THE CINCINNATI GAS & ELECTRIC COMPANY

CINCINNATI, OHIO 45201

December 16, 1983
LOZ-83-0242

J. WILLIAMS, JR
SENIOR VICE PRESIDENT
NUCLEAR OPERATIONS

Docket No. 50-358

U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Attention: Mr. J.G. Keppler
Regional Administrator

Gentlemen:

RE: WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1
PLAN TO VERIFY THE QUALITY OF CONSTRUCTION (PVQC)
W.O. 57300, JOB E-5590, FILE NO. 956C

Attached in accordance with Section IV.B(2)(a) of the Commission's November 12, 1982, "Order to Show Cause and Order Immediately Suspending Construction", is the CG&E Plan to Verify the Quality of Construction (PVQC) of the Zimmer facility. The PVQC contains responses to questions contained in your letters dated October 28, 1983 and November 15, 1983, as they pertain to this program. These responses also reference the section within the PVQC which provides a more detailed response.

Our preparation of detailed procedures for implementation of the PVQC is in progress. These procedures will be made available for your staff review at the site at their convenience.

Should you have any questions or require any additional information, please let me know.

Very truly yours,

THE CINCINNATI GAS & ELECTRIC COMPANY

By J. Williams, Jr.
J. WILLIAMS, JR.
SENIOR VICE PRESIDENT

GCF/sfr

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12/15/83
PVQCCOA

BPC/PVQC RESPONSE TO NRC QUESTIONS ON COA
ROUND 1

(Reference NRC Letter J.G. Keppler to J. Williams,Jr. Dated 10/28/83, Enclosure 2)

Question 1. Regarding the determination of the quality of every existing safety-related system, structure, and component (SSC), as a minimum the SSC list should include the structures, systems, and components in the FSAR (Section 3.2). In addition, NRC (Region III) will review the more detailed listing prepared by CG&E.

Response: The scope of the PVQC will encompass all safety-related SSCs. Where additional commitments have been made in the FSAR on other SSCs, these will be included in the scope of the PVQC. Acceptance criteria of these SSCs will be provided by Sargent & Lundy. Sargent & Lundy is preparing a list which identifies all such SSCs. Reference PVQC Program, Page 8, Paragraph 4.

Question 2. Does procurement documentation review include verification that suppliers' Quality Assurance programs have been determined to be acceptable and the supplier is on the Approved Vendors List (AVL)?

Response: PVQC will verify that vendors are identified on an Approved Vendors List (AVL). The AVL will be supplied by CG&E, HJK and other contractors. In addition, PVQC will verify the AVL in accordance with the provisions on Page 33 of the PVQC.

Question 3. Will PVQC review documents to a set of "validated" design drawings and specifications or to the drawings and specifications approved for construction on November 12, 1982?

Response: PVQC will utilize both the current design drawings and specifications and those A/E approved design drawings as of November 12, 1983, as follows:

1. The visual and physical inspection process requires the use of A/E approved design drawings for these activities. These will be the current design drawings and specifications. Reference PVQC Program, Page 20, Paragraph 3.

2. After completion of these activities a comparison evaluation will be performed between as-constructed design drawings, specifications or other documentation, as necessary, and the approved

baseline data as of November 12, 1983. The PVQC refers to those as "validated" design documents. The results of this comparison will be included in the QA trend program where appropriate. Reference PVQC Program, Page 44, Paragraphs 4 and 5, Baseline Data Comparison Evaluation.

Question 4. If the review is to a "validated" original, explain the validation process. If the review is to both a "validated" design and the design approved for construction on November 12, 1982, provide additional clarification.

Response: "Validated" base line data refers to the approved design as of November 12, 1982, and is defined in Section 2.2 of the PVQC Program. The validation process requires the Sargent and Lundy organization to formally identify the revision status of approved design documents as of the date of the show cause order. Reference PVQC Program, Page 7, Paragraph 3.

For part 2 of Question 4, see response to Question 3.

Question 5. General statements, "...may be uncovered..." and "...may be physically inspected..." do not provide sufficient guidance as to when these actions are performed. Provide further guidance to clarify these statements.

Response: The question as stated refers to the last sentence of Paragraph 1, Page 23 of the COA which states: "Inaccessible portions of SSCs may be uncovered in order to be visually inspected or they may be physically inspected." In the PVQC Program, Sections 2.0 and 4.0 provide clarification of the term "Inaccessible" and provides a detailed description of visual and physical inspection activities. (Also see response to Question 7.) Reference PVQC Program, Pages 26 through 30.

Question 6. The statement that physical inspections will be performed on a sample basis is too general. Provide additional information relative to the standards used to determine sample size and the degree to increase in inspections when one or more items in the sample size are found deficient.

Response: Sample basis methodology is described in the PVQC Program. The specific details supporting the described methodology will be detailed in procedures and/or Quality Verification Instructions. Reference PVQC Program, Page 28, Paragraph 3 through 30; Page 40, Paragraphs 5 through Page 42, last paragraph.

Question 7. Clarify the difference between "visual" and "physical" inspections. Guidance should be provided as to what criteria will be used to determine acceptance of the visual inspections.

Response: Visual inspection consists of those examinations that can be performed without special tests and without destructive examination. This includes identification of material and equipment numbers, determination of configuration and dimensions, identification of inaccessible areas/components, nonconformances, conformances and collection of other as-constructed data. Equipment for visual inspection will include items such as tape measures, rulers, electronic measuring devices, levels, micrometers, calipers and gauges. Reference PVQC Program, Page 26, Paragraph 1 through Page 28, Paragraph 2.

Physical inspections of safety-related SSCs will be performed to provide the as-constructed status of non-visual attributes, when visual inspections will not provide the data required, and to determine whether the as-constructed status conforms to the requirements of design drawings and specifications. SSCs to be inspected include those recommended in the report of the NRC Evaluation Team (Reference 8); reports of the National Board of Boiler and Pressure Vessel Inspectors; NRC inspection reports; the relevant specific and general public allegations now on file; the areas that are the subject of extensive or significant nonconformances identified by the Quality Confirmation Program (QCP) and in 10 CFR 50.55(e) reports. There may be some portions of the safety-related SSCs verified by the document review as conforming but that have not been confirmed by physical inspection. These portions will be the candidates for confirmatory physical inspections. Physical inspections will include nondestructive examinations, destructive examinations, and other inspections that can only be performed with special tests or equipment. Reference PVQC Program, Page 28, Pargraph 3 through Page 30, Paragraph 4 and Appendix F.

Question 8. What is considered "inaccessible"? Who makes this determination?

Response: The term "inaccessible" is defined in Paragraph 2.2 of the PVQC Program. The Project Field Engineer-PVQC will determine what is inaccessible. Reference PVQC Program, Page 5, Paragraph 7 through Page 6, Paragraph 1.

Question 9: When a portion of a system is required to be visually inspected by a code to which the licensee is (previously) committed and that portion is deemed "inaccessible," what actions will be pursued by the licensee relative to previous commitments in the PSAR/FSAR?

Response: PVQC will verify all accessible SSCs by visual inspection to approved design drawings and specifications (which address the mandatory code requirements). Physical inspection will be performed on SSCs inaccessible (non-visual) items as appropriate to supply the required data. SSCs that are inaccessible and have acceptable documentation will be subject to confirmatory physical inspection to provide additional assurance of compliance to design documents. Similar accessible items to those inaccessible will be considered in review of the inaccessible evaluation. Reference PVQC Program, Page 40, Paragraph 5 through Page 41, Paragraph 2.

Question 10: Has CG&E or its contractors identified any system or parts of systems that by fuel loading will not meet the code(s) previously committed to by CG&E?

Response: No. If any systems or parts of systems are identified as not meeting code by the time of fuel load, as previously committed by CG&E they will be brought to the attention of the NRC. It is the intention of the project that all such conditions, if identified, will be resolved before fuel load.

Question 11: Will all nonconformances be recorded as a "nonconformance" report?

Response: Yes. Reference PVQC Program, Page 39, Paragraph 3 through Page 40, Paragraph 3.

Question 12: Will any other document or record be used to identify a condition adverse to safety-related criteria such as a "deficiency report? If so, what other documents may be used in this manner?

Response: During the performance of PVQC activities, suspected deficiencies will be identified and tracked by the use of a discrepancy list. During the status determination process for SSCs, nonconformance reports will be initiated for all SSCs listed on the discrepancy list which are determined to be valid nonconformances (e.g., during the walkdown a discrepancy may be noted and during the status review it may

be determined that an existing nonconformance report has previously identified the nonconformance; the discrepancy would not be documented again on an NCR). Reference PVQC Program, Page 38, Paragraph 3.

Question 13: If documentation other than nonconformance reports will be used, what criteria will be employed to determine which type of documentation should be useshould be used? What supervisory review will be established to assure the proper distinction is made?

Response: Discrepancies will initially be identified and tracked on a Discrepancies list. During status determination, evaluation by the PVQC team (Quality Control and Field Engineering) will be performed to determine if the discrepancy is to be reported on a nonconformance report. An investigation will be performed to identify duplicate NCRs, obtain improperly filed documentation, material traceability numbers, etc., and the results of the investigation used to evaluate the discrepancy. Quality Control personnel assigned to the team will review each discrepancy listed and concur with its final determination which includes issuing nonconformance reports. Each completed verification package is further subjected to a review by QC personnel other than those who performed the initial verification. Reference PVQC Program, Pages 13, 28, 30, 33 and 34.

Question 14: The COA states that Bechtel will utilize personnel from CG&E for member(s) of PVQC team(s). Does CG&E intend to use the CG&E team members to both participate in and oversee the activities of Bechtel?

Response: The personnel assigned to the Manager of PVQC and Nuclear Project Support Services have the responsibility for overseeing Bechtel activities. These individuals will not be assigned as team members. The CG&E members of the PVQC teams participating in PVQC activities will have no other major responsibilities while assigned to PVQC and will not be involved in overseeing Bechtel. Reference PVQC Program, Page 22, Paragraph 2.

Question 15: Is it planned to continue the QCP as a subset of the PVQC or to cease work on the QCP upon activation of the PVQC. If the QCP is stopped before completion of all of the tasks, please describe how the remainder of the program would be incorporated into the PVQC.

Response: Upon activation of PVQC activities that will emcompass the associated QCP activity, the QCP activity will cease and a status report will be developed for the QCP activity.

Should any QCP activity remain to be completed it would be incorporated in PVQC. Any reduction in scope to the QCP activity will be submitted to the NRC for approval. Reference PVQC Program, Page 18, Paragraph 3 through Page 19, Paragraph 1.

Question 16: What is meant by "concentrated" inspections to be provided by the PVQC?

Response: PVQC will "concentrate" inspections in certain attributes of SSCs to investigate generic concerns identified by QCP. In addition, physical inspections will "concentrate" on deficient areas. This will be accomplished as depicted in the PVQC Program. Reference PVQC Program, Page 19, Paragraph 1; Page 28, Paragraph 1 through Page 30, Paragraph 1.

Question 17: The statement, "...significant quality concerns..." is used to determine when corrective action is initiated to prevent recurrence. This statement must be sufficiently clarified so there is no misunderstanding as to when these types of corrective actions are to be performed.

Response: A generic project corrective action procedure applicable to both PVQC and CCP is being developed which will clearly define the phrase "significant quality concerns" in terms of significant singular events, recurring events, items reportable under 50.55(e) and items reportable under 10CFR Part 21. Reference PVQC Program, Section 6.0.

Question 18: Will QA/QC inspectors use separate procedures or sign construction check lists at a predesignated hold point (both for QCP and PVQC)?

Response: All PVQC personnel will perform verification activity in accordance with PVQC procedures that provide for documentation of QA/QC activity, including establishing and

acknowledgment of QA/QC hold points on verification checklists. PVQC will utilize their own procedures and checklists. Reference PVQC Program, Page 33, Paragraph 3 through Page 34, Paragraph 3, Section 6.0.

Question 19. Will a revised quality assurance manual be submitted for CG&E, Bechtel, Kaiser?

Response: Yes. The manuals are being revised and will be available for NRC audit at the site.

Question 20. Does the PVQC include systems that may be considered "associated" systems, e.g., non safety-related cable run in a safety-related tray; non safety-related pipe which is mounted above a safety-related pipe; adjacent masonry walls.

Response: To the extent that these subjects are committed to in the Zimmer FSAR, Sargent & Lundy will include them on the list of SSCs to be inspected and provide acceptance criteria for meeting these commitments. Reference PVQC Program, Page 7, Paragraph 2.

Question 21. Will the PVQC inspect these "Q" systems against drawings, design specifications, and construction specifications?

Response: PVQC will inspect these systems against design drawings and specifications and construction specifications as approved by the architect-engineer for construction. Reference PVQC Program, Page 11, Paragraph 3 and Page 24, Paragraph 2.

Question 22./23.

Will the PVQC review all design drawings and specifications? (If not, which ones will they review?)

