&G Contract Administrator, detailing overall work progress, problems and proposed solutions, and open issues between PSE&G and the IDVP contractor. This report shall be only for contract monitoring purposes, and shall contain no discussion of

technical findings, discrepancies, etc., which are reserved for the Technical Report.

3. A network schedule with sufficient details and milestones identified to provide PSE&G assurance of timely and adequate progress. The IDVP contractor shall update this network chart and transmit it to the PSE&G Contract Administrator on a biweekly basis.

4. Copies of all meeting minutes, telecons, and correspondence recorded by the IDVP contractor under the scope of this contract, and meeting notices/agendas for requested meetings.

5. Individual, written documentation of observations and potential findings, issued promptly as generated, for review and response by PSE&G, Bechtel, and affected organizations.

6. A Technical Report, draft and final versions, issued to the PSE&G Contract Administrator, which includes as a minimum:

   . An executive summary covering scope of work, project organization, methodology, results, and overall conclusions.

   . A detailed discussion of the program scope, objectives, selection of systems and

components reviewed, and design disciplines and aspects examined.

- A summary of the contractor's team, personnel assignments, management methods, Senior Review Committee.

- A discussion of the independent design verification document collection, methods used, data review criteria and procedures, analyses completed, plant walkdowns.

- A discussion of the contractor's review of the design control and interface process.

- Compilation of the review results by discipline and design aspect.

- Conclusions and recommendations, including significant findings, significant design conservatisms, recommendations, and overall conclusions on Hope Creek design and design control adequacy, as measured against the IDVP contractor's objective.

- Appendices which provide detailed definitions, nomenclature, documents reviewed, review criteria, observation review records, checklists, potential finding reports and

related responses, disposition of observations and potential findings as valid or invalid.

. A statement of the IDVP contractor's independence in performing this scope of work, including a testament of corporate and personnel lack of vested interest in the outcome of the IDVP, and the assurance of no previous corporate or key employee involvement in the engineering or design activities of Hope Creek systems and components pertinent to this IDVP.

g. Miscellaneous Contractor Requirements

1. Security Provisions and Work Rules

The IDVP contractor shall be required to abide by Public Service Electric and Gas security provisions and job site work rules at the Newark offices and the Hope Creek site. The IDVP contractor shall also be required to abide by security regulations in effect at Bechtel and General Electric offices during visits to these facilities.

Document Control Center procedures for the obtaining and controlling of design data and drawings at Bechtel's San Francisco offices and Hope Creek job site offices shall be followed by the IDVP contractor.

2. Performance of Work per Procedures

The IDVP contractor shall perform his work per his established internal procedures manual. The contractor shall also abide by the reporting requirements of 10CFR21.

Should the IDVP contractor determine that a finding is reportable under 10CFR21, the contractor shall immediately report its finding verbally to Mr. Arthur E. Giardino, Manager, Quality Assurance, PSE&G, followed up by a written confirmation.

III. PSE&G/BECHTEL/GENERAL ELECTRIC INTERFACE ORGANIZATION

The IDVP contractor shall develop and maintain working relationships with the following interface organizations, and shall become familiar with the stated procedural methods for Hope Creek design and design control:

a. Public Service Electric and Gas Company

For the Newark headquarters office, the IDVP contractor will coordinate activities through the PSE&G Contract Administrator, William F. Bauer. Additional contacts within specific disciplines of PSE&G's Hope Creek Project Organization and the Engineering and Construction (E&C) Department, will be identified to the contractor at the project "kickoff" meeting.

The IDVP contractor will utilize the Hope Creek Generating Station Project Manual, including all procedures pertinent to the IDVP contained therein, as a source document for PSE&G activities. The specific engineering and design procedures of each E&C Department discipline supporting the Hope Creek Project will also be referenced as they apply to review and approval of Hope Creek documents prepared by Bechtel Power Corporation.

For the PSE&G Hope Creek Site Engineering Division, a single contact will be identified to the IDVP contractor at the kickoff meeting. This contact will coordinate contractor activities involving all PSE&G site personnel.

The IDVP contractor will utilize the Hope Creek Site Engineering Division Instructions Manual as the source document for site engineering activities pertinent to the IDVP scope.

b. Bechtel Power Corporation

Bechtel Power Corporation, with main offices in San Francisco and support offices at the Hope Creek job site, is the architect/engineer and constructor for the Hope Creek Generating Station. As such, it is expected that a major portion of the IDVP contractor's work will be focused on Bechtel design and engineering activities.

Bechtel Power Corporation will coordinate all IDVP activities involving its work through a single contact, designated as the Bechtel Task Leader. The Bechtel Task Leader will have available discipline contacts and other resources, which will be identified at the kickoff meeting.

The IDVP contractor will utilize the Bechtel Hope Creek Project Engineering Procedures Manual as a source document for Engineering Department Procedures, Project Instructions, and Manager of Engineering Directives pertinent to the IDVP project.

The IDVP contractor will utilize the Bechtel Document Control Center as the source for obtaining data and drawings. A single contact will be designated at the project kickoff meeting, who will coordinate all data requests of the contractor.

The IDVP contractor will be provided an orientation to the Bechtel documentation system, including the use of the following Bechtel documents:

. Communication Control Register
. Design Document Register
. Supplier Document Register
. Indices for valves, components, instruments, equipment, dampers and piping lines

. Piping and Instrumentation Diagrams (P&ID), and Design Installation and Test Specifications (DITS)
. EE580 program containing cable, conduit, tray, and termination information

The use of these and other documents in retrieving design information at both the San Francisco and Hope Creek Bechtel offices will be explained to facilitate IDVP contractor identification of the needed data.

The Bechtel Task Leader will identify to the IDVP contractor the Bechtel site contacts for review activities and system walkdowns at the Hope Creek plant. These contacts may be in either Bechtel's Resident Engineering group (supporting the home office engineering effort) or in Bechtel's Field Engineering group (supporting the construction effort).

c. General Electric Company

The IDVP contractor will have a limited interface with the General Electric Company at their San Jose, California and Hope Creek site offices. This interface will be restricted to the transfer of design data and concepts which occurred between General Electric and Bechtel/PSE&G regarding the technical scope discussed in Section IV.

A General Electric contact will be identified at the kickoff meeting, and arrangements to meet with General Electric personnel for IDVP purposes will be established via the PSE&G Contract Administrator. Data requests and design control information for General Electric will be defined by the IDVP contractor after his initial engineering review effort at Bechtel.

d. Miscellaneous Interfaces

The IDVP contractor may have a limited interface with Bailey Controls for the instrumentation and controls segment of the review. This interface will be coordinated through the Bechtel Task Leader. No other interfaces are anticipated for the IDVP.

e. Services, Materials, Data Provided by PSE&G, Bechtel, GE

To support the IDVP contractor's work scope, the contractor will be provided the following services, materials, and data at contract initiation:

. Sufficient private office space, furniture and telephones for contractor personnel during their visits to PSE&G, Bechtel or GE facilities. This will not necessarily be dedicated offices, and the contractor should not assume that the contractor's materials, supplies, or belongings may be left during periods of contractor absence.

- Current organization charts for affected areas of PSE&G and Bechtel.

- Current versions of the PSE&G Hope Creek Project Manual, the PSE&G Site Engineering Division Instructions Manual, PSE&G E&C Department discipline procedures pertinent to Hope Creek, and the Bechtel Hope Creek Project Engineering Procedures Manual.

- Current revisions of specific design data for the affected systems, as may be determined by the contractor prior to the kickoff meeting.

- Current set of the Hope Creek Final Safety Analysis Report.

- Specific data normally prepared by sources outside the organizations to be reviewed, which served as input to certain design and engineering activities associated with the technical scope of work in Section IV. Review and independent verification of this data is not part of this contractual scope, and the data is to be accepted by the IDVP contractor as valid input. This data is specifically identified in Section IV, and is provided directly to the IDVP contractor to avoid unnecessary and costly regeneration.

IV. TECHNICAL SCOPE OF WORK PERFORMANCE

a. Background and Selection Criteria

Public Service Electric and Gas requested an independent consultant to develop selection criteria and choose appropriate systems, components, and aspects to be included in the Hope Creek Independent Design Verification Program. This section of the Work Scope Document details these criteria, the selected areas of Hope Creek design to be reviewed, and other technical considerations for the IDVP contractor to assess the design and design control adequacy.

The basis for determining design adequacy, as stated in the Contractor's Objective of Section II(a), is the Hope Creek Final Safety Analysis Report. This includes all design criteria, design and licensing commitments, Federal regulations, industry codes and standards, and other aspects which are embodied in the FSAR related to the specific systems and components to be reviewed. The FSAR will serve as the IDVP contractor's source document for making determinations on observations or potential findings concerning design adequacy.

The basis for determining design control adequacy and proper design interfaces will be the Hope Creek Project Manual procedures, Site Engineering Division instructions, PSE&G E&C Department discipline

procedures, and the Bechtel Hope Creek Project Engineering Procedures Manual.

It is important to note that the primary function of this IDVP is an assurance of design adequacy and proper implementation of design control practices and interfaces. This will be accomplished by focusing on the application and continuity of design criteria and practices from system concepts and base Federal regulations through actual implementation via construction. This review is not intended to be a detailed quality assurance audit of safety-related systems similar to those performed on several occasions in the past.

The systems and components to be reviewed were selected on the following criteria:

- They must be safety-related and/or important to the safe shutdown of the plant.
- There should be an inability to verify the accident or emergency performance of equipment by direct testing (on the assumption that direct testing serves as a design verification).
- There must be involvement of multiple architect/ engineer design interfaces

. There should be design changes which have occurred over the plant design period.

. There must be a cross-section of engineering and design disciplines.

. Parallel and series design interfaces will be considered.

. To the extent practical, there will be consideration of Hope Creek unique admitted contentions from the Atomic Safety and Licensing Board Prehearing Conference.

. The selected scope has not been previously reviewed or audited via other boiling water reactor IDVP's (on a generic basis) or through previous plant-unique design reviews and audits.

The selection process involved identifying engineering and design disciplines, specific segments of systems, and related design aspects to best accommodate these criteria. Elements of the High Pressure Coolant Injection (HPCI) System and the Automatic Depressurization System (ADS), and selected auxiliary systems which support operation of these systems, were chosen as detailed below.

The emphasis on engineering discipline review and related design aspects is placed on the HPCI system.

The elements of the HPCI system to be reviewed are portrayed on Figure 1 as highlighted segments of a simplified HPCI P&ID. The review of the ADS is limited to its function as part of the HPCI-ADS Emergency Core Cooling System "network" for high pressure relief in the safe shutdown process, and its diversity, separation and redundancy to HPCI. No separate figure is provided for the ADS.

Items (b) through (f) below address specific design disciplines and aspects to be reviewed. Item (g) discusses the design control process to be reviewed.

b. Electrical Design to be Reviewed

The electrical IDVP review will consist of two segments:

1. HPCI Steam Line Isolation Valves HV-F002, HV-F003

The contractor shall review the electrical motive and control power feeds to valves HV-F002 and HV-F003 in terms of the following:

- Diversity of power sources
- Redundancy and Class 1E channel separation
- Voltage requirements and regulation, including undervoltage protection and operation at degraded voltage
- Cable sizing, insulation, and code standards
- Conduit sizing (if any)

. Physical separation of cabling, conduit, and trays carrying power to these valves
. Fault protection sizing, selectivity, and coordination with overall Class 1E electrical system, for cables feeding these valves (for faults within valve, cabling, local control power cabinet, source motor control center, or 480 volt Class 1E unit substation bus).

The span of this review will cover the motive power feeds from the valves themselves out to and including the Class 1E 480 volt unit substation buses which directly power the valves, and the control power feeds from the valves to the control power cabinet buses.