Response: The PVQC scope of work covers safety-related systems, structures and components and, therefore, only the applicable design document will be reviewed. In addition, PVQC will utilize the current, approved design documents for verification purposes and therefore will not review all previous designs and design revisions except as provided for by baseline data comparison activity and except as necessary to determine whether an item is a nonconformance or incomplete by virtue of subsequent design changes. PVQC will not review any design drawings and specification for technical adequacy. Reference PVQC Program, Page 24, Paragraph 2.

Question 24: Will the PVQC review all construction dra ings? (If not, which ones will they review?)

Response: PVQC will not review all construction drawings (those prepared by H.J. Kaiser or contractors). Some construction drawings, such as PSKs and ISKs, may be utilized to supplement use of approved design drawings. PVQC will use construction drawings that are approved design by Sargent & Lundy. PVQC will only review drawings, within the scope of PVQC. PVQC will review any installation data recorded on construction drawings. PVQC will not review construction drawings for technical adequacy. Reference PVQC Program, Page 24, Paragraph 2.

Question 25: Will the PVQC review all construction specifications? (If not, which ones will they review?)

Response: PVQC will review all construction specifications to ensure that specifications reflect the appropriate S&L design. Some construction specifications, such as expansion anchor bolt installation, may be utilized to supplement use of approved design specifications. PVQC will not review construction specifications for technical adequacy. Reference PVQC Program, Page 21, Paragraph 2.

Question 26: Will any Bechtel approval signatures be on any documents?

Response: Bechtel will sign, during the verification process, the Quality Verification Checklists (QVCL). There will be no Bechtel approval signatures on any approved design drawings and specifications except for those required by the PVQC Program.

Question 27: Will QC inspectors do the system inspections? If yes, will they report to a quality assurance manager or the PVQC manager? If they report to the PVQC manager, what quality assurance/quality control activities will be connected with the PVQC?

Response: Yes, Quality Control personnel assigned to PVQC are directly supervised by lead QC engineers who report to the PVQC Project Quality Control Engineer who is directed by the Project Quality Control Manager. The Assistant Project Director for PVQC will provide project coordination through the PVQC Project Quality Control Engineer including the identification of assigned tasks to be performed by

quality control personnel. Quality Control personnel performing PVQC verification activities will be assigned to verification teams for the validation of collected data and performance of inspection, as appropriate and necessary, to complete team verification tasks. Team leaders coordinate directly with assigned QC personnel. Reference PVQC Program, Pages 22, Paragraph 1 through Page 24, Paragraph 1; and Section 5.0.

Question 28. What records will the personnel conducting the system walkdown generate?

Response During walkdown PVQC will generate PVQC completed checklists; nonconformance reports; nondestructive examination reports, including radiographs; destructive test results; and other special test results, when required. All of the above are considered QA/QC records when fully processed. Additional items generated such as deficiency lists and as-built status drawings detailing completion status of a system will be controlled documents. Reference the PVQC Program, Page 25, Paragraph 2.

Question 29. Will these records be classified as "Quality Assurance" or "Quality Control" records?

Response: See answer to Question 28.

Question 30. Will PVQC review all records relative to previous safety-related construction?

Response: PVQC will review quality related records and documents as described in the PVQC Program. Reference PVQC Program, Page 30, Paragraph 3 through Page 34, Paragraph 3.

Question 31. When some portion of safety-related structures, components, supports, or equipment is not available for inspection and acceptable documentation does not provide sufficient evidence that the activity was performed in a quality manner, what actions will be performed?

Response: Those SSCs that are not available for visual inspection and have acceptable documentation, whether or not this documentation is adequate to substantiate that a particular quality level has been achieved, will be candidates for physical or confirmatory inspection. Reference PVQC Program, Page 14, Paragraph 4 through Page 16, Paragraph 2; and Page 40, Paragraph 1.

Question 32: After an examination of a safety-related construction activity, including a quality record, or quality document, and a condition adverse to a requirement is confirmed or suspected, what actions will be performed?

Response: Suspect conditions, not confirmed as a condition adverse to a requirement, will be identified as a discrepancy and tracked by the use of a discrepancy log until such time the condition is confirmed or resolved as being conforming. Conditions adverse to a requirement which are confirmed will be documented on a nonconformance report. Reference PVQC Program, Page 38, Paragraph 3 through 4; and Page 40, Paragraph 3.

Question 33: What physical control and protection will be provided to both quality related documents and records?

Response: During PVQC review of quality related documents and records, physical control and protection will be maintained in accordance with approved procedures which will define specific requirements such as controlled access, filing, and protection. Reference PVQC Program, Page 58, Paragraph 5.

Question 34: Who will do the training and certification of the personnel conducting the PVQC?

Response: Teams will be trained by Bechtel and certification will be performed by Bechtel for those conducting the PVQC. Reference PVQC Program, Page 22, Paragraph 4 through Page 23, Paragraph 1 and Section 8.2 (entire section).

Question 35: What training will individuals receive prior to performing activities pursuant to the PVQC?

Response: The training of PVQC Personnel prior to performing activities pursuant to the PVQC will be defined in the PVQC training matrix. The training of PVQC personnel is defined in the training matrix and includes indoctrination training and training in the discipline task its individual is working. Reference PVQC Program, Page 71, Paragraph 4.

Question 36: What previous occupational experience will be required as a prerequisite to selection of individuals for examination of quality-related construction, records, or documents? How will this be verified?

Response: Each individual selected to examine quality-related hardware, records or documents will have a sufficient combination of education and experience to ensure understanding, and ability

to implement, the principles of quality construction and procedures related to the individual's assignment. Quality Control personnel performing examination of quality-related construction records, and documents will be certified in accordance with the Project Quality Assurance requirements.

Specific requirements for personnel qualification are to be detailed in project procedures. Verification of prior employment is made in accordance with personnel procedures.

Question 37. Will the walkdown of a particular system be made relative to all requirements applicable to that system, e.g. code, design drawing and specification, construction drawing and specification and QC procedures? If one or a selected group of documents is used for the walkdown, how will the licensee assure that this group of documents contain all of the requirements relative to that particular installation?

Response: The walkdown of a system is accomplished to a specific verification instruction prepared for each unique type of equipment, component, installation or commodity to be verified during walkdown activities. Each verification instruction shall incorporate, as applicable requirements (attributes) obtained from:

a. The Architect/Engineer

b. Applicable standards, codes and code cases

c. Drawings, specifications and procedures

d. Purchase Orders

e. NRC Committments and NRC Evaluation Team (NET) report

f. National Board and ASME audits

g. Immediate Action letter

h. Show Cause Order CL-82-33

i. 50.55(e) reports

j. Other documents and public concerns, where relevant and on file.

Major attributes will be identified or concurred with by Sargent & Lundy and used in PVQC. The verification instructions will be prepared by PVQC Field Engineering and reviewed and approved by Quality Control to assure instructions address all relative requirements. Reference PVQC Program, Page 20, Paragraph 3 through Page 21, Paragraph 1; Page 24, Paragraph 2; and Appendix B, Page 1.

RESPONSES TO NRC PVQC QUESTIONS
Round 2

(Reference NRC Letter J.G. Keppler to J. Williams,Jr. Dated 11/15/83, Enclosure 2)

Question 1: The PVQC should address the process for self-monitoring, identification of needed changes to the PVQC, and the process for making these adjustments.

Response:

A. In addition to the independent auditor, PVQC will be audited and monitored by Bechtel and CG&E QA providing an internal mechanism for monitoring. Reference PVQC Program, Page 33, Paragraph 4.

B. Quality assurance will be trending PVQC audit findings, corrective action requests, and findings from outside auditors. Periodic QA management reports will be issued discussing the PVQC operation. Reference PVQC Program, Page 63, Paragraph 2; Page 64, Paragraph 2; Page 65, Paragraphs 1 and 4.

C. Monthly progress reports will be issued by PVQC discussing status, and progress on near term PVQC activities, results and findings of PVQC, restraints and action items; providing early warning of developing and potential problems; and recommending corrective action. The development and issuance of these progress reports will be controlled by a PVQC procedure. These reports will be forwarded to the NRC by CG&E. Reference PVQC Program, Page 73, Paragraph 3 and 4.

D. Changes to the PVQC program in light of PVQC findings will follow a formal process including NRC review and approval. This process is further detailed in the PVQC Program. Reference PVQC Program, Page 47, paragraphs 1 and 2.

E. In addition, as a matter of course, periodic PVQC management meetings will be held with key PVQC personnel to evaluate progress and discuss problems.

Question 2: The PVQC should address plans for trending problems/deficiencies/nonconforming conditions and plans for addressing these items determined to be generic or repetitive.

Response: PVQC is the organization responsible for identifying conforming, nonconforming, and incomplete work statuses of the SSCs. The Bechtel QA organization will review the NCRs

generated by PVQC and prepare trends of these nonconformances. In addition, Bechtel QA will trend the PVQC audit findings, corrective action requests, and findings from outside audits to which PVQC will respond. (See discussion and references in Response 1). Reference PVQC Program, Page 62, Paragraph 5. Generic deficiencies will be identified in the Construction Verification Report (CVR). Reference PVQC Program, Page 45, Paragraph 6.

Question 3: Personnel participating in the PVQC and CCP must be qualified and appropriately trained. Have qualification requirements and training commitments been identified?

Response: Personnel participating in PVQC will be qualified and appropriately trained. The specific qualifications of PVQC personnel will be detailed in a PVQC procedure and the training requirements specifically identified by class and/or type of training in the PVQC training matrix. The detailed training requirements are currently being established.

Quality control personnel will either perform, participate in supervising, or surveiling the performance of inspection or tests intended to verify the quality of construction. Quality control personnel will be qualified and certified in accordance with ANSI-45.2.6-1978. Reference PVQC Program, Pages 71-73 and Appendix M.

Question 4 The PVQC includes physical inspections of safety-related structures, systems and components on a sample basis. Describe the basis for determining sample size and acceptance criteria. How will structures, systems, and components be selected for physical inspections? What types of physical inspections will be made? Can you give some idea of the portion of total safety-related structures, systems, and components that will be selected for initial physical inspection? (Page 23, Volume I).

Response: Verification teams will identify inaccessible items as a result of walkdown inspection activity. Safety-related SSCs will be evaluated by type, construction method, previous tests and inspections performed, etc., and categorized into sample groupings as candidates for physical or confirmatory inspections. PVQC engineering will evaluate and identify sample groups that are to be physically inspected or to be part of the confirmatory physical inspection program.

The acceptance criteria will either be pre-defined attributes depicted on Quality Verification Instructions and Checklists (QVI/QVCL) or specific data will be gathered and submitted to the A/E for further evaluation. PVQC procedures will be written for executing the sampling program. We cannot at this time quantify the SSCs to be physically inspected. Reference PVQC Program, Pages 28-30; Page 39, Paragraph 5 through Page 43, Paragraph 1.

Question 5: One of four objectives of the physical inspections of safety-related structures, systems and components is to determine the validity of specific and general allegations now "on file" regarding the quality of construction of Zimmer. Provide a list of the types of allegation on file and describe the type of physical inspections which will be made to determine their validity. (Page 24, Volume I)

Response: A list of representative quality problems previously reported including allegations now on file, and the action planned for further PVQC evaluations including physical testing, has been prepared as an appendix to the PVQC program. In addition, a project problem matrix is being developed defining allegations, NET reports, audit findings, 50.55(e), etc, along with any project commitment made as a result. This will be used to address specific and general allegations now on file. The type of physical test will vary depending on the components involved. Types of physical tests and their results have been discussed in the referenced letter. Reference PVQC Program, Appendix P; and J. Williams, Jr letter to J.G. Keppler dated November 18, 1983, Docket No. 50-358, LOZ-83-0233.

Question 6: Item 159 of Attachment 6, Volume 2, indicates part of the PVQC will be a field walkdown to identify any discrepancies from the validated drawings and specifications. In this field walkdown part of the visual inspection or in addition to the visual inspection? Provide additional details.

Response: The visual inspection process is part of the field walkdown. After the evaluation verification packages (EVP) are developed, PVQC will walk down the accessible SSCs to the currently issued design as defined by Sargent and Lundy.

The current design documents will be redlined to depict the as-constructed condition. Deviations from the current design documents will be noted on discrepancy lists and identified as a design change as appropriate. In addition, PVQC will provide a baseline data comparison to the as-constructed condition. A comparison evaluation will be performed to identify Quality Assurance problems or discrepancies that exist between the A/E validated (baseline) design drawings and specifications in effect on the date of the SCO and the as-contructed design drawings and specifications verified by the PVQC. The purpose of this activity will be to document those quality assurance issues that existed at the time of the SCO which have been resolved by design changes. This is further detailed in the PVQC program. Reference PVQC Program, Page 24, Paragraph 2; Page 25, Paragraph 3; Page 34, Paragraph 5; Page 44, Paragraph 4-5.