2. HPCI-ADS Network Separation

The contractor shall review the electrical power separation between HPCI and ADS in the following aspects:

. Separation of Class 1E channels of control power to the ADS valves from those power channels feeding the HPCI system.

. Control power diversity and independency to the ADS valves as a system, for automatic and manual actuation.

The span of this review will cover from the essential control power cabinet buses to the ADS valves.

c. Instrumentation and Controls Design to be Reviewed

The instrumentation and controls IDVP segment shall consist of a detailed review of the flow orifice FO-N032 on the HPCI steam line, and all instrumentation and control functions which are generated from the flow orifice. This orifice generates steam flow signals which result in alarm and isolation/trip signals being supplied to shut down the HPCI turbine for abnormal conditions.

Mechanical designs of the orifice and instrument tubing are covered in paragraph (d) below.

The IDVP contractor shall review the following elements of the orifice FO-N032 and all connected instrumentation and controls:

- Sensing devices
- Signal conversion and processing devices
- Intermediate instrumentation cabinet devices
- Control room instruments, alarms, indication, setpoints
- Automatic trip functions, isolation logic, interlocks
- Capturing of information on sequence of events recorders, computer, hardcopy recorders

. Testability aspects for surveillance monitoring

The span of the review shall cover proper selection of devices, separation, redundancy, correct design and proper installation. The specification, design and correct application of AC and DC instrument power sources and components for the selected devices will also be reviewed. The review will trace all four instrument tubing lines from the orifice to the end devices.

This segment of the review may require some limited interface with Bailey Controls.

d. Mechanical/Structural Design to be Reviewed

The mechanical and structural IDVP review shall consist of two segments:

1. HPCI Steam Line

The IDVP contractor shall review the overall mechanical and structural design of the HPCI steam line from the main steam line tap to the HPCI turbine drain pot. This review will be performed considering the appropriate design and equipment specifications, and the compliance of the design to appropriate ASME code sections, ANSI standards, and Federal regulations. The following specific aspects will be reviewed:

. Line sizing
. Thermal transients including line warmup
. Thermal movements
. Mechanical design of FO-N032 flow orifice
. Mechanical design of FO-N032 instrument tubing
. Penetration loads (including load path to structure)
. Penetration stresses
. Annulus pressurization loads interface
. HV-F002 valve loads and seismic qualification
. Main steam line design interface
. Pipe break locations
. Seismic loads interface

The IDVP contractor shall also assess the design adequacy of one each of the following components along the HPCI steam line, to be selected by the contractor:

. One snubber
. One hanger/support
. One pipe whip restraint

The assessment of design adequacy for these three selected components will consider sizing, proper placement, welds, and the effects of load transfer to the structure.

In the event the IDVP contractor generates a valid finding on the selected snubber, hanger/

support, or pipe whip restraint, the contractor will select two (2) additional samples of the affected component type for further independent verification. The intent of this activity will be to define any generic design inadequacy related to these components.

The span of the review is the entire segment of the HPCI steam line from and including the main steam "tee" to and including the drain pot.

2. HPCI Pump Suction Line from Condensate Storage Tank

The IDVP contractor shall review selected mechanical and structural aspects of the buried HPCI pump suction line from the condensate storage tank to the HPCI pump, as follows:

- Line sizing
- Net Positive Suction Head margin
- Buried pipe analysis (seismic design, cathodic protection/corrosion control, sealants, etc.)
- Pipe break and flooding potential into Reactor Building

The span of the review is the entire HPCI pump suction line from the condensate storage tank to the "tee" connection with the pump suction line from the torus.

e. Miscellaneous Design Aspects to be Reviewed

In addition to the specific electrical, instrumentation and controls, and mechanical/structural elements to be reviewed as discussed in paragraphs (b) through (d) above, the IDVP contractor shall review the following design aspects:

1. Environmental Qualification

The environmental qualification of the inboard HPCI steam line isolation valve HV-F002 motor shall be reviewed. The IDVP contractor shall not regenerate the drywell environmental responses of humidity, temperature, pressure, and radiation, but shall use provided data to determine its correct application to the qualification of the motor.

2. Pipe Break Analysis

The pipe break inside containment analysis shall be selectively reviewed to identify those pipe breaks which will impact HPCI or ADS operation. For these selected breaks, the contractor shall confirm that pipe whip, jet impingement, and related effects on the HPCI system do not concurrently disable the ADS function, and vice versa.

f. Identified Interfaces and Use of Existing Data

For the purposes of this Independent Design Verification Program, the IDVP contractor will be

involved with design interfaces at General Electric, Bechtel Power Corporation, Bailey Controls and PSE&G. These interfaces will involve meetings, telecons, and correspondence as appropriate to accomplish the design verification. Such interfaces will be accomplished in such a manner as to maintain independence of the review.

The IDVP contractor shall accept without further verification the following existing input data:

- Site seismic g-level and related geological data prepared by Dames and Moore
- Building seismic response spectra prepared by EDS/Impell
- Instrumentation and controls standard specifications provided by Bailey Controls, Inc.
- Standard equipment product literature and test reports supplied by vendors to PSE&G or Bechtel
- Generic engineering or test data supplied by General Electric
- Drywell environmental responses supplied by Bechtel

The use of this supplied data does not waive the IDVP contractor's responsibility to verify its correct application to the design of system components.

g. Design Control Process Review

In addition to ensuring design adequacy by a review of selected systems and design aspects, the IDVP contractor shall review and assess the adequacy of the design control process. This shall consist of two aspects:

1. Flow of Design Information

For the selected systems and components in Items (b) through (e) above, the IDVP contractor shall review the flow of design information, specifically including these considerations:

- Were FSAR design criteria and commitments, and applicable Federal regulations, properly translated into Piping and Instrumentation Diagrams (P&ID), Design Installation and Test Specifications (DITS), design calculations, plant general specifications, equipment specifications, and Technical Specifications.

- Were P&ID's, DITS, design calculations, and specifications properly "expanded" into correct procurement documents, plant indices, detailed mechanical, electrical, controls and plant design drawings, and supporting data such as stress reports, hanger sketches, and isometrics.

- Were data and drawings supplied by General Electric and other affected vendors properly interfaced and incorporated into the design.

- Did integration of design among disciplines occur to ensure proper transmission of data without conflicting designs developing.

- Has the design been correctly implemented in the plant construction per the contractor's physical examination. Do as-built configurations reflect the intended design, and are base configuration design documents in agreement with the as-built.

- Were approved design changes implemented in a manner that the system design intent was not violated, and were design changes initiated, processed, approved and implemented in the proper format to consider PSE&G, Bechtel, and GE technical input. Was configuration control maintained during design changes, particularly field-initiated changes.

- Have applicable NRC Inspection and Enforcement Bulletins, Notices, and Circulars, as selected by the IDVP contractor, been appropriately considered and implemented.

2. Design Interfaces

For the selected systems and components, the IDVP contractor shall review the design interface among organizations to ensure that proper and complete transmission of design data occurred. This will include interfaces among PSE&G, Bechtel, and General Electric, and interfaces within units of the same corporation (particularly between Bechtel's San Francisco office and the engineering groups based at the Hope Creek site).

To determine the adequacy of the design control process, the IDVP contractor shall utilize the PSE&G and Bechtel engineering procedures discussed in Section III of this Work Scope Document, combined with physical inspections and personnel interviews.

The focus of this design control review is to ensure the proper communication, application, and continuity of design criteria and data, from FSAR base criteria and commitments to construction implementation, through review of design documents and physical inspections.

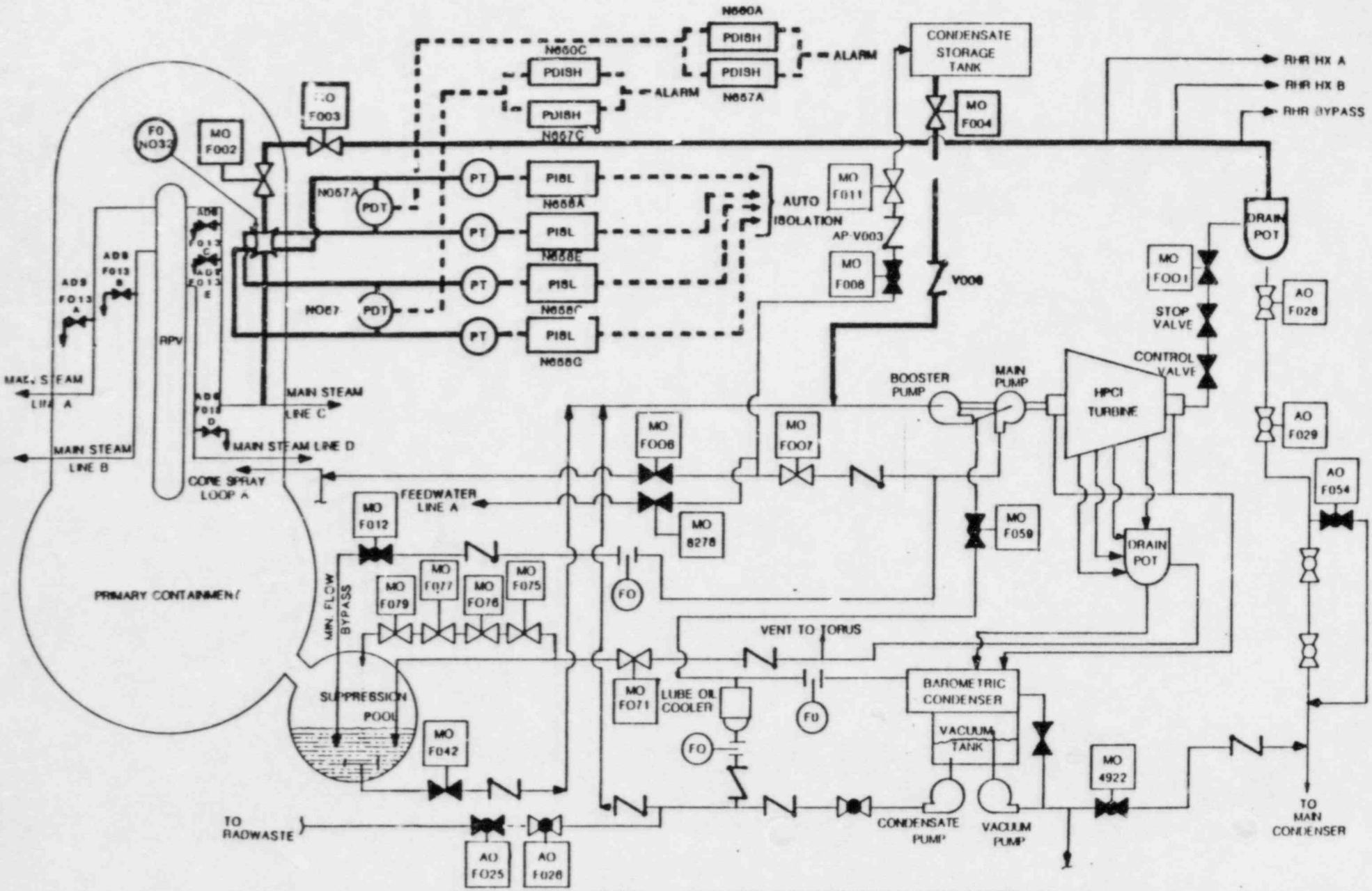


FIGURE 1- HOPE CREEK IDVP TECHNICAL WORK SCOPE

Public Service Electric and Gas Co.
Hope Creek Generating Station
Independent Design Verification Program

Meeting with Nuclear Regulatory Commission

February 12, 1985
5th Floor Conference Room
East-West Towers
Bethesda, MD.
9:00 AM

AGENDA

I. INTRODUCTION. . . . . Bruce A. Preston
Project Licensing Manager
Public Service Elec. & Gas

- Purpose of meeting
- Introduction of attendees
- Review agenda and time schedule

II. PSE&G PERSPECTIVE OF HOPE CREEK IDVP. William Gailey
Chief Project Engineer
Public Service Elec. & Gas

- Motivation of management to perform IDVP
- Past and present design assurance activities (INPO, T. Barry, NRC, internal)
- Current IDVP schedule
  - Initial discussion in November 1983
  - Organizational meetings in August 1984
  - Scope document issued in November 1984
  - Contract established in January 1985
  - Completion target is June 1985
- Emphasis is on independence for
  - Scope definition
  - Contractor selection
- Organizational Roles
  - Bechtel - Hope Creek A/E and constructor
  - Sargent & Lundy - IDVP contractor
  - General Electric - NSSS supplier
  - Multiple Dynamics Corporation - Scope definition and monitor/arbitrator

III. A/E PERSPECTIVE. . . . . Harry Hollingshaus
Engineering Manager
Bechtel Power Corp.

- Discuss Bechtel experience and results with other IDVP's

IV. IDVP SCOPE PRESENTATION. . . . . Frank E. Gregor, President
Raymond M. Berg, Vice Pres.
Multiple Dynamics Corp.

- Brief MDC corporate overview, IDVP experience
- Scope selection approach and criteria
- Contractor objectives, requirements, experience, personnel, independence
- Protocol requirements, MDC monitoring role
- Technical scope presentation
- Expected work output
- Bid selection process

V. IDVP CONTRACTOR'S PROGRAM. . . . . Richard J. Pruski
Project Manager
Sargent and Lundy

VI. CLOSING STATEMENTS/QUESTIONS AND ANSWERS

MULTIPLE DYNAMICS CORPORATION

CORPORATE OVERVIEW AND IDVP EXPERIENCE

- MULTIPLE DYNAMICS CORPORATION (MDC) IS A DIVERSIFIED ENGINEERING CONSULTING FIRM LOCATED IN SOUTHFIELD, MICHIGAN (DETROIT SUBURB) - 4 YEARS IN BUSINESS

- STAFF OF 20 FULL TIME EMPLOYEES WITH MIX OF ENGINEERING DISCIPLINES, REGISTERED P.E.'S, CODE COMMITTEE MEMBERSHIP

- PARTNERS AND FOUNDERS ARE FORMER DETROIT EDISON EMPLOYEES (FERMI 2), WITH EXTENSIVE UTILITY AND NUCLEAR INDUSTRY BACKGROUND

- PREVIOUS RELEVANT EXPERIENCE:

  - FERMI 2 IDVP SCOPE DOCUMENT PREPARATION AND TECHNICAL ASSISTANCE

  - FERMI 2 SAFETY REVIEW TASK FORCE AFTER TMI

  - FERMI 2, MONTICELLO INDEPENDENT REVIEW OF CONTAINMENT MODIFICATION PROGRAMS, PUA'S

  - COMMONWEALTH EDISON - INDEPENDENT REVIEW OF RECIRCULATION PIPING REPLACEMENT PROGRAM

  - DETROIT EDISON AND NORTHERN STATES POWER - EXTENSIVE AD HOC ENGINEERING, LICENSING, CONSTRUCTION SUPPORT

MDC'S SCOPE FOR HOPE CREEK IDVP

- CONTRACTED BY PUBLIC SERVICE ELECTRIC AND GAS CO. TO:
  - INDEPENDENTLY SET HOPE CREEK IDVP CRITERIA AND REQUIREMENTS
  - SELECT SYSTEMS AND COMPONENTS FOR REVIEW
  - DEFINE DESIGN ASPECTS TO BE REVIEWED
  - PREPARE WORK SCOPE DOCUMENT
  - REVIEW BIDS AND RECOMMEND IDVP CONTRACTOR
  - PROVIDE INDEPENDENT MONITORING AND ARBITRATION DURING PERFORMANCE OF IDVP

SCOPE SELECTION APPROACH

- BROAD GOALS OF INDEPENDENT DESIGN VERIFICATION PROGRAM

  - PERFORM IDVP AT INITIATIVE OF PSE&G MANAGEMENT TO SUPPLEMENT RESULTS OF PREVIOUS DESIGN ASSURANCE REVIEWS

  - PROVIDE ADDITIONAL, INDEPENDENT ASSURANCE OF HOPE CREEK DESIGN ADEQUACY AND THOROUGHNESS

  - PROVIDE ADDITIONAL, INDEPENDENT ASSURANCE OF THE DESIGN INTERFACE AND CONTROL PRACTICES AMONG PSE&G, BECHTEL AND OTHER CONTRACTORS

  - ESTABLISH SCOPE, OBJECTIVES AND COMMUNICATIONS PROTOCOL SIMILAR TO PREVIOUSLY PERFORMED IDVP'S

  - ESTABLISH COMPLETE "VERTICAL SLICE" THROUGH APPROPRIATE SYSTEMS, COMPONENTS AND DESIGN ASPECTS, INCLUDING BASE SYSTEM DESIGN AND SUPPORTING SYSTEMS' DESIGN

  - ENSURE BALANCE AMONG ENGINEERING DISCIPLINES

  - ESTABLISH AN ADEQUATE DEPTH OF REVIEW FOR EACH DISCIPLINE, TO ALLOW CONTRACTOR INVESTIGATION OF DESIGN ADEQUACY AND DESIGN CONTROL PRACTICES FROM FSAR COMMITMENTS TO AS-BUILT CONSTRUCTION.

  - PROVIDE A MECHANISM FOR SCOPE EXPANSION IF FINDINGS OR OBSERVATIONS DETECT A GENERIC PROBLEM

IDVP SCOPE SELECTION CRITERIA

SYSTEMS AND COMPONENTS TO BE REVIEWED WERE SELECTED BASED ON THE FOLLOWING CRITERIA:

- MUST BE SAFETY-RELATED AND/OR IMPORTANT TO SAFE SHUTDOWN
- INABILITY TO VERIFY ACCIDENT OR EMERGENCY PERFORMANCE BY DIRECT TESTING
- INVOLVEMENT OF MULTIPLE A/E DESIGN INTERFACES
- DESIGN CHANGES OVER THE PLANT DESIGN PERIOD
- CROSS-SECTION OF ENGINEERING AND DESIGN DISCIPLINES
- PARALLEL AND SERIES DESIGN INTERFACES WILL BE CONSIDERED
- CONSIDERATION OF ADMITTED CONTENTIONS FROM ASLB
- SUFFICIENTLY DIFFERENT FROM OTHER BWR IDVP'S
- NOT PREVIOUSLY REVIEWED/AUDITED ON HCGS

IDVP CONTRACTOR CONSIDERATIONS

- CONTRACTOR'S OBJECTIVES

  - PROVIDE ADDITIONAL, INDEPENDENT ASSURANCE TO PSE&G THAT CONCEPTUAL ENGINEERING, DETAILED DESIGN IMPLEMENTATION, AND DESIGN CONTROL PRACTICES HAVE BEEN ADEQUATELY PERFORMED FOR HOPE CREEK, GIVEN A LIMITED SCOPE OF REVIEW OF SELECTED SYSTEMS AND COMPONENTS

  - PROVIDE ASSURANCE THAT THE DESIGN INTERFACES AMONG PSE&G, BECHTEL AND GENERAL ELECTRIC HAVE BEEN PROPERLY ADMINISTERED AND CONTROLLED

  - BASIS FOR DESIGN ADEQUACY IS THE HOPE CREEK FSAR, INCLUDING ALL FEDERAL REGULATIONS, INDUSTRY CODES, LICENSING COMMITMENTS

  - BASIS FOR DESIGN CONTROL AND INTERFACE ADEQUACY ARE THE PSE&G, BECHTEL AND OTHER CONTRACTORS ENGINEERING AND DESIGN PROCEDURES

IDVP CONTRACTOR CONSIDERATIONS (CONTINUED)

- CONTRACTOR'S TECHNICAL APPROACH
  - DEFINE, COLLECT AND REVIEW ENGINEERING AND DESIGN DATA
  - REVIEW RELATED ENGINEERING AND DESIGN PROCEDURES
  - PERFORM INDEPENDENT CALCULATIONS AND ANALYSES AS APPROPRIATE
  - INTERVIEWS AND MEETINGS WITH DESIGN PERSONNEL AND MANAGEMENT OF AFFECTED ORGANIZATIONS
  - ON-SITE AS-BUILT VERIFICATION OF CONSTRUCTED COMPONENTS
  - DEVELOP OBSERVATIONS OR POTENTIAL FINDINGS, TRANSMIT TO PSE&G
  - REVIEW RESPONSES AND ADDITIONAL DATA
  - INDEPENDENT REVIEW BY SENIOR REVIEW COMMITTEE
  - PREPARE DRAFT AND FINAL REPORTS

IDVP CONTRACTOR CONSIDERATIONS (CONTINUED)

- CONTRACTOR REQUIREMENTS

  - CORPORATE AND PROJECT TEAM INDEPENDENCE

  - SUCCESSFULLY PERFORMED A PREVIOUS IDVP OR BE A LARGE, MULTI-DISCIPLINED A/E FIRM WITH INTEGRATED NUCLEAR PLANT DESIGN EXPERIENCE

  - COMMITMENT TO ASSIGNMENT AND RETENTION OF STRONG PROGRAM MANAGER AND KEY TEAM MEMBERS

  - PROPRIETARY AGREEMENTS FOR USE OF DATA

  - OBSERVANCE OF SECURITY PROVISIONS AND JOB SITE WORK RULES

  - 10CFR21 REQUIREMENT

  - INTERFACING WITH PSE&G, BECHTEL, GE

  - USE OF EXISTING DATA FROM OUTSIDE ORGANIZATIONS

  - ESTABLISH AND ABIDE BY COMMUNICATIONS PROTOCOL

- CONTRACTOR WORK OUTPUT

  - PROGRAM PLAN
  - STATUS REPORTS, SCHEDULES
  - PREPARATION OF MINUTES, TELECONS, CORRESPONDENCE
  - OBSERVATION/POTENTIAL FINDING REPORTS
  - TECHNICAL REPORT (APPROACH, METHODS, DATA, RESULTS, CONCLUSIONS)

COMMUNICATIONS PROTOCOL

- PURPOSES OF PROTOCOL

  - ENSURE CONTRACTOR'S INDEPENDENCE IS NOT COMPROMISED

  - ENSURE CREATION AND RETENTION OF DOCUMENT TRAIL TO VERIFY INDEPENDENCE

  - ENSURE THAT OBSERVATIONS AND POTENTIAL FINDINGS ARE BASED ON COMPLETE AND CORRECT USE OF DATA

- AREAS COVERED BY PROTOCOL

  - SEPARATION OF COMMERCIAL AND TECHNICAL MATTERS
  - CORRESPONDENCE FOR DATA REQUESTS
  - MEETINGS AND MINUTES
  - TELEPHONE CONVERSATIONS
  - ORAL CONVERSATIONS
  - GENERATION OF OBSERVATIONS AND POTENTIAL FINDINGS BY CONTRACTOR
  - RESPONSES BY AFFECTED ORGANIZATIONS
  - SENIOR REVIEW COMMITTEE
  - MAINTENANCE OF RECORDS AND DATA

- MDC TO MONITOR PROTOCOL COMPLIANCE

TECHNICAL WORK SCOPE

- SELECTED SYSTEMS ARE:

  - HIGH PRESSURE COOLANT INJECTION (HPCI)
  - AUTOMATIC DEPRESSURIZATION SYSTEM (ADS)
  - SAFETY-RELATED AC/DC ELECTRICAL POWER SYSTEMS TO HPCI/ADS