Question 7: In light of problems identified in the construction of some of the systems and components in the NSSS, has General Electric provided input to the PVQC and the CCP with respect to their portion of the Zimmer project? (Page 3, Table 3, Volume I).

Response: PVQC is a project-wide program, including General Electric which is covered by the program details. Where General Electric supplied materials or components, it will be incorporated into the materials review and the contractor fabricating and installing those components will be covered under the fabrication and installation records review and visual and physical inspections program. General Electric will provide input to the inspection criteria and attributes that are to be included on the quality verification instructions and checklists. In addition, General Electric has and will continue to assist in developing lesson plans for PVQC personnel inspecting their scope of work. Reference PVQC Program, Page 25, Paragraph 2; and Page 71, all of Sectin 8.2.

Question 9: CG&E's plan of action to respond to the NRC Evaluation Test Report (NUREG-0969) does not consider NRR staff letters to CG&E requesting additional information regarding certain NUREG-0969 recommendations concerning design of equipment (letters dated July 26 and August 25, 1983). Commitments made in the response to these requests may influence the final resolution of these items. For example, in Item EH-5 of the table, a commitment was made in a September 21, 1983 letter from CG&E to install backup over-current devices for

low and medium voltage containment penetration circuits prior to fuel load. Will the tracking of the NET report items include NRR requests and CG&E responses to applicable items?

Response: CG&E licensing group has developed a licensing commitment tracking system which identifies commitments made by the licencee in response to NET reports and NRR requests. In addition, the project problem matrix being developed by the project also identifies previous project problems, such as NET reports, 50.55(e), and commitments made as a result. No references.

Question 10: On page 27 of Volume 1 of the COA there is a list of significant problems - for example, procurement documentation, welding quality, and material traceability and a statement that they will be resolved by the PVQC and the CCP. Provide additional detail on how resolution of these problems will be accomplished by the PVQC and the CCP.

Response: Relative to these examples, PVQC will identify and resolve all discrepancies/deficiencies in essential documentation of physical attributes of safety-related SSCs (i.e., material composition). In resolving these discrepancies, PVQC may determine the condition to be non-conforming and document it accordingly. CCP may resolve these NCRs as rework, repair or replace or send them to the A/E for evaluation and resolution as to the adequacy of the current condition. In all cases actions will be sufficiently documented to provide an auditable and verifiable tracking for external review. The NCR procedure details the process for identification, tracking, dispositioning and resolving of nonconformances. A summary of this process has been prepared in Appendix H. A table of representative quality problems previously reported and the action planned for further PVQC evaluation has been prepared as an appendix to PVQC. Reference PVQC Program, Page 39, Paragraph 3; Pages 30-32; Appendix C; Appendix H; and Appendix O.

PVQC EXECUTIVE SUMMARY

On November 12, 1982, the Nuclear Regulatory Commission (NRC) issued a show cause order, which immediately suspended all safety-related construction activities at the William H. Zimmer Nuclear Power Station (Zimmer). Additionally, the order directed The Cincinnati Gas & Electric Company (CG&E), the project manager of Zimmer, to obtain an independent review of the management of Zimmer, to submit for NRC approval a recommended course of action to complete construction of Zimmer, to submit for NRC approval a comprehensive plan to verify the quality of construction (PVQC) of Zimmer, and to submit for NRC approval a comprehensive plan for continuation of construction (CCP). The PVQC then, constitutes only one part of a more comprehensive program to provide reasonable assurance that construction of Zimmer will conform with the provisions of NRC regulations and Zimmer's construction permit.

By its very definition, the purpose of the PVQC is to "verify the quality of construction" of Zimmer. The quality of construction of Zimmer will be verified by determining whether its existing safety-related structures, systems, and components (SSCs) conform with approved design drawings and specifications supplied to the constructor for use in plant construction. The PVQC will consist of four main inspection and documentation review activities, which may be conducted concurrently or in sequence, depending on the SSC to be verified. These activities are visual inspections of as-constructed SSCs, physical inspections of

as-constructed SSCs, reviews of documents associated with the purchase and supply of fabricated or manufactured materials and equipment, and reviews of documents associated with the site fabrication and installation of SSCs. Following these activities, the individual SSCs will be statused as conforming, nonconforming, or incomplete. On a sampling basis, in parallel with other PVQC activities, confirmatory physical inspections of conforming SSCs will be performed. The results of the PVQC will identify conformances and nonconformances between the existing safety-related SSCs and the design drawings and specifications, and will also identify whether construction work has been completed on the SSCs. This information will provide the basis for planning construction completion under the CCP.

Verification of the quality of construction of Zimmer will consist of the following process:

1) Existing project documentation will be gathered and categorized for use in the PVQC.

2) Data regarding existing safety-related SSCs will be collected by the following means:

   (a) Visual inspections will be conducted on each accessible safety-related SSC to determine its as-constructed configuration and to obtain other data for use in determining whether the as-constructed SSC conforms with approved design drawings and specifications. Visual

inspections will consist of observations and measurements that can be performed without special tests or equipment. Where systems are not accessible, physical inspections will be conducted as described in (b) below.

(b) Physical inspections will be conducted where necessary and appropriate in the case of an SSC not accessible for visual inspection or when visual inspections will not provide data required. Physical inspections will include nondestructive examinations and/or destructive examinations, that can only be performed with special tests or equipment.

(c) Documents will be reviewed to obtain data related to the procurement, receipt, handling, and storage of materials and equipment. A material and equipment identification log will be developed for use in determining whether the documents demonstrate that material and equipment used in each safety-related SSC conform with design drawings and specifications.

(d) Documents will be reviewed to obtain data related to construction installation of each safety-related SSC for use in determining whether the documents demonstrate that the SSC conforms with design drawings and specifications.

3) Data collected by the above process will be compared to determine the status of each safety-related item. Any inconsistency

between (a) the characteristics of the items that exist according to project documents and records, (b) the characteristics of as-constructed items that actually exist based upon the results of the visual and physical inspection conducted during the PVQC, or (c) the design drawings and specifications governing the item will indicate the presence of a nonconformance, which will be documented on a nonconformance report for evaluation and resolution pursuant to the project nonconformance program. If this data is consistent, the item is conforming. This data will also identify any incomplete work.

4) Features of safety-related SSCs verified to be conforming will be subject to a confirmatory physical inspection program. These physical inspections will be performed on a sampling basis to provide confidence that the relevant portions of the SSCs are, in fact, conforming as indicated in the documents. This program will utilize physical inspections already performed under the PVQC as a part of the process to provide sufficient confidence in the quality of the relevant portions of the SSCs.

5) As verification activities are completed, a construction verification report (CVR) will be prepared, which will summarize and evaluate the results of the PVQC for those particular systems, subsystems, areas, or components. This report may be prepared on a system, subsystem, area, or component basis. A final construction verification report will also be prepared following the entire PVQC.

The above process provides for a comprehensive program to verify the quality of existing construction of Zimmer. This process also accounts for the recommendations in the report of the NRC Evaluation Team on the quality of construction of Zimmer, and the results of CG&E's Quality Confirmation Program for Zimmer and addresses allegations now on file from public groups and other reports on the quality of construction of Zimmer. The PVQC has been designed to ensure that inspections recommended or indicated by these reports will be conducted as part of the PVQC.

Although the PVQC will provide a comprehensive plan for verifying the quality of construction, there are several activities that, though related to the PVQC, are outside its scope and will not be encompassed by it. First, the PVQC will not include an independent design review (IDR), which will be conducted separately to verify the quality of the engineering and design for Zimmer. Second, the resolution of nonconformances identified during or prior to the PVQC will be handled under the CCP and therefore is outside the scope of the PVQC.

The PVQC will evaluate nonconformances for trends of generic problems. Disposition and resolution of such nonconformances will be conducted pursuant to a new project program for resolving nonconformances identified during construction of Zimmer. This program is described in Appendix H. Finally, completion of construction on safety-related SSCs will be performed in accordance with an approved CCP and will not be undertaken under the auspices of the PVQC unless approved to be

performed as part of the inspection process by the NRC. For example, bolt replacement may be part of the sampling process. Thus, the sole purpose of the PVQC is to provide a systematic, controlled method for identifying the status and determining the quality of construction of Zimmer. Activities needed to correct nonconforming items found during the PVQC will be undertaken as part of CCP or in accordance with relaxations to the Show Cause Order.

Several steps will be taken to ensure that the results of the PVQC will accurately identify conformances, nonconformances, and incomplete work in existing safety-related SSCs. First, the verification process will be controlled by procedures and checklists, and will be subject to a quality assurance program. Second, all personnel engaged in verification activities will be trained and qualified to perform the duties required of them. Third, all data and results produced by the PVQC will be documented. Fourth, PVQC activities will be subject to quality assurance audits and surveillance under the project quality assurance program. Fifth, project management will closely monitor the conduct and results of the PVQC by such means as progress reports and periodic meetings. Finally, PVQC activities will be subject to an independent audit.

Bechtel Power Corporation will manage and direct implementation of the PVQC, in accordance with the policies of and subject to surveillance by CG&E. PVQC activities will be performed by teams of PVQC personnel headed by a Bechtel team leader. Each inspection team will also include at least one Bechtel quality control engineer. Other team members will

originate from Bechtel and other companies including CG&E, Kaiser (for ASME Section III items only), and Sargent & Lundy. PVQC team members who are employees of other companies will receive their technical direction from Bechtel, all team members will be trained and qualified by Bechtel, and every effort will be made to ensure stable team composition. Bechtel quality control engineers will validate all verification data collected by the PVQC teams.

In summary, the PVQC provides for a comprehensive plan to verify the quality of existing construction of Zimmer. This plan will provide reasonable assurance that conformances, nonconformances, and incomplete work in each safety-related SSC will be accurately identified.

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APPENDICES

FIGURES

1.0 BACKGROUND

On November 12, 1982, the Nuclear Regulatory Commission (NRC) issued an "Order to Show Cause and Order Immediately Suspending Construction" (SCO) regarding the William H. Zimmer Nuclear Power Station (Zimmer) (Reference 5). Among other things, the SCO stated that "the Zimmer facility has been constructed without an adequate quality assurance (QA) program to govern construction and to monitor its quality, resulting in the construction of a facility which currently is of indeterminate quality." The SCO immediately suspended all safety-related construction at Zimmer and directed The Cincinnati Gas & Electric Company (CG&E), one of the licensees and project manager of Zimmer, to undertake the following four actions prior to beginning any additional safety-related construction activities.

o Retain an independent organization approved by the NRC regional administrator to review the management of the Zimmer project (including the QA program and the quality confirmation program), and, to consider, at a minimum, the four alternative management structures described in the SCO, then to recommend measures to ensure that construction of Zimmer can be completed in conformance with NRC regulations and the construction permit.

o Submit for approval to the NRC regional administrator a recommended course of action based on the independent organization's review and a schedule for implementing those recommendations.

o Submit for approval to the NRC regional administrator a comprehensive plan to verify the quality of construction (PVQC) of Zimmer, including an audit by a qualified independent organization to verify the adequacy of the quality of construction.

o Submit for approval to the NRC regional administrator a comprehensive continuation of construction plan (CCP) based upon the results of the verification program.

In short, the SCO requires CG&E to establish a four-part program as a prerequisite to continuation of safety-related construction activities. The first two parts were completed with:

o The selection and approval of Torrey Pines Technology (TPT) as the independent management reviewer and the submission of its recommendations regarding the management of Zimmer in August, 1983 (Reference 9)

o The submission of CG&E's recommended Course of Action (COA) submitted October 5, 1983 (Reference 6).

The PVQC, which is described in detail in this document, has been prepared to satisfy the third part of the SCO calling for a comprehensive plan to verify the quality of construction of Zimmer. The fourth and final part, the CCP, is under development and will be submitted to the NRC at a future date. Thus, the PVQC constitutes only one part of a larger program designed to provide reasonable assurance that construction of Zimmer will conform to NRC regulations and to Zimmer's construction permit.

2.0 DEFINITIONS

2.1 ACRONYMS

A/E	Architect/Engineer
ANSI	American National Standards Institute
AQL	Acceptance Quality Level
ASME	American Society of Mechanical Engineers
AVL	Approved Vendors List
CAR	Corrective Action Report
CCP	Continuation of Construction Plan
COA	Course of Action
CVR	Construction Verification Report
CWIS	Computerized Weld Information System
DDC	Design Document Change
FSAR	Final Safety Analysis Report
HJK	Henry J. Kaiser Company
IDR	Independent Design Review
LTPN	Lot Tolerance Percent Nonconformance
NET	Nuclear Regulatory Commission Evaluation Team
NR	Nonconformance Report (issued prior to implementation of the nonconformance program described in Appendix H of this plan)
NCR	Nonconformance Report (issued under the nonconformance program described in Appendix H of this plan)
NRC	Nuclear Regulatory Commission

NQAM	Bechtel Nuclear Quality Assurance Manual
OC	Operating Characteristics
PQAM	Project Quality Assurance Manual
PVQC	Plan to Verify the Quality of Construction
QA	Quality Assurance
QC	Quality Control
QCP	Quality Confirmation Program
QVCL	Quality Verification Checklist
SCO	"Order to Show Cause and Order Immediately Suspending Construction" or Show Cause Order
S&L	Sargent & Lundy Engineers
SSC	Systems, Structures, and Components
TPT	Torrey Pines Technology (a Division of GA Technologies, Inc.)