- DISCIPLINES AND DESIGN ASPECTS TO BE REVIEWED

  - ELECTRICAL DESIGN
  - INSTRUMENTATION AND CONTROLS
  - MECHANICAL/STRUCTURAL
  - ENVIRONMENTAL QUALIFICATION
  - PIPE BREAK ANALYSIS
  - DESIGN CONTROL PROCESS

TECHNICAL WORK SCOPE (CONTINUED)

- ELECTRICAL DESIGN REVIEW

  - MOTIVE AND CONTROL POWER SYSTEMS TO HPCI AND ADS

  - REVIEW POWER TO HPCI STEAM LINE INBOARD/OUTBOARD ISOLATION VALVES

  - REVIEW SEPARATION OF POWER TO HPCI AND ADS

  - ASPECTS TO BE CONSIDERED

    - DIVERSITY OF POWER SOURCES TO HPCI VALVES
    - REDUNDANCY AND CLASS 1E CHANNEL SEPARATION FOR HPCI
    - VOLTAGE REQUIREMENTS, REGULATION, UNDERVOLTAGE PROTECTION, DEGRADED VOLTAGE OPERATION FOR HPCI VALVES
    - CABLE SIZING, INSULATION, CODES AND STANDARDS FOR HPCI VALVES
    - CONDUIT SIZING FOR HPCI VALVES
    - PHYSICAL SEPARATION OF CABLING, CONDUIT, AND TRAYS TO HPCI VALVES
    - FAULT PROTECTION SIZING, SELECTIVITY, COORDINATION TO HPCI VALVES
    - ADS-HPCI CONTROL POWER SEPARATION
    - CONTROL POWER DIVERSITY AND INDEPENDENCE FOR ADS IN AUTOMATIC AND MANUAL SRV OPENING MODES

  - SPAN OF REVIEW

    - MOTIVE POWER FEEDS FROM HPCI ISOLATION VALVES TO 480 VOLT UNIT SUBSTATION BUSES
    - CONTROL POWER FEEDS FROM HPCI ISOLATION VALVES AND ADS VALVES TO CONTROL POWER CABINET BUSES

TECHNICAL WORK SCOPE (CONTINUED)

- INSTRUMENTATION AND CONTROLS DESIGN REVIEW

  - HPCI STEAM LINE FLOW ORIFICE AND ALL CONNECTED TUBING, INSTRUMENTATION AND CONTROLS

  - ASPECTS TO BE CONSIDERED

    - SENSING DEVICES
    - SIGNAL CONVERSION AND PROCESSING DEVICES
    - INSTRUMENTATION CABINET DEVICES
    - CONTROL ROOM INSTRUMENTS, ALARMS, INDICATION
    - AUTOMATIC TRIP FUNCTIONS, ISOLATION LOGIC, INTERLOCKS
    - INFORMATION CAPTURE BY SEQUENCE OF EVENTS RECORDER, COMPUTER, HARDCOPY RECORDERS
    - TESTABILITY ASPECTS FOR SURVEILLANCE
    - SETPOINT COMPUTATIONS

  - SPAN OF REVIEW

    - FOUR INSTRUMENT TUBING LINES FROM ORIFICE TO THE END DEVICES
    - PROPER SELECTION OF DEVICES, CORRECT DESIGN AND INSTALLATION
    - SPECIFICATION, DESIGN AND APPLICATION OF AC AND DC INSTRUMENT POWER

TECHNICAL WORK SCOPE (CONTINUED)

- MECHANICAL/STRUCTURAL DESIGN REVIEW

1. - HPCI STEAM LINE FROM AND INCLUDING MAIN STEAM LINE TAP TO AND INCLUDING DRAIN POT

   - ASPECTS

     - LINE SIZING
     - THERMAL TRANSIENTS INCLUDING LINE WARMUP
     - THERMAL MOVEMENTS
     - MECHANICAL DESIGN OF FLOW ORIFICE AND INSTRUMENT TUBING
     - PENETRATION LOADS AND STRESSES
     - ANNULUS PRESSURIZATION LOADS INTERFACE
     - HV-F002 VALVE LOADS/SEISMIC QUALIFICATION
     - MAIN STEAM LINE DESIGN INTERFACE
     - PIPE BREAK LOCATIONS
     - SEISMIC LOADS INTERFACE
     - ONE EACH - SNUBBER, HANGER/SUPPORT, PIPE WHIP RESTRAINT (SIZING, PLACEMENT, WELDS, LOAD TRANSFER EFFECTS)

   - PROVISION FOR SCOPE EXPANSION ON SNUBBER, HANGER/SUPPORT OR PIPE WHIP RESTRAINT IF VALID FINDING IS DETERMINED

2. - HPCI PUMP SUCTION LINE FROM CONDENSATE STORAGE TANK TO "TEE" CONNECTION WITH TORUS SUCTION LINE

   - ASPECTS

     - LINE SIZING
     - NET POSITIVE SUCTION HEAD MARGIN
     - BURIED PIPE ANALYSIS (SEISMIC DESIGN, CATHODIC PROTECTION/CORROSION CONTROL, SEALANTS)
     - PIPE BREAK AND FLOODING POTENTIAL INTO REACTOR BUILDING

TECHNICAL WORK SCOPE (CONTINUED)

- ENVIRONMENTAL QUALIFICATION REVIEW

  - HPCI INBOARD STEAM LINE ISOLATION VALVE MOTOR ENVIRONMENTAL QUALIFICATION

  - VERIFY CORRECT APPLICATION OF EXISTING DRYWELL ENVIRONMENTAL DATA TO MOTOR QUALIFICATION

- PIPE BREAK ANALYSIS REVIEW

  - EVALUATE PIPE BREAK INSIDE CONTAINMENT ANALYSIS TO SELECT PIPE BREAKS WHICH IMPACT HPCI OR ADS OPERATION

  - VERIFY THAT PIPE WHIP, JET IMPINGEMENT, AND RELATED EFFECTS ON HPCI DO NOT CONCURRENTLY DISABLE ADS FUNCTION, AND VICE VERSA

- USE OF EXISTING INPUT DATA

  - SITE SEISMIC G-LEVEL (DAMES AND MOORE)
  - BUILDING SEISMIC RESPONSE SPECTRA (EDS/IMPELL)
  - I&C STANDARD SPECIFICATIONS BY BAILEY CONTROLS
  - STANDARD PRODUCT LITERATURE AND TEST REPORTS FROM VENDORS
  - GENERIC GE TEST DATA
  - DRYWELL ENVIRONMENTAL RESPONSES SUPPLIED BY BECHTEL

TECHNICAL WORK SCOPE (CONTINUED)

- AS-BUILT VERIFICATION
  - CONDUCTED VIA ON-SITE WALKDOWNS
  - VERIFICATION OF GEOMETRIC PARAMETERS

    E.G., PIPE-TUBING ROUTING, SLOPES, LUGS, TAPS, ETC.

    HANGER/SNUBBER LOCATION, TYPE, DIRECTION

    VALVE MOTOR OPERATOR LOCATION, ROTATION

    CABLE ROUTING, SEPARATION, TRAY ASSIGNMENTS, FUSING

    PIPE BREAK TARGETS AND JET PATH

    TEMPORARY MODIFICATIONS

    FIELD DESIGN CHANGE IMPLEMENTATION
  - NOT A CONSTRUCTION VERIFICATION
  - INTENT IS TO CHOOSE COMPONENTS THAT ARE IN-PLACE
  - AS-BUILT RECONCILIATION PROGRAM AND PROCEDURES TO BE CONSIDERED IN IDVP

TECHNICAL WORK SCOPE (CONTINUED)

- DESIGN CONTROL PROCESS REVIEW

  1. FLOW OF DESIGN INFORMATION

     - WERE FSAR DESIGN CRITERIA AND COMMITMENTS, INCLUDING FEDERAL REGULATIONS, PROPERLY TRANSLATED INTO P&ID'S, DESIGN CALCULATIONS, DESIGN, INSTALLATION, EQUIPMENT AND TEST SPECIFICATIONS, AND TECHNICAL SPECIFICATIONS

     - WERE THESE BASE DOCUMENTS PROPERLY "EXPANDED" INTO PROCUREMENT DOCUMENTS, PLANT INDICES, DETAILED DESIGN DRAWINGS, AND SUPPORTING DATA SUCH AS STRESS REPORTS, SKETCHES, ISOMETRICS

     - WERE DRAWINGS AND DATA BY GE AND OTHER VENDORS PROPERLY INTERFACED AND INCORPORATED INTO DESIGN

     - DID DESIGN INTEGRATION OCCUR AMONG DISCIPLINES TO PROPERLY TRANSMIT DATA AND PREVENT CONFLICTING DESIGNS

     - WAS THE DESIGN CORRECTLY IMPLEMENTED IN PLANT CONSTRUCTION PER AS-BUILT VERIFICATION

     - DO BASE CONFIGURATION DESIGN DOCUMENTS AGREE WITH THE AS-BUILT

TECHNICAL WORK SCOPE (CONTINUED)

- WERE APPROVED DESIGN CHANGES IMPLEMENTED IN A MANNER THAT THE SYSTEM DESIGN INTENT WAS NOT VIOLATED

- WERE DESIGN CHANGES INITIATED, PROCESSED, APPROVED AND IMPLEMENTED PROPERLY CONSIDERING INPUT FROM ALL ORGANIZATIONS

- WAS CONFIGURATION CONTROL MAINTAINED DURING DESIGN CHANGES (PARTICULARLY FIELD-INITIATED CHANGES)

2. DESIGN INTERFACES

- REVIEW DESIGN INTERFACE AMONG ORGANIZATIONS TO ENSURE PROPER AND COMPLETE TRANSMISSION OF DESIGN DATA

- REVIEW INTERNAL AND EXTERNAL TRANSMISSION OF DATA (PARTICULARLY BETWEEN BECHTEL SAN FRANCISCO AND HOPE CREEK SITE)