2.2 TERMS

APPENDIX B TO 10 CFR 50 - NRC regulations governing quality assurance

AREA - the section or part of a plant typically defined by coordinate lines, elevations, or room designations, or functional purpose

AS-CONSTRUCTED - safety-related SSCs as currently constructed

AS-CONSTRUCTED STATUS - the status of existing work as determined by the PVQC

AS NECESSARY AND APPROPRIATE - the extent of quality examinations, applications, and/or evaluation activities which are sufficient to form a basis for acceptance of a particular activity.

APPROVED DESIGN DRAWINGS AND SPECIFICATIONS - design drawings and specifications by the architect/engineer for construction at the time of the verification process of that SSC. Defines requirements provided to the constructor by the responsible designer that identify the necessary attributes and characteristics for construction of SSCs. These include DDCs and NRs that document nonconformances which have received approved dispositions of "repair" and "accept-as-is"

INACCESSIBLE - an SSC or part of an SSC is inacessible when, due to its physical location or configuration, it cannot be visually inspected

without removing or invalidating installed work. Characteristics of SSCs which are normally inspected in-process or which subsequent construction processing covers and therefore cannot be inspected are considered inaccessible. Examples include piping fit-up, root weld and subsequent layers under the cover pass, anchor bolt hole drilling, embedment in concrete, etc. An SSC is not considered inaccessible if it can reasonably be reached by scaffold erection, if access to the SSC requires the physical size of the inspection personnel to be limited or if the SSC can be viewed by removal of access covers or panels, e.g. electrical consoles, cabinets, conduit boxes, etc. Characteristics covered by paint or insulation are not considered inaccessible. The Project Field Engineer - PVQC is responsible for determining if an SSC is inaccessible.

INCOMPLETE WORK - construction or inspections that have been performed in accordance with design and drawing requirements but have not yet proceeded to a status of completion

NONVISUAL ATTRIBUTE - an attribute of an SSC that cannot be verified by visual inspection

PHYSICAL INSPECTION - an inspection performed with special tests or equipment or by inspectors who have special training or qualifications. This includes both destructive and nondestructive examinations

QUALITY CONFIRMATION PROGRAM - CG&E program established in 1981 to investigate the quality of specific types of items or documents

REDLINING -- the process of marking a drawing to depict the as-constructed status of an SSC

SAFETY-RELATED SSCs - those SSCs necessary to ensure 1) the integrity of the reactor coolant pressure boundary, 2) the capability to shut down the reactor and maintain it in a safe shutdown condition, or 3) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to those referred to in 10 CFR 100.11. As used in this PVQC, the term "safety-related" includes some SSCs that are designed as Seismic Category I or which are subject to FSAR commitments which expand the scope of the QA program (e.g., fire protection).

VALIDATED BASELINE DATA - design drawings and specifications for safety-related SSCs approved for use in construction as of the date of the SCO

VALIDATE - the process of confirming inspections or reviews by observation, including review of documentation, and checking to the degree necessary to provide reasonable assurance of completeness and accuracy

VISUAL INSPECTION - an inspection of an as-constructed SSC that can be performed visually without special testing or equipment. These inspections may include, among others, the use of tape measures, fillet gauges, micrometers, borescopes, TV cameras, fiber optics and other visual techniques.

3.0 PURPOSE AND SCOPE OF THE PVQC

By its very definition, the purpose of the PVQC is to "verify the quality of construction" of Zimmer.

The quality of construction of any product, including a nuclear plant, can be verified by determining whether or not the as-built product conforms with the specifications directly governing its construction. In the case of a nuclear plant, construction is governed by the approved design drawings and specifications supplied to the constructor. Thus, the PVQC for Zimmer will determine whether construction of Zimmer conforms with the approved design drawings and specifications supplied to the constructor for use in plant construction.

There are two principal methods which are used to determine whether construction of a plant conforms with the design drawings and specifications, used in construction. The first is to review existing material, equipment, and construction-related documents to determine whether they demonstrate that the plant was constructed in conformance with design drawings and specifications; the second is to perform visual and physical plant inspections to determine directly whether construction conforms with design drawings and specifications. Both of these methods will form the basis of the PVQC for Zimmer.

The scope of the Zimmer PVQC will be broad. All safety-related SSCs will be encompassed within the purview of the PVQC. (See Appendix A for a sample list of SSCs.) Additionally, where CG&E FSAR safety related

commitments have expanded the scope of items subject to a quality program, additional SSCs will be included within the scope of the PVQC. The acceptance criteria for meeting these commitments will be provided by Sargent & Lundy. Sargent & Lundy is preparing a "classification list" which identifies all such SSCs to be evaluated in PVQC.

The classification list provided to the PVQC will list the safety-related SSCs at Zimmer. The verification process for the safety-related SSCs will be extensive. Available and relevant documents related to procurement and installation of safety-related SSCs will be reviewed to assess their conformance to design drawings and specifications. Visual inspections will be conducted to determine the as-constructed configuration and to identify other as-constructed characteristics of safety-related SSCs. Additionally, physical inspections will be performed to the degree necessary to provide confidence that the condition of as-constructed, safety-related SSCs is as indicated in the documents. The PVQC provides for a comprehensive verification of the quality of construction of Zimmer.

The results of the PVQC will identify conformances and nonconformances between the as-constructed safety related SSCs and approved design drawings and specifications. In addition, incomplete work will be identified. This information will provide the basis for planning construction completion under the CCP.

Although the PVQC will provide a comprehensive plan for verifying the quality of construction, there are several activities that, though related to PVQC, are outside its scope and will not be

encompassed by it. It will not include an independent design review (IDR) conducted to verify the quality of the engineering and design for Zimmer and it will not determine the resolution of nonconformances or given problems identified during or prior to the PVQC. A separate IDR will be performed independent of the PVQC. Nonconformances identified by PVQC will be evaluated and a trend analysis performed to find generic problems. Disposition and resolution of such generic nonconformances will be conducted according to a new project program for resolving nonconformances (see Appendix H). In addition, the Construction Verification Report (CVR) will identify any generic non-conformances in the as-constructed SSC. Completion of construction and any necessary rework on safety-related SSCs will be performed in accordance with the approved CCP and will not be undertaken under the auspices of the PVQC unless approved to be performed as part of the inspection process by the NRC. For example, bolt replacement may be part of the inspection process.

The Bechtel Power Corporation will manage and direct execution of the PVQC. Bechtel's organization to perform this work is discussed in Section 5. Implementation of the PVQC will be subject to a quality assurance/quality control program conducted by Bechtel and, further, will be subject to a quality assurance review by CG&E. These QA programs are described in Sections 6 and 7. The PVQC will also be audited by an outside organization which is independent of previous activities associated with the Zimmer project, as described in Section 7. The combination of these checks and balances provides the requisite assurance that the results of the PVQC will be accurate and reliable.

4.0 VERIFICATION PROCESS

4.1 POLICIES

The following policies have been established to serve as a basis for defining the specific concepts, procedures, and techniques of the PVQC verification process:

o The quality of construction is considered to have been verified when it has been determined whether or not safety-related construction conforms with the design drawings and specifications. The approved design drawings and specifications form the standards against which all verification activities are conducted.

o The collection of verification data is to be accomplished through the use of checklists and other documents that identify applicable requirements in the design drawings and specifications. This will assure that the verification process will address the condition of the safety-related SSC conformance with the approved design drawings and specifications.

o The verification process is structured to produce an objective determination of the quality of construction, i.e., either the as-constructed condition of the safety related SSC conforms with the approved design drawings and specifications, or it does not.

o The PVQC is to be executed in a controlled manner. Verification activities will be conducted according to specific and relevant procedures approved for its implementation.

o Data generated or reviewed by the PVQC will be documented and will form the only basis for PVQC results and conclusions.

o PVQC activities shall be subject to QA/QC validations and audits. Documents and data generated by the PVQC shall be considered controlled documents and shall be in a form that will facilitate audits.

o Personnel who perform inspections, or testing, or review quality documents to verify conformances, will be qualified and certified to the requirements of ANSI 45.2.6.

o Personnel involved in the verification process will be trained commensurate with their assigned tasks. Verification activity performed during the PVQC shall be surveilled and validated by certified Bechtel QC personnel.

o Appropriate data gathered during the PVQC shall be organized and entered into a database to facilitate status, monitoring and scheduling of PVQC and CCP activities.

o Physical inspections will be performed when necessary and appropriate in cases of an SSC not accessible for visual inspections or when visual inspections will not provide data required.

o Confirmatory physical inspections will be conducted on a sample basis to provide confidence that the as-constructed condition of safety-related SSCs is conforming as indicated by the documentation review.

o Partially completed work will be evaluated to determine whether the completed portion of the work conforms with the approved design drawings and specifications.

4.2 OVERVIEW

There are two main phases of the PVQC: collection of verification data and status determination.

The verification activities of both phases will be grouped and performed on the basis of logical groupings of systems, structures, or components. These activities will provide reasonable assurance that each safety-related SSC, as it currently exists, conforms to the approved design drawings and specifications; that nonconformances have been properly identified on NCRs; and that incomplete work and the as-constructed status of each are accurately known (see Appendix K, Overall PVQC Activities).

Prior to beginning PVQC verification data collection and status determination activities, various types of documents will be provided to the PVQC (see Appendix K, Flowchart for the Acquisition of Documents). This information includes a classification list of safety-related SSCs; design drawings and specifications; construction aids and sketches used in construction; documents related to materials and construction installation; data from the quality confirmation program (QCP) and applicable reports issued by the NRC, ASME, and others. Documents will also be provided for the PVQC by CG&E, S&L, HJK, and other contractors involved with Zimmer.

Verification Data Collection

The collection of verification data will consist of four activities that may be conducted concurrently or in sequence, depending on the SSC to be verified. These activities are:

o Visual inspections to determine the as-constructed configuration and other as-constructed data for each accessible safety-related SSCs; identification of those portions of the SSCs that are inaccessible; and determination of existing identification numbers on material and equipment, dimensions of SSCs, configuration, and other attributes required by design drawings and specifications that can be observed without special tests or equipment.

o Physical inspections of safety-related SSCs will be performed when necessary and appropriate to provide the as-constructed status of

nonvisual attributes, when visual inspections will not provide data required, and to determine whether the as-constructed status conforms to the requirements of approved design drawings and specifications. These attributes are evaluated by using special tests and equipment and by trained and qualified personnel.

The Physical Inspection Program will also:

- be responsive to the findings and recommendations of the NRC Evaluation Team (reference 8); reports of the National Board of Boiler and Pressure Vessel Inspectors; and NRC Inspection Reports
- address the specific and general public allegations on file that lend themselves to resolution by physical inspection
- reflect the findings of the QCP and issues addressed in 10 CFR 50.55e reports
- Provide, on a sample basis, confirmation that SSCs verified by document review to be conforming are in fact conforming

There may be some portions of the safety-related SSCs verified by the document review as conforming but that have not been confirmed by physical inspection. These portions will be the subject of confirmatory physical inspections which will be of sufficient numbers and types, based upon statistical analysis, to provide confidence that the relevant portions of the SSCs are, in fact, conforming as indicated in the documents.

In cases where the results of the physical inspections indicate that an appreciable number of nonconformances or a significant nonconformance had previously been unidentified, consideration will be given to an expansion of the group of physical inspections, including inspection of up to all of the relevant attributes.

o Construction installation documentation for all safety-related SSCs will be reviewed to determine their as-constructed status as indicated by the documents, to identify documents that verify the quality of

construction, and to identify documents that are defective, missing, or which otherwise do not conform with requirements and, therefore, are deficient for use in verifying the quality of construction.

o Material documentation will be reviewed to provide data regarding procurement, handling, and storage of materials and equipment of safety-related SSCs. The objective of this review is to determine whether the documents indicate that the materials and equipment conform to approved design drawings and specifications, to develop material and equipment identification lists, and to identify documents which are deficient for use in verifying the quality of materials and equipment.

Data collection activities will be conducted and documented using checklists and other appropriate documents (see Appendixes C, D, and E).

The sequence of visual and physical inspections and documentation review activities will vary depending on the SSC being verified. For example, for systems, the material document review and the visual inspection could be done concurrently. The results then would be compared with the installation documentation to determine whether the SSC was installed in conformance with approved design drawings and specifications and that the proper documentation exists. Appropriate physical inspections would be performed as necessary and appropriate for nonvisual attributes to verify their conformance. A different sequence of activities may be used to verify structures. Visual and physical inspections could be performed concurrently with material and installation documentation reviews, and

then the results of these four activities would be reviewed to assess conformance. Once a nonconformance has been determined or it is found that the extent of investigation necessary to firmly establish the condition is not cost effective, the review may be terminated and a decision made to replace the affected SSC. The plan allows flexibility in the sequencing of activities in order to conduct the PVQC in the most efficient manner.