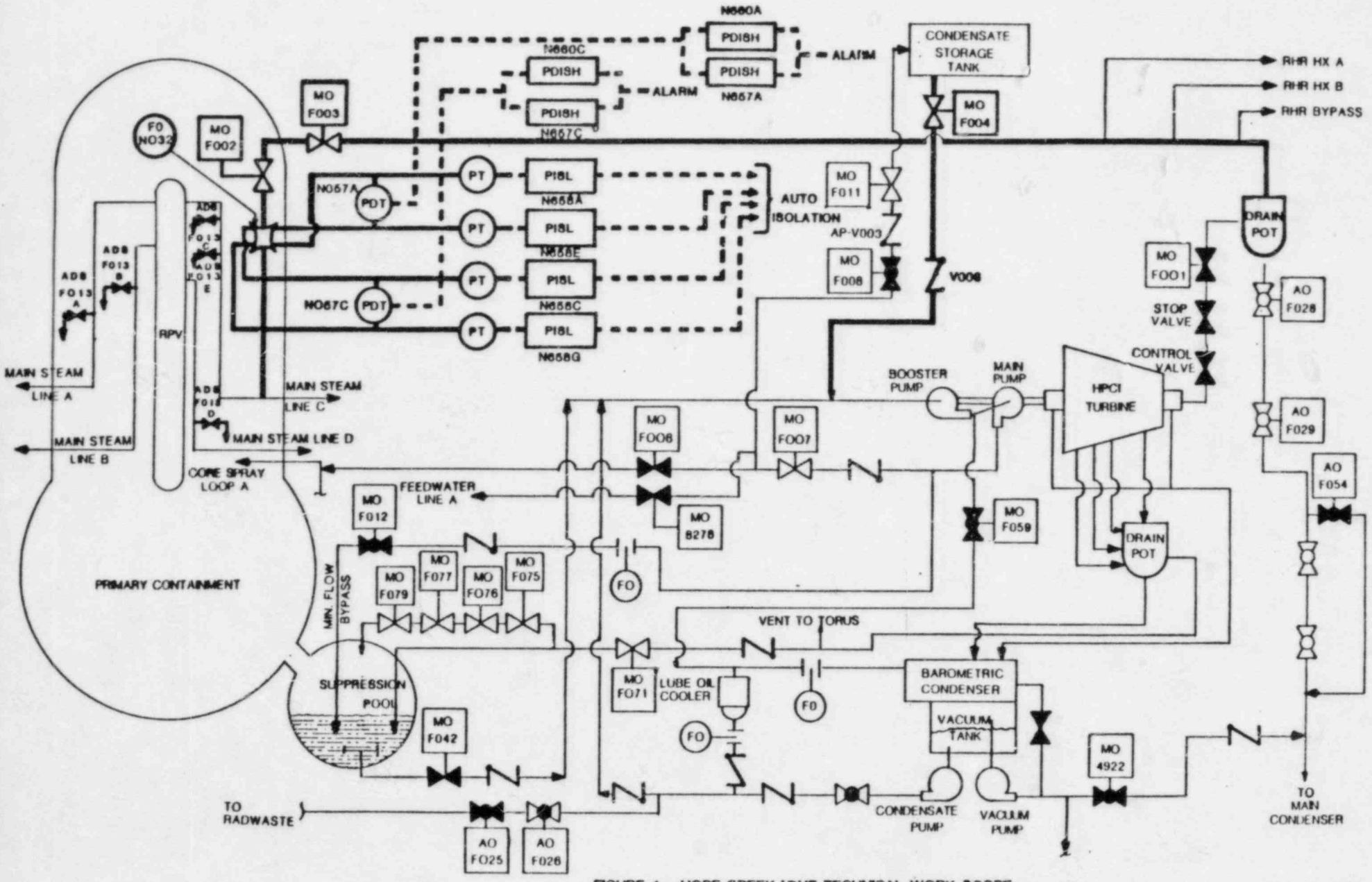


FIGURE 1- HOPE CREEK IDVP TECHNICAL WORK SCOPE

ADDITIONAL TECHNICAL SCOPE

- GENERAL SYSTEM DESIGN REVIEW

  - GENERAL REVIEW OF THE CONTAINMENT HYDROGEN RECOMBINATION SYSTEM (CHRS)

  - ASPECTS

    - FUNCTIONAL OBJECTIVE
    - CODE CLASS, SAFETY CLASS AND SEISMIC CLASS
    - QA DESIGNATION
    - REDUNDANCY AND SPATIAL SEPARATION
    - SYSTEM SIZE
      - FLOW
      - COOLING AND HEATING
      - CONDENSATION (DRAINAGE)
    - MODES AND METHODS OF OPERATION, INCLUDING THE OPERATING PROCEDURES
    - TECHNICAL SPECIFICATION DATA
    - SYSTEM ISOLATION
    - OVERPRESSURE PROTECTION
    - ALARMS AND INTERLOCKS
    - TESTABILITY

ADDITIONAL TECHNICAL SCOPE (CONTINUED)

- ELECTRICAL DESIGN REVIEW

  - SKID-MOUNTED CHRS ELECTRICAL MOTIVE AND CONTROL POWER FEEDS FROM THE TRAIN "A" PRIMARY COMPONENTS OUT TO THE SUBSTATION BUSES OR CONTROL POWER CABINET BUSES

    - PRIMARY COMPONENTS

      - GAS INLET ISOLATION VALVE
      - BLOWER AND MOTOR UNIT
      - MAIN UNIT HEATERS
      - GAS RECIRCULATION VALVE
      - COOLING WATER VALVE

  - ASPECTS

    - VOLTAGE REQUIREMENTS AND REGULATION, INCLUDING UNDERVOLTAGE PROTECTION
    - CABLE SIZING, INSULATION, AND CODE STANDARDS
    - CONDUIT SIZING (IF ANY)
    - PHYSICAL SEPARATION FROM TRAIN "B" OF CABLING, CONDUIT, AND TRAYS CARRYING POWER TO THESE PRIMARY COMPONENTS
    - FAULT PROTECTION SIZING, SELECTIVITY, AND COORDINATION WITH OVERALL CLASS 1E ELECTRICAL SYSTEM, FOR CABLES FEEDING THE PRIMARY COMPONENTS

ADDITIONAL TECHNICAL SCOPE (CONTINUED)

- INSTRUMENTATION AND CONTROLS DESIGN REVIEW

  - INSTRUMENT TUBING FROM THE PRIMARY CONTAINMENT NOZZLES TO THE CONTAINMENT HYDROGEN/OXYGEN (H/O) ANALYZER, INSTRUMENT TUBING FROM THE H_2/O_2 BOTTLE STORAGE STATION TO THE H/O ANALYZER, AND EXTERNAL H/O ANALYZER INSTRUMENTATION

  - ASPECTS

    - INSTRUMENT TUBING DESIGN AND SUPPORTS
    - SENSING DEVICES
    - SIGNAL CONVERSION AND PROCESSING DEVICES
    - INTERMEDIATE INSTRUMENTATION CABINET DEVICES
    - CONTROL ROOM INSTRUMENTS, ALARMS, INDICATION, SETPOINTS
    - AUTOMATIC TRIP FUNCTIONS, ISOLATION LOGIC, INTERLOCKS
    - CAPTURING OF INFORMATION ON SEQUENCE OF EVENTS RECORDERS, COMPUTER, HARDCOPY RECORDERS
    - TESTABILITY ASPECTS FOR SURVEILLANCE MONITORING
    - AC/DC INSTRUMENT POWER SOURCES

  - TWO RANDOMLY SELECTED TUBING LINES FROM CONTAINMENT

  - ONE RANDOMLY SELECTED TUBING LINE FROM BOTTLE STORAGE SYSTEM

ADDITIONAL TECHNICAL SCOPE (CONTINUED)

- MECHANICAL DESIGN REVIEW

1. - DRYWELL CONTAINMENT PURGE INLET PENETRATION, PIPING AND VALVING FROM DRYWELL SHELL TO THE CHRS TRAIN "B" SKID-MOUNTED RECOMBINER PIPING INTERFACE

   - ASPECTS

     - DESIGN AND EQUIPMENT SPECIFICATIONS COMPLIANCE TO DESIGN CODES AND STANDARDS
     - THERMAL AND PRESSURE TRANSIENTS
     - THERMAL MOVEMENTS
     - MECHANICAL DESIGN OF THE PIPING, HANGERS AND SUPPORTS FROM THE DRYWELL PENETRATION TO THE SKID-MOUNTED PIPING CONNECTION, INCLUDING THE PIPING UP TO ISOLATION VALVE HV-4956
     - MECHANICAL DESIGN OF THE ISOLATION VALVE AND OPERATORS, INCLUDING OPERABILITY AND FUNCTIONALITY UNDER DESIGN CONDITIONS

2. - NON-SAFETY/SAFETY INTERFACE OF THE CIPS FROM THE OFFGAS TREATMENT SYSTEM LIQUID NITROGEN TANKS TO THE CODE BOUNDARIES AT VALVES HV-4978 AND HV-4974

   - ASPECTS

     - CODE AND SAFETY GROUP CLASSIFICATION BOUNDARIES
     - FUNCTIONAL ASSESSMENT OF ADHERENCE TO DESIGN REQUIREMENT STATED IN THE FSAR

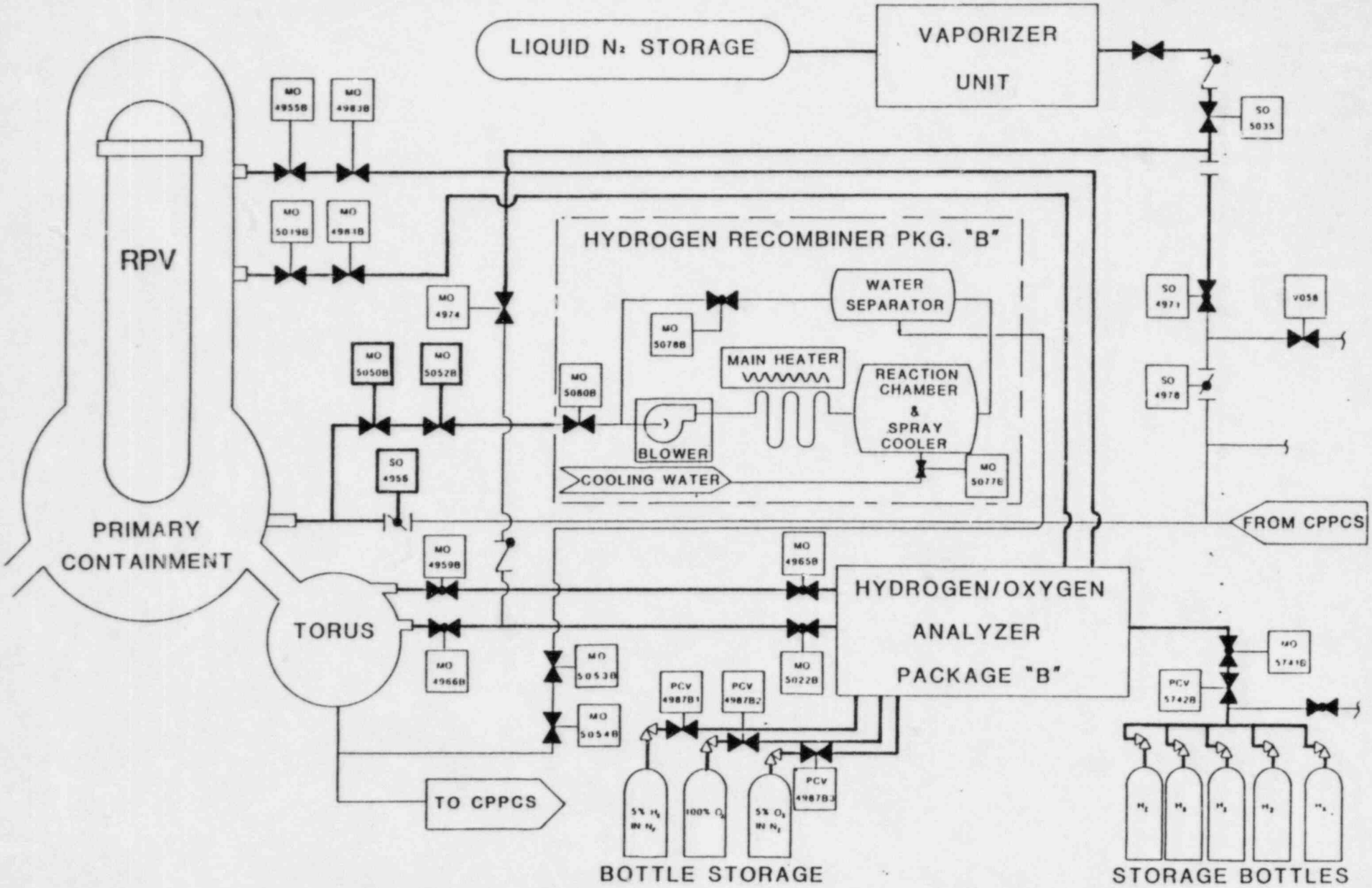
ADDITIONAL TECHNICAL SCOPE (CONTINUED)

- STRUCTURAL DESIGN REVIEW

  - CONTAINMENT HYDROGEN RECOMBINATION SYSTEM TRAIN "A" SKID ANCHORAGE/SUPPORT

  - ASPECTS

    - FOUNDATION DESIGN AND EMBEDMENTS
    - ANCHOR BOLT SIZING AND TORQUING
    - LOAD COMBINATIONS (INCLUDING NOZZLE REACTION LOADS, DEAD WEIGHT, LIVE LOADS, SEISMIC, ETC.)
    - AS-BUILT CONFIGURATION



SCHEMATIC

HOPE CREEK ADDITIONAL IDVP TECHNICAL WORK SCOPE

HOPE CREEK INDEPENDENT DESIGN VERIFICATION PROGRAM
ADDITIONAL SCOPE SELECTION

The selection process for the additional scope of work on the Hope Creek IDVP consisted of identifying systems not involving the NSSS contractor, and then identifying appropriate engineering and design disciplines, specific segments, and related design aspects of these systems to best accommodate the selection criteria (see attached matrix). Elements of the Containment Atmospheric Control System (CACS), and selected auxiliary systems which support operation of this system, were chosen as detailed below. The elements of the system to be reviewed are portrayed on the attached schematic as highlighted segments of a simplified P&ID.

Items (a) through (e) below address specific design disciplines and aspects to be reviewed.

(a) General System Design Review of the Containment Hydrogen Recombination System (CHRS)

The contractor shall conduct a general review of the CHRS with respect to the following:

- Functional objective
- Code class, safety class, seismic class and QA designation
- Redundancy and spatial separation
- System size
  - Flow
  - Cooling and heating
  - Condensation (drainage)

. Modes and methods of operation, including the Operating Procedures
. Technical Specification data
. System isolation
. Overpressure protection
. Alarms and interlocks
. Testability

(b) Electrical Design to be Reviewed

The electrical IDVP segment shall consist of a detailed review of the entire skid-mounted Containment Hydrogen Recombination System electrical motive and control power for train "A".

The contractor shall review the electrical motive and control power feeds to the primary skid-mounted components:

. Gas inlet isolation valve HV-5080A
. Blower and motor unit AV-215
. Main unit heaters
. Gas recirculation valve HV-5078A
. Cooling water valve HV-5077A

The review shall consider the following aspects:

. Voltage requirements and regulation, including undervoltage protection
. Cable sizing, insulation, and code standards
. Conduit sizing (if any)
. Physical separation from train "B" of cabling, conduit, and trays carrying power to these primary components

. Fault protection sizing, selectivity, and coordination with overall Class 1E electrical system, for cables feeding the primary components (for faults within components, cabling, local control power cabinet, source motor control center, or 480 volt Class 1E unit substation bus).

The span of this review will cover the motive power feeds from the primary components out to and including the Class 1E 480 volt unit substation buses which directly power these components, and the control power feeds from the primary components to the control power cabinet buses.

This segment of the review may require some limited interface with Rockwell International.

(c) Instrumentation and Controls Design to be Reviewed

The instrumentation and controls IDVP segment shall consist of a detailed review of the design interface between Bechtel and the Comsip Inc. H/O analyzer package "B". The design review shall include the design of instrument tubing from the primary containment nozzles to the H/O analyzer, instrument tubing from the H_2/O_2 bottle storage station to the H/O analyzer, and external H/O analyzer instrumentation.

The IDVP contractor shall review the following elements of the instrument tubing and all connected valving, test connections, heat tracing, instrumentation and controls, up to the hydrogen/oxygen analyzer package "B" connections:

- Instrument tubing design, including support design
- Sensing devices
- Signal conversion and processing devices
- Intermediate instrumentation cabinet devices
- Control room instruments, alarms, indication, setpoints
- Automatic trip functions, isolation logic, interlocks
- Capturing of information on sequence of events recorders, computer, hardcopy recorders
- Testability aspects for surveillance monitoring

The span of the review shall cover proper selection of devices, correct design and proper installation. The specification, design and correct application of AC and DC instrument power sources and components for the selected devices will also be reviewed. The review will trace two randomly selected instrument tubing lines from the containment penetrations to the hydrogen/oxygen analyzer package "B" connections. In addition, one instrument tubing line from the H_2/O_2 bottle storage station to the hydrogen/oxygen analyzer package "B" will be reviewed.

This segment of the review may require some limited interface with Comsip Inc.

(d) Mechanical Design to be Reviewed

The mechanical IDVP review shall consist of two segments:

1. Drywell Containment Purge Inlet Penetration, Piping and Selected Isolation Valves

   The IDVP contractor shall review the overall mechanical and structural design of the drywell

containment purge inlet penetration, piping and isolation valves HV-4956, HV-5050B and HV-5052B. This review will be performed considering the appropriate design and equipment specifications, and the compliance of the design to appropriate ASME code sections, ACI and ANSI standards, and Federal regulations. The following specific aspects will be reviewed:

- Thermal and pressure transients
- Thermal movements
- Mechanical design of the piping, hangers and supports from the drywell penetration to the skid-mounted piping connection, including the piping up to isolation valve HV-4956
- Mechanical design of the isolation valves and operators for HV-4956, HV-5050B and HV-5052B, including operability and functionality under design conditions
- HV-4956, HV-5050B and HV-5052B valve loads and stresses

The span of the review is the segment of piping from the drywell shell to the skid-mounted recombiner piping interface, including isolation valves and branch piping as noted on the P&ID.

2. <u>CIPS System Non-Safety to Safety Interface</u>
The IDVP contractor shall review the non-safety/ safety interface of the CIPS from the Offgas Treatment System liquid nitrogen tanks to the code boundaries at valves HV-4978 and HV-4974.

(The steam supply and return to the vaporizor need not be reviewed.) This review shall entail the following:

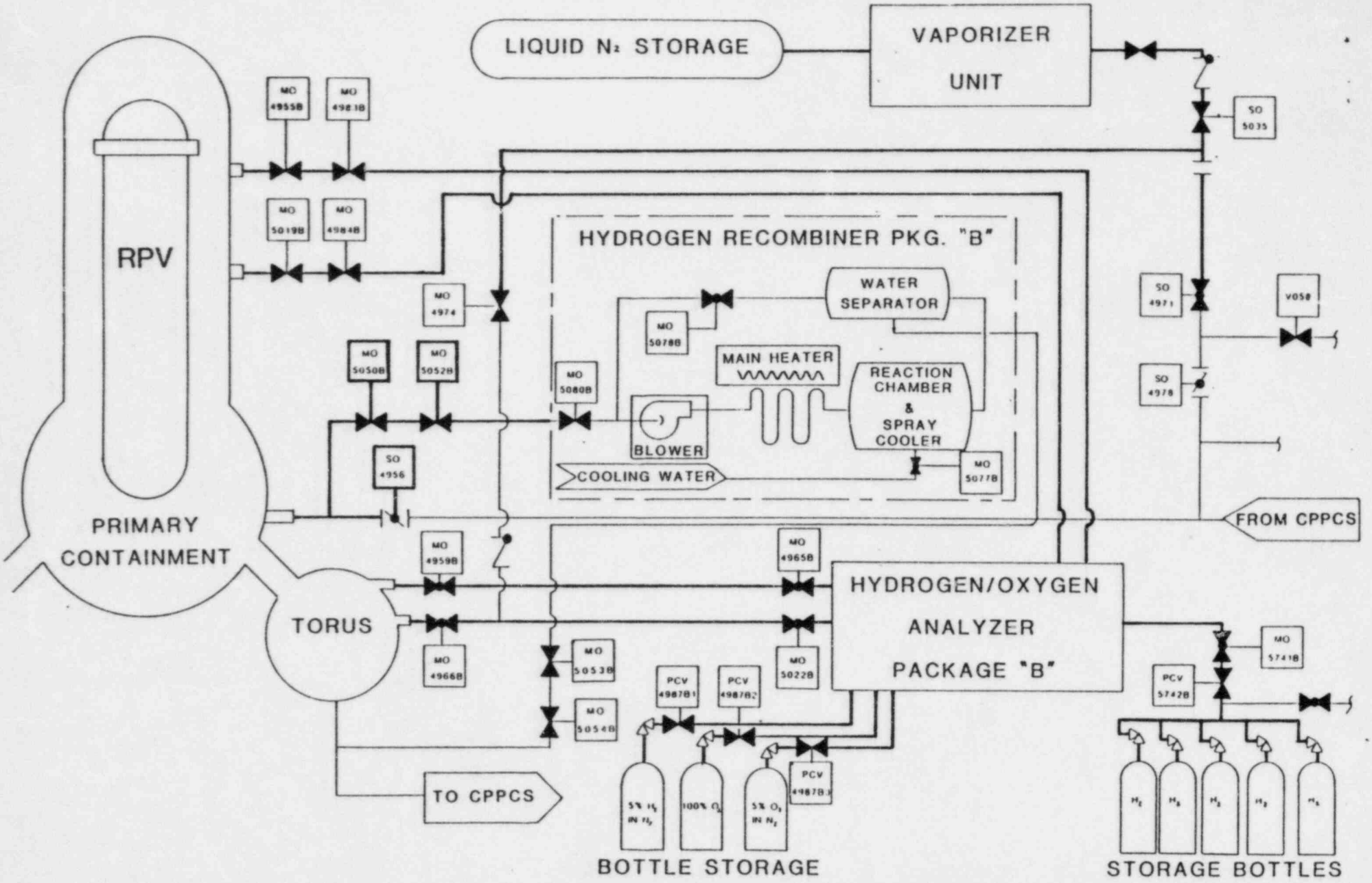
. Code and safety group classification boundaries
. Functional assessment of adherence to design requirement stated in the FSAR

(e) Structural Design to be Reviewed

The structural IDVP segment shall consist of a detailed review of the CHRS train "A" skid anchorage/supports.

The IDVP contractor shall review the following design aspects:

. Foundation design and embedments
. Anchor bolt sizing and torquing design specifications
. Load combinations (including nozzle reaction loads, dead weight, live loads, seismic, etc.)
. As-built configuration



SCHEMATIC

HOPE CREEK ADDITIONAL IDVP TECHNICAL WORK SCOPE

SARGENT & LUNDY

Nuclear Units Authorized for Design by Sargent & Lundy

Exhibit VI-3
0189-27
12/84

Client	Station-Unit	Type of Reactor*	Rated Gross MW	Year of Operation
Commonwealth Edison Company	Dresden 2	BWR	850	1971
	Dresden 3	BWR	850	1971
	Quad-Cities 1	BWR	850	1972
	Quad-Cities 2	BWR	850	1972
	Zion 1	PWR	1085	1973
	Zion 2	PWR	1085	1974
	La Salle 1	BWR	1122	1982
	La Salle 2	BWR	1122	1984
	Byron 1	PWR	1175	1985
	Byron 2	PWR	1175	1986
	Braidwood 1	PWR	1175	1986
	Braidwood 2	PWR	1175	1987
	Carroll County 1	PWR	1175	2000
	Carroll County 2	PWR	1175	2001
The Cincinnati Gas and Electric Company	Zimmer	BWR	839	Converted**
Dairyland Power Cooperative	La Crosse	BWR	48	1969
Illinois Power Company	Clinton 1	BWR	985	1986
Public Service Company of Colorado	Fort St. Vrain 1	HTGR	330	1979
Public Service Indiana	Marble Hill 1	PWR	1175	Cancelled**
	Marble Hill 2	PWR	1175	Cancelled**
Southwest Atomic Energy Associates	SEFOR	LMFBR	7	1967
United Power Association	Elk River	BWR	20	1961
U.S. Atomic Energy Commission	Borax III	BWR	3	1955
	EBWR	BWR	5	1956

*BWR - boiling water reactor
HTGR - high temperature gas reactor
LMFBR - liquid metal fast breeder reactor
PWR - pressurized water reactor
**The designs were completed at the time the projects were coverted or cancelled.