Status Determination

Status determination will identify conforming, nonconforming, and incomplete work. Data pertaining to an item will be reviewed following completion of the verification data collection activity to determine whether inconsistencies exist among the approved design drawings and specifications, the as-constructed data, from visual and physical inspections, and existing material or installation documentation data. From this verification data it will be determined whether a conformance, nonconformance, or incomplete work exists for each portion of the safety-related SSCs.

Quality Confirmation Program (QCP)

The SCO states that the PVQC shall determine whether the scope and depth of the QCP "should be expanded in light of the hardware and programmatic problems identified to date." The PVQC described above greatly exceeds the scope of the QCP. Under the PVQC, safety-related SSCs will be subject to documentation reviews and visual inspections for comparison

against approved design drawings and specifications, and the number and types of visual and physical inspections will be far more extensive than under the QCP. Additionally, the PVQC inspection program will be structured to account for the results of the QCP. For those areas in which the QCP has identified a significant number of nonconformances, the PVQC will provide concentrated inspections of items' attributes not inspected by QCP. Thus, consideration of QCP expansion has been fully accounted for in the preparation of the PVQC.

Baseline Data Comparison Evaluation

A baseline data comparison evaluation will be performed. The purpose of this activity will be to identify, where possible, design changes made subsequent to the SCO that, had the change not occurred, would have resulted in a quality assurance program discrepancy.

4.3 SPECIFICS OF THE VERIFICATION PROCESS

Components of the Database

To perform the PVQC, it will be necessary to identify and collect

documents relevant to Zimmer construction. (See Appendix I that describes Construction Document Control, a center for collecting and controlling documents relevant to the PVQC).

In order for the PVQC to utilize these documents in an effective manner, appropriate documents will be recorded in the data base. By appropriately categorizing these documents, the PVQC will be able to identify documents relevant to a particular item with greater efficiency.

The A/E will provide the PVQC with validated data consisting of a classification list of all safety-related and other SSCs subject to PVQC and the design drawings and specifications (including approved DDCs and NRs) for such SSCs approved for construction. These approved drawings will comprise the basis for verification of the quality of construction and will be used to prepare checklists for collection verification data. The classification list will be forwarded to the NRC for review.

CG&E, HJK, and other contractors will provide the PVQC with documents and records related to procurement, handling and storage of materials, and documents related to construction installation of safety-related SSCs. These documents will include in process and completed documents such as: approved vendor lists or the qualification status of vendors; purchase orders for materials and equipment; material logs; records related to receipt, handling and storage of materials; equipment maintenance records; construction aids and sketches; drawing and specification

registers; traveler forms; weld cards; welder certification records; welding procedure and certification records; certified QC and NDE personnel lists; QC inspection records; cable pull cards; contractor and subcontractor listings; inspection records; nonconformance reports; and inspection procedures and other documentation, as required. These records and documents will be subject to reviews to determine whether safety-related SSCs conform to design drawings and specifications according to plant records. In addition, the approved vendors list will be verified as described in sections below.

CG&E will provide data being generated by the QCP. Nonconformances identified by the QCP will be used to assist in planning the program of physical inspections.

In addition to records for materials, equipment, and construction installation, other types of documents will be used for development of checklists during the PVQC. These include the QCP and NET reports, 10 CFR 50.55(e) reports, reports of the National Board of Boiler and Pressure Vessel Inspectors, audit reports, corrective action reports, NRC inspection reports, and allegations now on file.

Appropriate documents identified above will be entered into the computerized database, which will be programmed to provide variable sorting. The computer may be used to sort cross-referenced data based upon requirements to be developed for the PVQC (see Appendix J).

Personnel

Collection of verification data will be accomplished by teams of personnel organized according to a system, structure, or component. The visual inspection teams may be further divided into groups corresponding to various disciplines (e.g., civil, structural, piping/mechanical, electrical, and instrumentation). The teams for visual inspection will be augmented by specialists and subcontractors approved by Bechtel who will perform physical inspections, such as radiography. These activities will be subjected to surveillance and audit by Bechtel.

The personnel performing the material documentation reviews will be organized into teams as appropriate to review documents related to a type of material or equipment, vendor, or purchase order.

The personnel performing the construction installation documentation review will be organized into teams similiar to those organized for visual inspections, i.e., by structure, system, component.

Teams will vary in the number of members. Each team will be headed by a Bechtel team leader. Each team will include one or more Bechtel QC engineers certified to perform the types of inspections required of that team. Team members will be assigned fulltime to the PVQC and will have no other major responsibilities during the period in which they are working on the PVQC. Non-Bechtel team members will receive training under the Bechtel training program for PVQC required activities.

Quality control and field engineering personnel of the contractor responsible for construction of an SSC may be assigned to PVQC teams corresponding to that SSC to assist PVQC field engineering. HJK personnel will be included on PVQC teams reviewing ASME Code Section III systems and will, with one-on-one Bechtel supervision, only perform activities required to fulfill their code commitment. The data obtained can be utilized for other PVQC evaluations where applicable. Training and certification in support of such inspection commitments shall be the responsibility of HJK.

If non-Bechtel team members have concerns about the conduct of the PVQC, they should address those concerns through the Bechtel supervisory organization up to and including the Assistant Project Director - PVQC. If a satisfactory resolution is not forthcoming, they are free to pursue the issue with the CG&E Project Manager for PVQC and Nuclear Project Support Services and through him to the CG&E Project Director and Project Manager.

NOTE: The foregoing in no way precludes anyone who has a concern relative to quality from utilizing the established avenues to Bechtel, CG&E, and NRC management.

Team members not employed by Bechtel will be directly supervised by Bechtel personnel who will provide the sole technical direction to such members while they are assigned to PVQC. When the team member is an HJK

QA/QC individual assigned for the purpose of ASME code work, Bechtel will provide one-on-one supervision in conduct of visual and physical inspections. All team members, including those who have been qualified or certified by other employers, will be trained and qualified and will be certified as necessary, by Bechtel to perform the types of inspections or reviews required of them under the PVQC. Bechtel QC engineers will be present during the collection of verification data, and they will validate all data.

Preparatory Activities

Inspections and reviews will be controlled through use of checklists and evaluation verification packages which contain relevant documentation, identify activities to be performed, and reference procedures for performing the work. Each team will be assigned an area of responsibility for conducting inspections or reviews. For each such area, the team will assemble applicable design drawings and specifications, A/E identified major attributes and other appropriate documents. Based upon the requirements in the design drawings and specifications, checklists will be prepared by Field Engineering that include each of the applicable attributes and characteristics for a particular inspection or review. S&L will provide or approve major attributes for incorporation into the checklists. The major attributes include those necessary to the safety-related function of an item. These

checklists will be used during data collection, and the results will be documented to provide objective evidence of the review or inspection.

The checklists for the material documentation review will also include requisite attributes and characteristics identified in purchase orders and procedures governing procurement, receipt, handling, and storage of material and equipment. These checklists will also identify other review points needed to trace the material or equipment (see Appendix C which identifies typical review points for the material documentation review). The checklists for the construction installation document review will include those items necessary to demonstrate that the SSC has been constructed according to design requirements (see Appendix E for a list of the types of construction installation documentation that will be reviewed).

An evaluation verification package will be used in the inspections. This package will typically consist of the instructions and checklists identifying the items to be inspected or reviewed. S&L will provide or approve major attributes for incorportation into the checklists. Additionally, evaluation verification packages for visual inspection teams will include copies of the design drawings and, if necessary, PVQC aids/sketches for the purpose of "redlining" the drawings to reflect the as-constructed status of the SSCs.

Bechtel QC will review and approve the checklists prior to implementation by the team and also review the finished evaluation verification packages for completeness.

Visual Inspections

Visual inspections will consist of those examinations that can be performed without special tests or equipment and without destructive examination.

Visual inspections include identification of material and equipment numbers, and the determination of configuration and dimensions. They will determine the as-constructed configuration, identify other as-constructed data for each accessible safety-related SSC, and identify those portions of the structures and systems that are inaccessible to visual inspection. These inspections will also identify components and portions of the structures and systems not yet constructed or installed. The data generated by the visual inspections will be documented for later use (see Appendix B that lists typical SSCs within each discipline, typical attributes that will be the subject of the visual inspection, and the extent of the inspections). Inaccessible portions of SSCs may be uncovered in order to be visually inspected, or they may be physically inspected.

The visual inspections are to be conducted in accordance with approved PVQC procedures and will be performed using checklists, appropriate design drawings and specifications, and installation documents. Verification data collected will be transcribed onto the appropriate documents, which will provide a record of the as-constructed configuration and other as-constructed data.

The type of visual inspections to be conducted will vary depending upon the type of SSC being inspected. Examples of typical visual inspection activities are included in Appendix B. These visual inspections will be defined and controlled by quality verification instructions and checklists. For example, visual inspections will include, but will not be limited to, the following:

- o Piping/mechanical - Visual inspection will be performed on piping, valves, welds, pumps, supports, snubbers, restraints, and hangers.

- o Electrical - Visual inspections will be performed on exposed conduit, trays and wireways, supports, welds, juncton boxes, penetrations, busses, cables, panel boards, motors, and motor control centers.

- o Civil - Visual inspections will be performed on concrete structures, penetrations, soils, anchor bolts, embedments, and painting.

- o Structural - Visual inspections will be performed on steel structures; galleries, ladders and stairs; equipment supports; bolting; welding; and special doors.

- o HVAC - Visual inspections will be performed on ducts, vents, and dampers; supports; and fans and blowers.

- o Instrumentation - Visual inspections will be performed on tubing, supports, and instrumentation.

Upon completion of the visual inspections by each team, a Bechtel QC engineer, who did not collect or validate the verification data, shall review the completed documents to ensure that the required visual inspections were completely documented.

Physical Inspections

Physical inspections will focus on four areas of activity. First, physical inspections will be conducted, where necessary and appropriate, to obtain as-constructed data, including data on those portions of SSCs that are inaccessible and for which documentation does not provide adequate assurance of the quality of those portions of the SSCs. This data will be used for later comparison against approved design drawings and specifications and for confirmation of data generated by the documentation review. Second, physical inspections will address the recommendations for inspections contained in the NET Report, the reports of the National Board of Boiler and Pressure Vessel Inspectors, and in the inspection reports of the NRC (see Section 9, References). Third, physical inspections will focus on deficiencies previously identified in the reports mentioned above, in 10 CFR 50.55(e) reports, by programs such as the QCP, and in the specific and general allegations now on file regarding the quality of construction at Zimmer (see Appendix G, a list of representative quality problems). Fourth, physical inspections will be used, where necessary and appropriate, to provide additional confidence

that verified conforming safety-related SSCs with appropriate supporting documentation and/or visual inspections are in fact conforming.

The physical inspections will consist of examinations that require special tests or equipment, specialized training and knowledge, or destructive examination. Examples of physical inspections include spectrometer analysis, ultrasonic testing, torque measurements of bolts, chemical analysis, dye penetration and X-ray examination of welds, hydrostatic tests, strength tests of concrete, soil compaction tests, and structural integrity tests.

Examples of typical physical inspection activities are included in Appendix F, with additional detail for ASME embedded or buried pipe, concrete structures, and electrical equipent given in Appendix P. Examples of physical inspections include, but will not be limited to, the following:

- o Bolting will be physically inspected for tension and torque.

- o Welding (Piping) will be physically inspected by means of nondestructive examination, destructive examinations, mechanical tests, and chemical analysis.

- o Material Traceability (Piping) will be physically inspected by means of physical analysis and chemical analysis.

- o Cable and Terminations will be physically inspected by means of megger tests, hi-pot tests, resistance and continuity tests.

- o Motors will be physically inspected by means of megger tests and polarization index tests.

- o Concrete will be physically inspected by strength tests on core samples, ultrasonic examination and destructive testing at selected locations.

Data collected during the physical inspections will be transcribed onto the appropriate documents for later use in the PVQC.

Document Reviews

The purpose of the material documentation review is to gather quality related data regarding procurement, receipt, handling and storage of material and equipment used in construction installation of all safety-related SSCs. This data will be used to prepare material and equipment identification logs that will provide traceability and a material status for the PVQC, and, ultimately, for construction of Zimmer.

Material and Equipment Documentation

The material and equipment documentation review will encompass documents related to material and equipment traceability. Material and equipment documentation will be divided for review according to type, vendor, purchase order, or other appropriate category.

Documents may be identified during the review that were listed in the as-constructed status data, but which are not available. This condition will be documented, and the appropriate organizations will be requested to obtain acceptable documentation. If the documents cannot be located, an NCR will be written.

Review teams will also examine the documents for evidence of unauthorized entries or deletions. Any such modified documents will be reviewed in accordance with PVQC procedures to determine whether the modification renders the document invalid and, therefore, nonconforming. This review will consist of the following:

o the document will be reviewed to determine whether the modification was made in accordance with applicable project procedures. If the modification was made in accordance with them, this fact will be documented and appropriate data in the document will be used in the PVQC.

o for modifications not in accordance with applicable project procedures, a review will be conducted to de' -rmine whether the modification has been identified by the project and resolved. The PVQC reviewer will determine whether this resolution has been properly documented and, if so, will document this fact. Data in such modified documents will be used in the PVQC.

o for modifications not in accordance with applicable project procedures and not resolved to the project program, the modified document will be reported on a nonconformance report. Such NCRs will be handled as described in Appendix H.

Upon completion of the review, documents will be considered as validated construction records. These records will be used in determining the as-constructed SSC status.

Construction Installation Documentation

The purpose of the construction installation documentation review is to determine whether the documents demonstrate that construction installation of safety-related SSCs conforms to approved design drawings and specifications. This review will encompass documents related to construction installation activity to determine whether the documents demonstrate that safety-related SSCs conform to approved design drawings and specifications. During this review, the team may identify documents that should exist, but are not available. This activity will be documented, and the team will request appropriate organizations to obtain acceptable documents. If the required documents cannot be located, an NCR will be written. The team will examine the documents for evidence of unauthorized entries or deletions. Any such modified documents will be reviewed in accordance with PVQC procedures to determine whether the modification renders the document invalid and therefore nonconforming. This review will follow the same method as the material documentation review, i.e., determining whether a modification was made according to project procedures or not, whether any nonconforming conditions were identified by the project, if it was documented, and if the modified document is a nonconformance or not.

Upon completion of the review, documents will be considered as validated construction records. These records will be used in determining the as-constructed SSC status.

Use of Data from QCP, AVL, CWIS, and Other Support Verification Programs

There may be cases in which the QCP, AVL, CWIS or other special verification programs have conducted inspections or reviews similar to those to be included in the PVQC. A group of those inspections or reviews will be validated under the PVQC to determine the validity of those results as compared to the approved design drawings and specifications. If the results of the two programs are in agreement, the results of the QCP, AVL, or other special verification programs will be incorporated for use in the PVQC. However, if the results of the PVQC and QCP, AVL, or other special verification programs are not in agreement, a determination will be made whether to include the results in the PVQC. The criteria for determination will differ from task to task, but will be in accordance with the sampling methodology described in subsequent sections. Nonconformances identified in the QCP or any other verification program will be utilized in the PVQC.

Documentation of Results

Verification data generated by the reviews and inspections will be identified on redlined installation documents or other documents used in the reviews and inspections. Material documentation review teams shall

provide input to a material identification log, which identifies the status of each purchase order and the type of material and equipment. This log will contain the types of data identified in Appendix D.

Bechtel QC shall determine the accuracy of the completed material identification log. Handling, transmittal, and storage of checklists, material identification logs and other data collection documents will be controlled.

Checklists, identification logs, redlined installation documents, activity lists and data collection documents will be submitted to the computerized records management system.

QA/QC Audit and Monitoring

The data collection process shall be subject to periodic QA monitoring and audits by Bechtel; by CG&E; and by the Independent Auditor. These monitoring and audit activities will determine whether the PVQC procedures governing the data collection and logging processes are being complied with and whether the program is being properly implemented.

Status Determination

During the status determination process, verification data generated during both the visual and physical inspections and the material and construction installation documentation reviews will be reviewed and evaluated. The purpose of this is to identify conformances,

nonconformances, and incomplete work in safety-related construction and to provide direction for additional confirmatory physical inspection, if required. However, to ensure that nonconformances are not inadvertently overlooked, data pertaining to an SSC collected during the PVQC visual and physical inspection activities will be compared with existing inspection and documentation data to check for inconsistencies. Evaluation verification package and checklists will be used to control analysis of verification data.

Personnel determining status will be trained and qualified by Bechtel, and certified Bechtel QC engineers will validate the status results. Status determination will be performed only by Bechtel personnel. They will use checklists for comparing the approved design drawings and specifications against inspection data and documentation review data. The results of this status review will be documented. The Bechtel QC engineer will review the checklists and other documentation for completeness prior to final approval of the verification packages.

By using appropriate documents such as redlined drawings, Bechtel documentation teams will determine those portions of the safety-related SSCs which have not been constructed or installed. This work shall be classified as incomplete in accordance with the Problem Resolution Matrix in Appendix O.

As a result of design changes, there may be cases where the as-constructed status of an item is consistent with the construction installation documentation, and is consistent with the design drawings and specifications actually used in construction, but is inconsistent with the current approved design drawings and specifications. If the inconsistency can be demonstrated to be the result of a design change it will be designated as incomplete work and processed accordingly (see Appendix O). All other inconsistencies, including those where doubt of actual reason for the inconsistency exists, will be classified as nonconforming and processed accordingly. A list of incomplete work for each SSC will be prepared. The status determination review will analyze all data categories (visual and physical inspection, material/equipment, construction/installation) in determining the existence of conformances and nonconformances.

Data from inspections or documentation reviews may not exist for some element of a safety-related SSC. For example, an installation record for completed work or a certified material test report from a material supplier documenting the quality of a safety-related SSC may not be available. This will be treated as follows:

o If, based on the status of construction, documentation should exist but does not, the item shall be designated as nonconforming. This would be the case for certain types of documentation for in-process inspections that do not exist. In the case where documentation should not yet exist, the item shall either be inspected under the PVQC or shall be designated as incomplete work.

This would be for cases of post-process inspections that were not conducted.

o If documentation data should exist by procedure or specification and it is determined that such documentation is not required:

(1) The item shall be designated as conforming if the documentation review data demonstrates that the installation conforms with the current design data. Such conformance shall, if appropriate, be the subject of the confirmatory physical inspection program to provide confidence that the items do in fact conform with the approved design drawings and specifications. For example, specification may require radiography tests of a weld which is not required by code.

(2) The item shall be designated as nonconforming if the documentation review data does not demonstrate that the installation conforms with the current design data.

Results of the status determination will be documented and recorded. These documents will then be submitted to Bechtel Document Control (see Appendix I) where they will be retained. The results of the status determination will be entered into the database.

The status determination process shall be subject to periodic QA monitoring and audits by Bechtel; by CG&E; and by the Independent

Auditor. These audits will determine whether the PVQC procedures governing the status determination process are being complied with and whether the program is properly implemented.

The QA audits will be conducted in accordance with the QA program for the PVQC. Audit reports will be formally transmitted to the Bechtel assistant project director (PVQC) and others as appropriate for review and determination of necessary corrective action.

Discrepancy List

Discrepancies between the as-constructed status of an item, the approved design drawings and specifications, or the contruction installation documentation will be identified on a discrepancy list by the PVQC teams during the performance of data collection activities. Discrepancies will be reviewed to determine: 1) whether the discrepancy has already been identified on a nonconformance report (NR), 2) whether the discrepancy concerns missing documentation which can be located with further effort, or 3) whether the discrepancy is incomplete work as indicated by Appendix O. Discrepancies which cannot be placed in one of the above categories will be classified as a nonconformance and will be identified on an NCR. Following this review, the classification of each discrepancy will be written on the discrepancy list and the quality verification check lists will not be considered complete until each discrepancy on the discrepancy list has received a classification. Each classification will be subject to concurrence by the team quality control engineer.

Conformances

Conformances will fall into one of two categories: (1) those items that have been verified as conforming to the current design data by the documentation review, the visual inspections, and the physical inspections; and (2) those inaccessible items or nonvisual attributes that have been verified as conforming to the current design data by the documentation reviews, but which have not been subject to physical inspections. No further PVQC action is necessary for those conforming items in category (1) above.

Conforming items falling into category (2) will be subject to the Confirmatory Physical Inspection Program. This program will provide additional confidence that the items are conforming as indicated by the documentation review.

Nonconformances

Bechtel will review all nonconformances not previously identified in as-constructed SSCs and will formally advise CG&E of potential significant deficiencies. CG&E and its contractors will then conduct any evaluation pursuant to project procedures to determine whether the nonconformance is reportable under 10 CFR Part 21 or 10 CFR 50.55(e).

Existing project NRs, IIDRs, and document deficiencies will be included in the work packages used for inspections and reviews. As new nonconformances are identified by the PVQC, an NCR will be prepared and submitted in accordance with the project nonconformance program.

If during the status determination the PVQC identifies inconsistencies in the data, the inconsistency will be documented on an NCR.
The project nonconformance program contains a system for tracking nonconformances. This program will be expanded to include the capability for tracking nonconformances specifically identified by the PVQC (i.e., those that are not the subject of an existing NR).

NCRs will be documented using the project program as described in Appendix H. The NRs and NCRs will be resolved outside the scope of the PVQC under the project nonconformance program.

Incomplete Work

Incomplete work will be documented for each safety-related SSC. This documentation will include lists of work-to-go and redlined drawings, which indicate the status of the as-constructed SSCs.

Confirmatory Physical Inspection Program

There will be SSCs where visual inspection and documentation review demonstrate that the SSC is conforming in all respects.

In these cases, confirmatory physical inspection will be performed which will provide added confidence that the SSCs are in fact conforming as indicated by the results of the documentation review. This will consist of a sample based program of selective inspections which will apply to systems and components. Some of these programs may be statistically based. Others will employ engineering analyisis, industry/military standards, or alternative methods, whichever is most appropriate for the SSC characteristic being confirmed.

The confirmatory inspections may not be necessary if the results of previous physical inspections, using selective sampling methods such as the examples described below, achieve the required reliability and confidence level. For example, if a particular release of material from a vendor was found to be nonconforming, concentrated physical inspections may have been performed on other similar material now determined to be conforming. Other confirmatory physical tests will not be necessary on the other similar material.

Example of a Sampling Method for the Confirmatory Inspection Program

One sampling method is to use randomly selected units for verification of compliance to design requirements. Approved procedures, containing appropriate industry-accepted sampling techniques, may be applied to the following categories:

- Attributes Sampling - This technique, used primarily for confirmatory inspections on homogeneous lots, involves selection of a sample using an appropriately determined confidence level. Once a lot size is fixed it determines the size of the sample. If nonconformances are found in the first sample, additional investigations will be performed based on the significance and number of rejectable attributes.

- Variables Sampling - The variable sampling plan would be used when the variability of a lot with respect to the quality characteristic (the characteristic of a unit of product, measured to determine its conformance to the design documents) is to be determined. Statistically selected samples would be used to establish the expected variability of the lot with a given confidence level and for assessment of the characteristic against acceptable engineering standards.

Confirmatory Physical Inspection Personnel and Activities

Inspection personnel and activities are essentially the same as those described earlier in this section. Appendix F lists examples of confirmatory physical inspections.

Product of the Verification Process

Several products will result from the verification effort:

a. Identification of the as-constructed configuration and other as-constructed data of safety-related SSCs

b. Identification of conformances

c. Identification of discrepancies and resulting non-conformances with approved design drawings and specifications in safety-related SSCs

d. Identification of incomplete work

e. Data bases including relevant information regarding the as-constructed status of safety-related SSC to be used as a management tool

f. Material and equipment identification log, welder qualification log, and similar logs

g. A comparison evaluation of the as-constructed design data with that existing at the date of the SCO

Baseline Data Comparison Evaluation

A comparison evaluation will be performed to identify Quality Assurance problems or discrepancies that exist between the A/E validated (baseline) design drawings and specifications in effect on the date of the SCO and the as-constructed design drawings and specifications verified by the PVQC. The purpose of this activity will be to document those quality assurance issues that existed at the time of the SCO which have been resolved by design changes.

PVQC personnel will perform this review and the results will be provided to Bechtel quality assurance for inclusion in the quality trend program. Significant trends will be analyzed as a source for input to the problem discussion section of the PVQC status report and the construction verification reports.

Construction Verification Report

Construction Verification Reports (CVRs) will be prepared. They may be prepared on a system, subsystem, area, or component basis after verification of each system, area, or component is completed. Confirmatory inspection may be performed on SSCs which have already been processed on CVRs to obtain additional data. These results will be reported on separate CVRs. The CVR will include the following elements:

a. Introduction and Background

b. Summary of applicable program elements and procedures

c. Identification of the SSC or area verified and a description of the methods used to perform the verification

d. Status of the findings of the PVQC (e.g., as-constructed status of the SSC or area verified, nonconformances found during verification and audit, and identification of incomplete work)

e. Identification of any generic nonconformances in the as-constructed SSC or area

f. Summary of the major findings and conclusions of the PVQC

g. Demonstration that PVQC provides reasonable assurance whether the quality of construction of the SSC or area has been verified.

A PVQC review team will review a CVR for completeness prior to submittal to CG&E management for review and approval. The CVR will then be forwarded to the NRC.