210,010EX

SARGENT & LUNDY

Operating BWRs Sargent & Lundy
Is Currently Servicing

Exhibit VI-1
0189-27
12/84

Unit	Model	Containment	MWT Licensed	CP Date	Commercial Operating Date
La Crosse	Unique	Unique	165	1963	1969
Dresden 2	BWR-2	Mark I	2527	1966	1971
Dresden 3	BWR-2	Mark I	2527	1966	1971
La Salle 1	BWR-5	Mark II	3323	1973	1982
La Salle 2	BWR-5	Mark II	3323	1973	1984
Quad Cities 1	BWR-3	Mark I	2511	1967	1972
Quad Cities 2	BWR-3	Mark I	2511	1967	1972
Brunswick 1	BWR-4	Mark I	2436	1970	1977
Brunswick 2	BWR-4	Mark I	2436	1970	1975
Susquehana 1	BWR-4	Mark II	3439	1973	1983
Susquehana 2	BWR-4	Mark II	3439	1973	1985

227,204EX

INDEPENDENT REVIEWS OF SARGENT & LUNDY DESIGNS BY OTHERS

UTILITY	STATION/UNIT	REVIEWER	SCOPE
Cincinnati Gas & Elec.	Zimmer 1	Bechtel	Complete Design
Commonwealth Edison	Byron 1,2 Braidwood 1,2	INPO	Construction Project Eval.
	Byron 1,2	Bechtel	Adherence to design requirements, technical adequacy and adequacy of design process for Essential Service Water, Component Cooling Water, and 125 volt dc distribution syst.
		NRC	Integrated Design Inspection for adherence to design reqts., technical adequacy of design, and adequacy of design process for Auxiliary Feedwater and Containment Spray systems.
	LaSalle 1	Teledyne	Design adequacy of portion of RHR system.
Detroit Edison	Fermi 2	Cygna	IDVP of design control, accuracy and completeness of design; included RHR primary shutdown path components and RHR cooling tower.

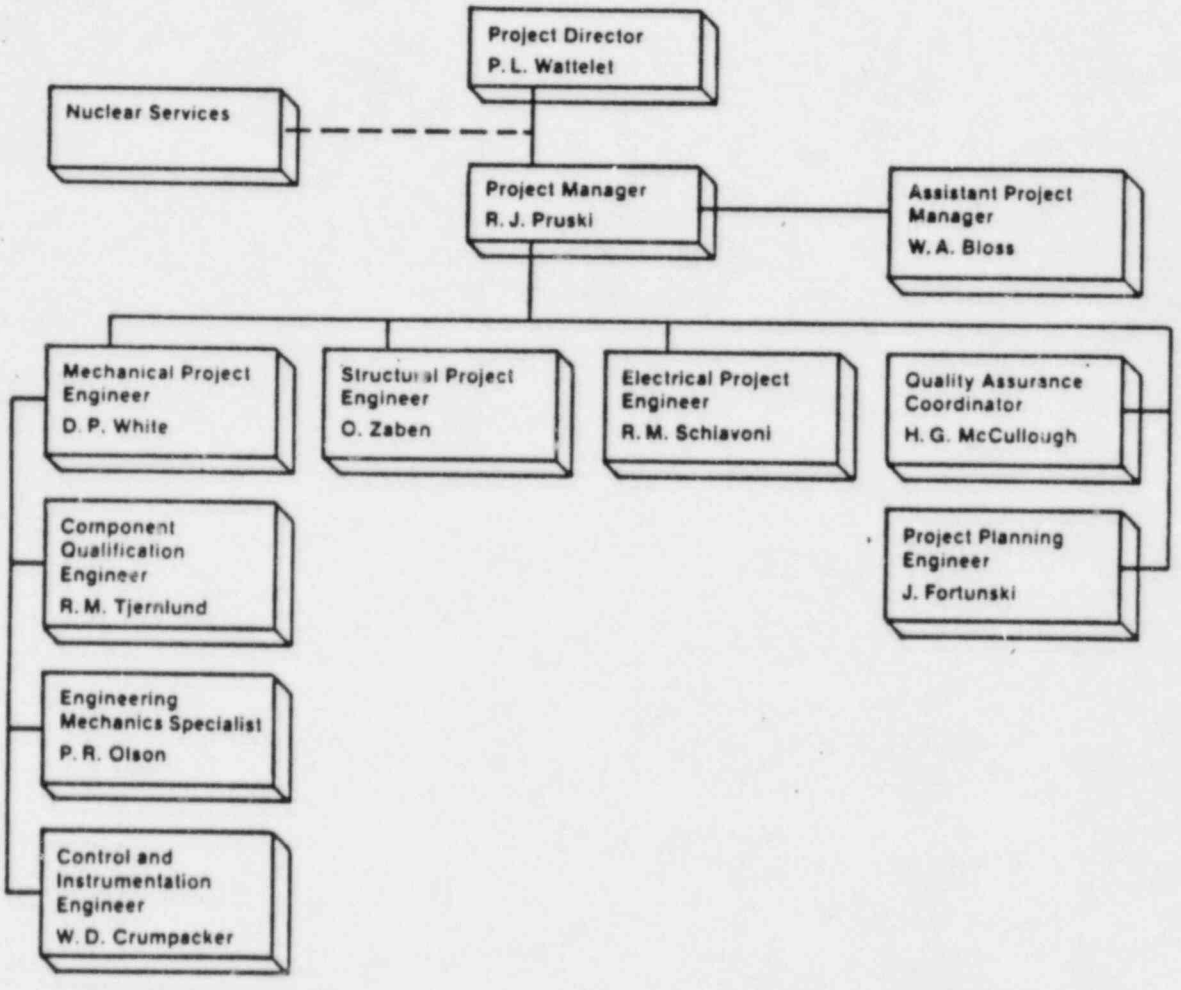
INDEPENDENT REVIEWS OF SARGENT & LUNDY DESIGNS BY OTHERS

UTILITY	STATION/UNIT	REVIEWER	SCOPE
Illinois Power	Clinton 1	Bechtel	Adherence to design reqts., technical adequacy and adequacy of design process for High Pressure Core Spray, Class 1E ac distribution and Shutdown Service Water systems.
Public Service Indiana	Marble Hill 1,2	INPO	Construction Project Eval.
		Nova	Plant Instrumentation & Control

SARGENT & LUNDY REVIEW OF DESIGN BY OTHERS

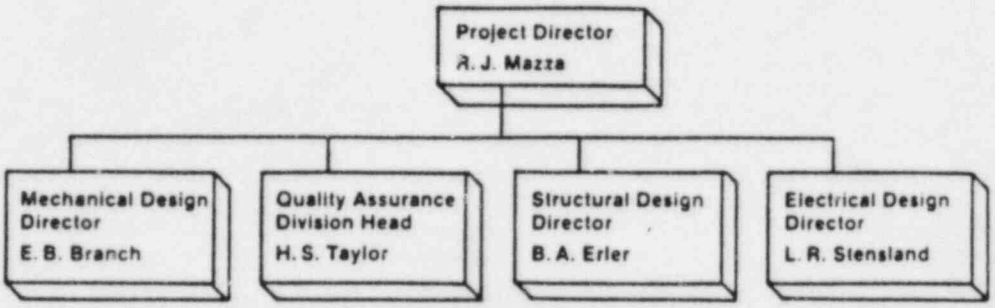
UTILITY	STATION/UNIT	SCOPE
Texas Utilities	Comanche Peak 1,2	Initial INPO-type self-initiated evaluation of the construction project including an evaluation of the design control, construction control, scheduling, planning, QA and administration. Evaluation included "vertical" as well as "horizontal" review components.

Project Team



Support Divisions

Nuclear Safety and Licensing
Heating, Ventilating, and Air Conditioning
Mechanical Design and Drafting
Structural Design Engineering


Project Director
R. J. Mazza
Mechanical Design Director
E. B. Branch
Quality Assurance Division Head
H. S. Taylor
Structural Design Director
B. A. Erler
Electrical Design Director
L. R. Stensland

SARGENT & LUNDY

HOPE CREEK IDVP PROJECT TEAM

	S&L POSITION	IDVP RESPONSIBILITY	NUCLEAR PLANT DESIGN EXPERIENCE (YEARS)
P. L. WATTELET	PARTNER, PROJECT DIRECTOR	PROJECT DIRECTOR	18
R. J. PRUSKI	ASSOCIATE, PROJECT MANAGER	PROJECT MANAGER	16
W. A. BLOSS	ASSOCIATE, PROJECT MANAGER	ASST. PROJECT MANAGER	16
O. ZABEN	ASSOCIATE, SENIOR STRUCTURAL PROJ. ENGR.	STRUCTURAL PROJECT ENGR.	15
D. P. WHITE	PROJECT MANAGER	MECHANICAL PROJECT ENGR.	20
M. R. SCHIAVONI	SR. ELECTRICAL PROJECT ENGINEER	ELECTRICAL PROJECT ENGR.	13
H. G. L. McCULLOUGH	QUALITY ASSURANCE COORDINATOR	DESIGN PROCESS COORDINATOR	20

SARGENT & LUNDY KEY SPECIALISTS

	S&L POSITION	IDVP RESPONSIBILITY	NUCLEAR PLANT DESIGN EXPERIENCE (YEARS)
R. M. TJERNLUND	SENIOR COMPONENT QUALIFICATION ENGR.	COMPONENT QUALIFICATION	9
P. R. OLSON	SUPERVISOR, ENGINEERING MECHANICS	PIPING/SUPPORTS	11
W. D. CRUMPACKER	C&I PROJECT ENGINEER	CONTROL & INSTRUMENTATION	8

SARGENT & LUNDY

SENIOR IDVP REVIEW COMMITTEE

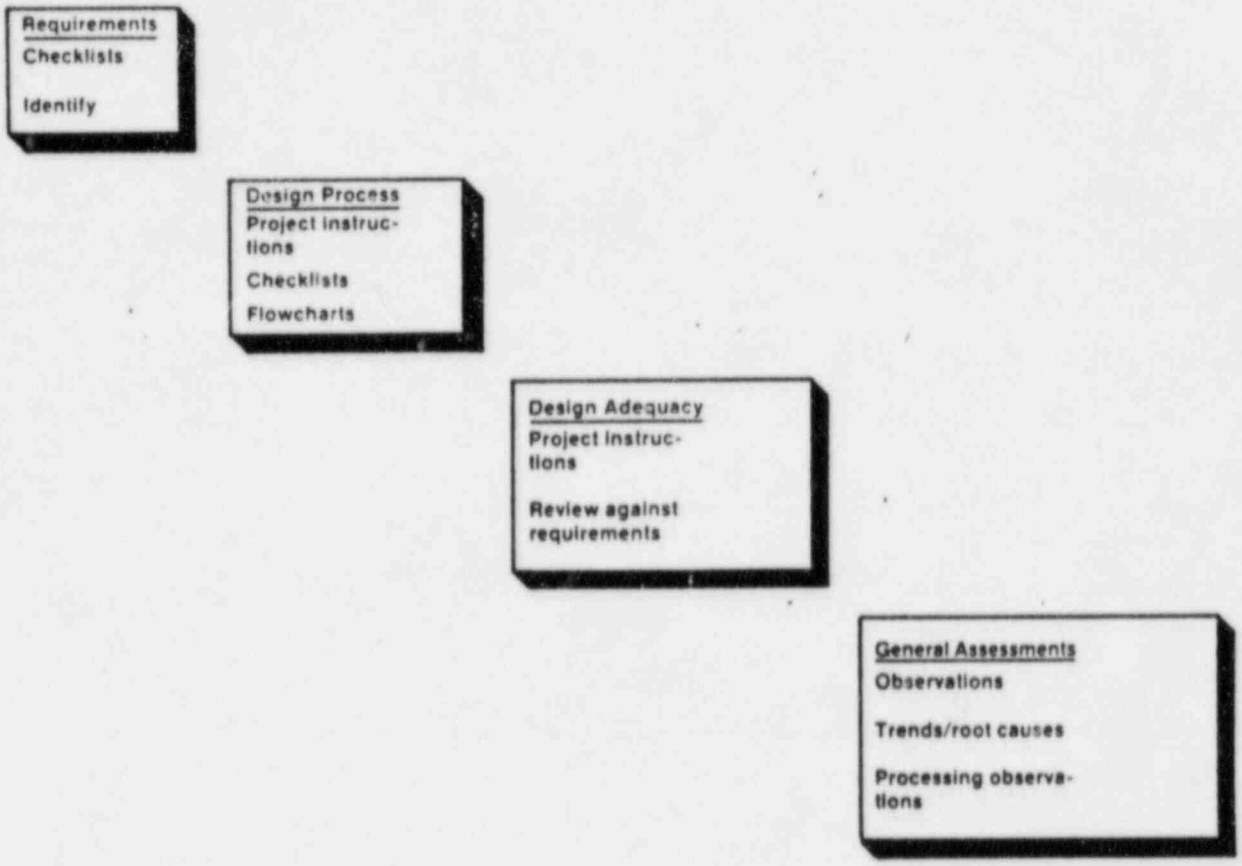
	S&L POSITION	NUCLEAR PLANT DESIGN EXPERIENCE (YEARS)
R. J. MAZZA	PARTNER, PROJECT DIRECTOR	> 20
E. B. BRANCH	ASSOCIATE, MECHANICAL DESIGN DIRECTOR	15
B. A. ERLER	ASSOCIATE, STRUCTURAL DESIGN DIRECTOR	14
L. R. STENSLAND	ASSOCIATE, ELECTRICAL DESIGN DIRECTOR	> 20
H. S. TAYLOR	ASSOCIATE, HEAD QUALITY ASSURANCE DIVISION	13