Upon completion of the entire PVQC, a final CVR will be prepared. This report will contain the following:

a. Introduction and Background

b. Summary of the verification program and procedures

c. Summary of the independent auditor findings and any corrective action for the PVQC

d. Summary of the CVRs for all systems and areas

e. Analysis of the overall effectiveness of the PVQC in accomplishing its intended purpose

f. Major findings and conclusions regarding generic nonconformances in the construction of the SSCs

g. Demonstration that the PVQC provides reasonable assurance that the quality of construction of all safety-related SSCs has been verified.

The PVQC review team will review the final CVR for completeness prior to submittal to CG&E for review and approval. The final CVR will then be forwarded to the NRC.

Evolution of the Vertification Process

As is explained above, the quality of construction of safety-related SSCs will be verified by means of documentation reviews, visual inspections, and physical inspections.

As verification is completed for several SSCs, it may be expected that certain patterns will begin to emerge. For example, one type of construction discipline, such as concrete, may be found to contain little or no nonconformances while another discipline, such as structural welding, might contain many nonconformances. Based on the results of the verification of the first several systems or structures, consideration may be given to modifying the degree or direction of verification. A modified verification plan for the remaining SSCs in construction disciplines which have been demonstrated to be of acceptable quality may be developed and submitted to the NRC by CG&E for review and concurrence. Such a plan will include a summary of the results of the verification conducted to date and justification in support of the planned modification. This justification will account for such factors as the number of items already verified, the number and type of nonconformances discovered in the verified items, the number of items remaining to be verified, and intra-discipline variables (such as the use of different construction contractors and different time-periods of construction activities).

5.0 ORGANIZATIONAL STRUCTURE FOR PVQC

CG&E has the responsibility for ensuring that the PVQC is properly formulated, managed, and completed. CG&E will provide overall guidance and policy direction to the Bechtel Project Director.

5.1 MANAGEMENT OF PVQC

Bechtel is responsible for PVQC management, including planning, implementation, cost control, contract administration, quality control, and quality assurance. Bechtel is also responsible for PVQC interface with CG&E and other contractors at the site. PVQC management will be established as a separate organization reporting through an Assistant Project Director to the Project Director to ensure independence.

Bechtel will require that Bechtel-approved procedures and checklists exist prior to the start of each PVQC activity requiring them. Bechtel will also require that each PVQC activity is documented in a manner that will facilitate quality assurance audits and inspections. Management control of PVQC activities shall be retained by Bechtel and may not be delegated to other organizations.

CG&E will conduct audits and surveillances of Bechtel's performance of these responsibilities, the results of which will be the subject of written progress reports and periodic meetings.

5.2 ORGANIZATIONAL INTERFACE

The CG&E nuclear operations organization is under the direction and management of the Senior Vice-President, Nuclear Operations, who is responsible for the PVQC (see Figure 6). He has delegated the day-to-day responsibility for the PVQC to the CG&E Assistant Vice-President, Nuclear Projects, who is the primary interface with the Bechtel Project Director.

The Assistant Vice-President, Nuclear Projects, has charged the CG&E Manager, PVQC and Nuclear Project Support Services who will interface with the Bechtel PVQC Assistant Project Director, to oversee Bechtel management and direction of the PVQC.

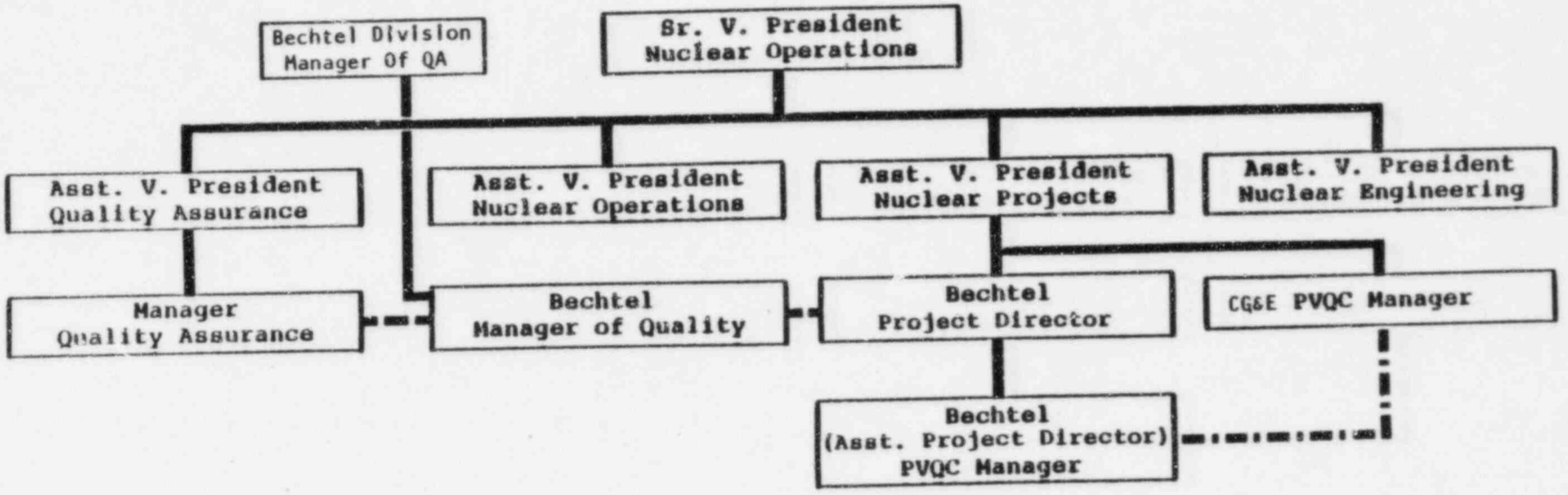
The CG&E Manager, Quality Assurance, communicates with the Bechtel Manager of Quality on problems identified in PVQC as a result of CG&E Quality Assurance overview of the PVQC activities. The CG&E Manager of Quality Assurance reports the effectiveness of the quality program in PVQC implementation to the Assistant Vice-President, Quality Assurance who communicates with the Assistant Vice-President, Nuclear Projects on the effectiveness of the PVQC program implementations.

5.3 BECHTEL PVQC STAFFING

The Bechtel Project Director is responsible for the overall management and direction of Bechtel activities at Zimmer, including activities under the PVQC. The Project Director is supported by a staff, which includes a construction manager, manager of controls and services, and a manager of engineering and licensing. These individuals are supported by a suitable

FIGURE 6

PVQC ORGANIZATIONAL INTERFACES



staff to perform the assigned duties. The Bechtel Manager of Quality maintains day-to-day coordination and communications with the Project Director, reports to the Division Manager of Quality Assurance, and is supported by a project quality control manager, project quality assurance engineer, and a project quality engineer. These, in turn, are supported by a suitable staff to perform their assigned duties.

The PVQC will be managed and directed by the Bechtel Assistant Project Director-PVQC, who will report to the Bechtel Project Director. The Assistant Project Director-PVQC provides project direction to those members of the Bechtel organization performing the PVQC activities.

The PVQC Supervisor is responsible for coordination and direction of the activities of the verification teams and coordination with Quality Control personnel.

The PVQC will be implemented through teams composed of team leaders, field engineers, quality control engineers, and other personnel with skills in the appropriate disciplines to perform the assigned activities. The size of the teams will vary from team to team, but each will consist of at least a team leader and a quality control engineer. The PVQC team leaders and the quality control engineers will be Bechtel personnel; other team members may be Bechtel employees or employees of other organizations. Regardless of the origin of the team members, each will be trained and qualified and will be certified as necessary by Bechtel. Such members of other organizations will be under the sole direction of Bechtel during their assignment to the PVQC.

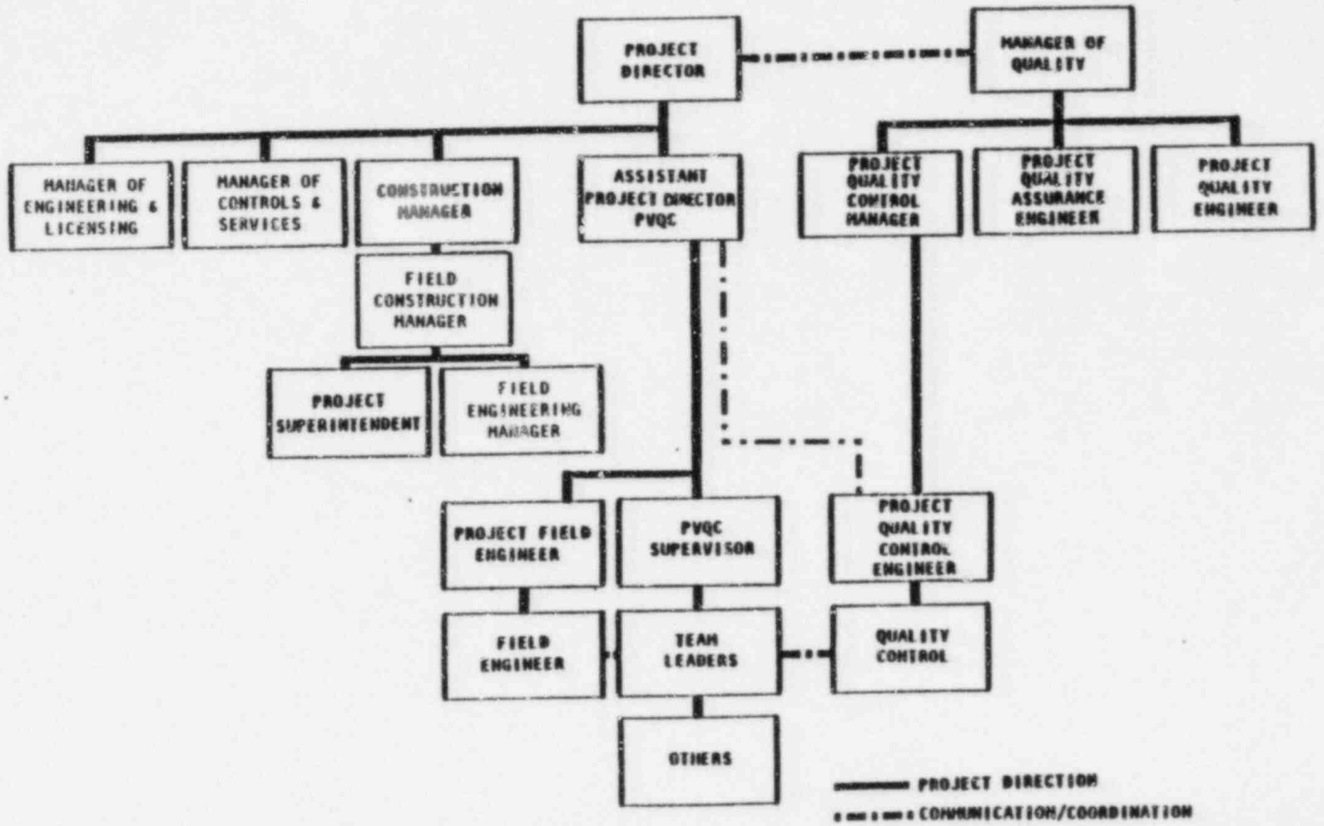
Although employees of other organizations will be team members and will assist Bechtel personnel in data collection, Bechtel will be solely responsible for the collection and validation of the data.

The number of teams will be a function of project schedule objectives. Procedures will define the responsibilities of each team and of the team members. Personnel performing inspections, document reviews, and other functions relating to quality will be appropriately trained and certified in accordance with approved procedures prior to performing the specific tasks to which they are assigned.

Figure 7 depicts the Bechtel organizational structure for the PVQC.

FIGURE 7

BECHTEL PVQC ORGANIZATION CHART



6.0 QUALITY ASSURANCE PROGRAM FOR THE PVQC

6.1 POLICIES

o It is CG&E's policy that all PVQC activities be performed in accordance with the applicable Appendix B criteria of 10 CFR 50.

o The CG&E project quality assurance program is described in the Zimmer Final Safety Analysis Report (Chapter 17.1) and the CG&E Project Quality Assurance Manual (PQAM). The Bechtel Nuclear Quality Assurance Manual (NQAM) describes the Bechtel quality assurance program and is applicable to all Bechtel PVQC safety-related activities.

6.2 IMPLEMENTATION

The purpose of the PVQC is to verify the quality of construction of the safety-related structures, systems, and components of the Zimmer plant. Quality is achieved through such measures as management involvement, proper controls, appropriate supervision, qualified personnel, certified personnel, and training of personnel. In addition, the quality assurance program provides important checks on quality and adds additional confidence that the conduct and results of the PVQC are valid.