Hope Creek IDVP

- o IDVP Plan
- o Review Process
- o Observations, Reports

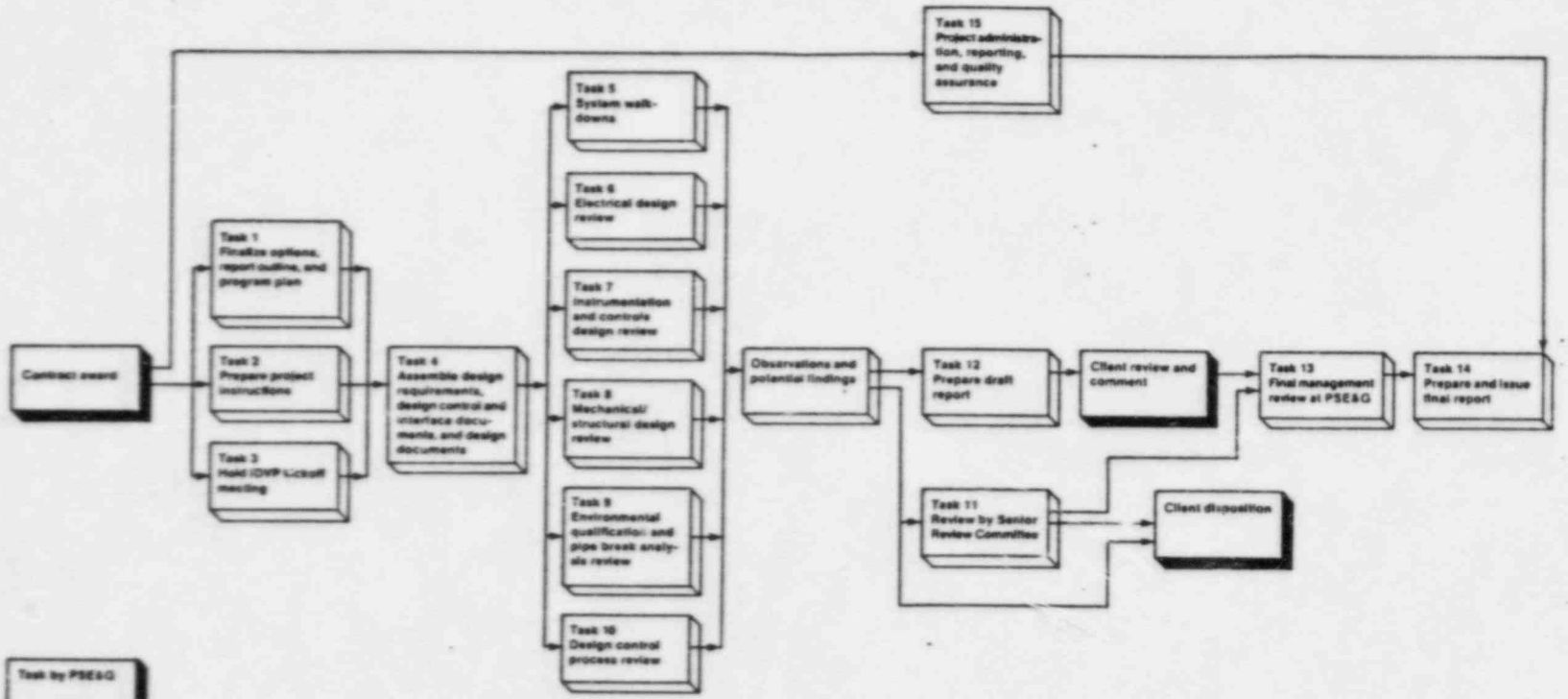
Sequence of Design Review Activities

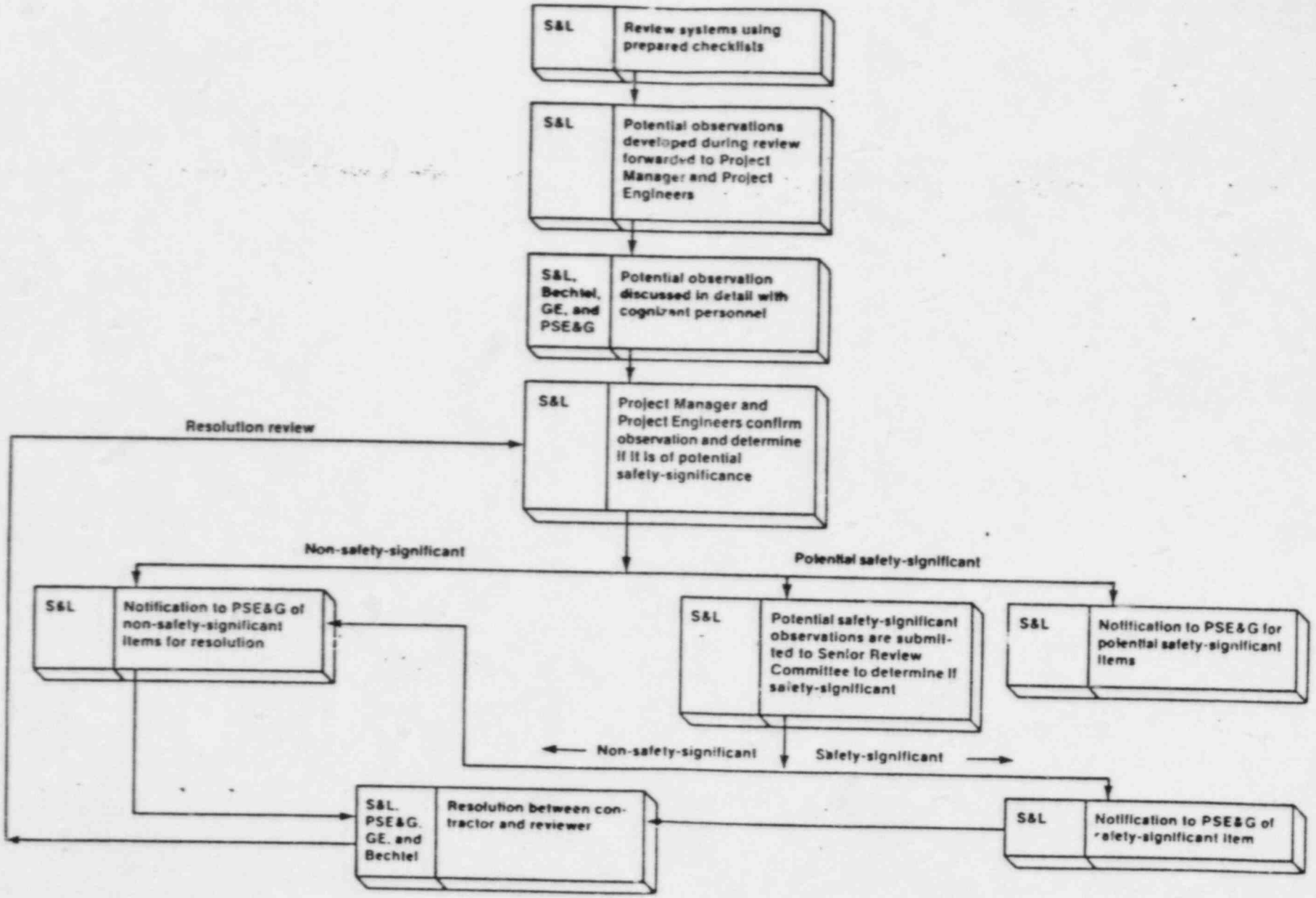
Exhibit III-2



SARGENT & LUNDY Precedence Diagram

Exhibit III-1




S&L
Review systems using prepared checklists
S&L
Potential observations developed during review forwarded to Project Manager and Project Engineers
S&L, Bechtel, GE, and PSE&G
Potential observation discussed in detail with cognizant personnel
S&L
Project Manager and Project Engineers confirm observation and determine if it is of potential safety-significance
Resolution review
Non-safety-significant
Potential safety-significant
S&L
Notification to PSE&G of non-safety-significant items for resolution
S&L
Potential safety-significant observations are submitted to Senior Review Committee to determine if safety-significant
S&L
Notification to PSE&G for potential safety-significant items
Non-safety-significant
Safety-significant
S&L, PSE&G, GE, and Bechtel
Resolution between contractor and reviewer
S&L
Notification to PSE&G of safety-significant item

I. Executive Summary
   - A. Purpose
   - B. Scope
   - C. Project Organization
   - D. Methodology
   - E. Results
   - F. Overall Conclusions

II. Program Detail
   - A. Objectives and Scope
   - B. Systems and Components Reviewed
   - C. Method Utilization
   - D. Description of Expertise Involvement
   - E. Delineation of Aspects
     1. Licensing
     2. Design Adequacy
     3. Design Procedures
     4. Design Interface
     5. Control of Design Changes
     6. Design Reviews
     7. As-Built Verification

III. Results
   - A. Observations
   - B. Potential Findings
   - C. Disposition of Potential Findings

IV. Conclusions and Recommendations
   - A. Findings
   - B. Recommendations
   - C. Conclusions

V. Appendices
   - A. Project Team
   - B. Senior Review Committee
   - C. Management Methodology
   - D. Definitions
   - E. List of Documents Reviewed
   - F. Review Criteria
   - G. Review Records
   - H. Observation Reports
   - I. Dispositions
   - J. Independence Statement
   - K. IDVP Project Manual

IDVP QUALITY ASSURANCE

THE SARGENT AND LUNDY QUALITY ASSURANCE TOPICAL REPORT SL-TR-1A REVISION 6 DOES NOT DIRECTLY ADDRESS AN INDEPENDENT DESIGN VERIFICATION PROGRAM (IDVP)

IN ORDER TO CONDUCT THIS IDVP UNDER AN APPROVED PROGRAM, A QUALITY ASSURANCE PROGRAM PLAN WAS PREPARED AND APPROVED BY THE HEAD OF THE QUALITY ASSURANCE DIVISION AND THE IDVP PROJECT DIRECTOR

COMPLIANCE WITH THIS Q. A. PROGRAM PLAN BY ALL PROJECT PERSONNEL IS MANDATORY

THE PROJECT MANUAL AND INSTRUCTIONS DELINEATE IN MORE DETAIL THE VARIOUS ACTIVITIES OF THE IDVP