The Quality Assurance Program is described in several project documents. These documents are identified below in the established order of precedence:

(1) Final Safety Analysis Report, Chapter 17.1

(2) CG&E Project Quality Assurance Manual

(3) Bechtel Nuclear Quality Assurance Manual

(4) Zimmer Procedures Manual

(5) PVQC Program Description

(6) PVQC Implementing Procedures (where necessary)

6.3 DIVISION OF RESPONSIBILITY

CG&E, as the licensee, has overall responsibility for quality assurance for the Zimmer project, including the PVQC. In this regard, CG&E performs the following functions:

o approves all submittals to the NRC that are related to the PVQC, including those concerning quality assurance

o audits and surveys the Bechtel, HJK, and S&L quality assurance program

- o performs continuing management review of the PVQC program

- o initiates actions necessary to ensure the continued effectiveness of the quality assurance program in regard to the PVQC.

Bechtel has responsibility for the management of the PVQC, pursuant to the overall policy guidance provided by CG&E. Bechtel is responsible for implementing an effective quality assurance program for the PVQC. Bechtel will establish separate organizations, reporting to the Project Director, to ensure PVQC and QA independence.

6.4 APPENDIX B TO 10 CFR 50

This section provides a brief description of the PVQC activity associated with the appplicable requirements of 10 CFR 50, Appendix B.

Organization (Criterion I)

The quality organization for CG&E and Bechtel is described in Section 5 of this program and is also described in the Bechtel NQAM.

The PVQC quality assurance program for the PVQC administered by Bechtel will function by verifying (through means such as checking, auditing, and inspecting) that PVQC activities have been correctly performed. Personnel performing quality assurance functions have sufficient authority and organizational freedom to identify quality problems; initiate action and recommend solutions; and verify the implementation of solutions.

Bechtel requires that its contractors or subcontractors provide quality assurance programs and procedures pertinent to their specified activities, which reflect Bechtel's commitment to CG&E.

Quality Assurance Program (Criterion II)

The Bechtel quality assurance program contains written policies, procedures, or instructions, and identifies those matters covered by the program in order to provide control over the quality of PVQC activities.

The quality assurance program ensures that indoctrination and training is provided for personnel performing PVQC activities, identifies those PVQC activities covered by the quality assurance program, and provides quality assurance control over those activities.

Design Control (Criterion III)

This criterion is not directily applicable to the activities of the PVQC.

Procurement Document Control (Criterion IV)

Although major procurement activities are not planned for PVQC, the program permits limited procurement of such services/supplies required for design testing, NDE test/sampling etc.

Procedures provide for the inclusion of the applicable technical and quality requirements to be imposed on suppliers of such services.

Instructions, Procedures, and Drawings (Criterion V)

The quality assurance program ensures that PVQC activities are prescribed by documented instructions or procedures appropriate to the activity, including quantitative or qualitative acceptance criteria, if necessary, to determine that important activities have been satisfactorily accomplished. Where other site procedures are in place, a specific PVQC procedure will not be necessary.

Document Control (Criterion VI)

The quality assurance program ensures that measures are established to control the issuance of documents for PVQC activities, such as instructions and procedures; that such documents are reviewed for

adequacy and released by authorized personnel and distributed to and used at the location where the prescribed PVQC activity is performed; and that changes to such documents are reviewed and approved by the organization that performed the original review and approval, unless otherwise designated by Bechtel.

Control of Purchased Material, Equipment, and Services (Criterion VII)

The program provides control of purchased material, equipment and/or services which may be required to perform design/specialized test services such as NDE testing in PVQC. These controls provide for tagging, marking or otherwise preserving the specified conditions of test specimens/materials. The applicable Bechtel and/or CG&E approved procedures will control these activities.

Identification and Control of Materials, Parts, and Components (Criterion VIII)

Provisions will be established in the QA program of CG&E and Bechtel to control materials and parts that are procured for conducting NDE test sampling and any other specialized test services.

Control of Special Processes (Criterion IX)

The quality assurance program ensures that PVQC activities involving special processes, such as nondestructive testing, are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria and other special requirements.

Inspection (Criterion X)

The quality assurance program provides a method to verify conformance with documented instructions and procedures for accomplishing PVQC activities. The program ensures that:

o inspection personnel are appropriately qualified and certified and independent of the individual or group performing the activity being inspected

o inspections or tests are performed for each PVQC activity, as necessary, to verify the quality of the activity

o indirect control (by monitoring processing methods, equipment, and personnel) is exercised if direct inspection of processed materials or products is not practical

o inspection and in-process monitoring are used when control is inadequate without both

The inspection program also ensures that inspection procedures and instructions are available for use prior to performing the inspections and that inspectors' qualifications or certifications are kept current.

Test Control (Criterion XI)

The quality assurance program ensures that testing associated with PVQC activities is performed in accordance with approved written test procedures. These test procedures will:

o incorporate requirements and acceptance limits (if applicable given the objectives of PVQC testing)

o include provisions assuring that

1) all prerequisites of the given test have been met

2) adequate test instrumentation is available and being used

3) testing is performed under suitable environmental conditions

4) personnel are certified

o require that test results are documented and evaluated to ensure that test requirements have been satisfied

Control of Measuring and Testing Equipment (Criterion XII)

The quality assurance program ensures that measures are established to ensure that tools, gauges, instruments, and other measuring and testing devices used for PVQC activities are properly controlled, calibrated, and adjusted at specified periods to maintain accuracy within necessary limits while such equipment is dedicated to the PVQC.

Handling, Storage, and Shipping (Criterion XIII)

The quality assurance program provides for controlled handling, shipping, and storage of test specimens and other materials or parts necessary for conducting specialized design/NDE test services associated with PVQC inspection activities.

Inspection, Test, and Operating Status (Criterion XIV)

The quality assurance program ensures that measures are established to indicate by the use of markings or other means the status of testing accomplished as part of the PVQC activities.

Nonconforming Materials, Parts, and Components (Criterion XV)

The quality assurance program ensures that measures are established to control nonconforming materials, parts, and components. Nonconformances

will be trended and analyzed to identify significant conditions that are potentially reportable.

Corrective Action (Criterion XVI)

The quality assurance program ensures that conditions adverse to quality in the implementation of the PVQC are promptly corrected and that evaluation of the cause and corrective action to prevent recurrence are accomplished for significant conditions adverse to quality.

Quality Assurance Records (Criterion XVII)

The quality assurance program ensures that sufficient records of PVQC activities are maintained to furnish evidence of quality, including the following:

- o results of reviews, inspections, tests, audits, monitoring of work performance, and materials analyses
- o qualifications of personnel, procedures, and equipment
- o inspection and test records that identify (as a minimum) the inspector or data recorder, type of observation, results, acceptability, and action taken in connection with any deficiency noted

Records will be identified and retrievable; they will be retained in accordance with the site records and document control system.

Audits (Criterion XVIII)

The quality assurance program includes a comprehensive system of planned and periodic audits of PVQC activities to verify compliance with all aspects of the quality assurance program and to determine its effectiveness. The audits are conducted in accordance with written procedures by trained personnel who have no direct responsibility for the activities being audited. Audit results are documented and reviewed by management personnel responsible for the audited activities. Follow-up action, including reaudit, will be taken where indicated. Audits will include, but not be limited to audits assessing:

- o procedural compliance for all activities
- o effectiveness of data collection
- o effectiveness of documentation reviews
- o validity of inspections

6.5 ADDITIONAL QUALITY ASSURANCE CONSIDERATIONS FOR PVQC

o Monitoring

The quality assurance program includes a monitoring program for use by quality assurance engineers to observe, analyze, and report to the manager of quality the extent of conformance of ongoing PVQC work activities. It will be performed in accordance with prepared checklists, and the results will be documented.

o Stop Work Authority

CG&E has stop work authority for all PVQC activities. Bechtel has stop work authority for any activity within its overall PVQC program management responsibilities. Each contractor has stop work authority within its own PVQC responsibilities. The ZPS-1 Stop work procedure(s) further allow(s) for limited stop work authority as assigned by the Manager - QAD for inspection personnel on the specific task or activitiy being inspected. Supervisors and directors may then stop work on an entire task or activity based upon evaluation of the inspector's findings.

o Quality Assurance Management Meetings

CG&E management will preside over periodic QA management meetings to review and assess ongoing quality assurance activities related to the PVQC. Contractors will attend and provide appropriate input, as requested by CG&E.

o Quality Assurance Management Reports

Bechtel will prepare periodic quality assurance management reports that discuss quality assurance matters associated with carrying out the PVQC.

7.0 INDEPENDENT AUDIT OF PVQC

The SCO requires that the PVQC "include an audit by a qualified outside organization, which did not perform the activities being audited, to verify the adequacy of the quality of construction." This audit is separate from and not a substitute for the QA program for the PVQC, which is described in Section 6. This audit will be a continuing audit throughout the duration of PVQC. This audit will be expanded to cover the QA/QC aspects of the Continuation of Construction Plan (CCP) to ensure a smooth transition from PVQC to CCP.

7.1 SELECTION AND QUALIFICATIONS OF INDEPENDENT AUDITOR

CG&E has selected an Independent Auditor for the PVQC. The independent auditor's technical qualifications have been be described in a submission to the NRC for approval (reference 13).

The outside organization has been determined to meet the independence criteria of previous activities associated with the Zimmer project. The independence has been defined as not having previously performed any of the construction installation or inspection activities, supplied any of the materials under the scope of PVQC, surveilled of the quality assurance activities, or been otherwise involved with any of the work under the purview of PVQC.

To maintain the independence of the independent auditor, all communications between the independent auditor and CG&E or its

contractors and subcontractors, including Bechtel, will be conducted in accordance with the March 2, 1983 "Protocol Governing Communications Between CG&E and Independent Organizations Conducting Review or Audits Under The Commission's Order."

7.2 PURPOSE AND SCOPE OF THE INDEPENDENT AUDIT

To maintain the independence of the independent auditor, CG&E has not and will not direct the independent auditor in the specific content of its audit program or in the manner in which that audit program is carried out. However, in requesting proposals to perform the independent audit, CG&E did identify prerequisites it believed should be included in the audit program at a very minimum. These prerequisites included the following:

a. An evaluation of whether the procedures for the PVQC, and any amendments thereto, are consistent with and fully implement the PVQC approved by the NRC

b. An evaluation of whether the procedures for the PVQC have been completely and adequately implemented

c. An evaluation of whether the results obtained by and during implementation of the PVQC are complete and accurate

d. An evaluation of the adequacy of the steps taken to correct elements of the PVQC in response to reports of the independent auditor

e. An evaluation of the effectiveness of the implementation of the quality assurance program for the PVQC

f. An auditor-established quality assurance program to govern the auditor's activities and verify the quality of the audit

g. Provisions for submission of periodic audit reports and a final (at completion of PVQC) audit report to CG&E

h. Provisions for immediate reporting of nonconforming items and significant noncompliances discovered by the independent auditor.

CG&E, Bechtel, and contractors performing PVQC activities will give full cooperation to the independent auditor in the conduct of its audit. This includes providing the independent auditor with any and all PVQC procedures, records, or other information required to perform the audit tasks.

7.3 EVALUATION OF REPORTS OF THE INDEPENDENT AUDIT

Periodic audit reports will be submitted by the independent auditor to CG&E. These reports will be reviewed by CG&E and Bechtel to determine any shortcomings in the execution of the PVQC. Any necessary or appropriate corrective action for the PVQC will be implemented. The NRC will be informed of any corrective actions taken as part of the periodic progress report management summaries, described in Section 8.3. The independent auditor will audit the corrective actions to ensure their adequacy and responsiveness.

8.0 ADMINISTRATIVE SUPPORT ACTIVITIES

8.1 SCHEDULE FOR PVQC

As manager of the PVQC, Bechtel is responsible for maintaining a schedule to complete it. Once this schedule has been established, PVQC management will accordingly allocate resources such as manpower and skilled personnel. Since the PVQC approval date by the NRC is uncertain, it is not possible to establish precise dates for beginning and completing the PVQC. However, a schedule based on elapsed time has been developed. This schedule, depicted in Appendix L, identifies milestone dates and the time for completion of the PVQC. As the PVQC proceeds, the schedule will be periodically revised, based upon actual experience.

It may be noted that the PVQC will, in general, be implemented on a system, subsystems, structure, area, or component basis.

The sequence of its activities will be established based upon factors such as the expected length of the verification process, expected extent of construction and rework, and the sequence of testing for the systems, areas, or components. For example, systems that will require early testing and lengthy periods of verification and construction will be verified first. Conversely, verification will be deferred until late in

the PVQC for those systems and areas that prove to be relatively easy to verify and construct and that are not required until later in the startup schedule. Thus, it is planned to verify, construct, and test the plant in an orderly phased manner, thereby minimizing the potential for delay in plant startup caused by differences in the times required to verify, construct, and test various systems and areas. Appendix N lists the typical systems, subsystems, areas, and components to be verified under the PVQC. These priorities may be modified based on constraints identified during the implementation of the PVQC.

A plan for the continuation of construction (CCP) will be developed and submitted to the NRC with a request to commence construction, as explained in CG&E's Course of Action (see References). As verification of each system, subsystem, area, or component is completed, the results will be recorded and evaluated.

Construction work will not commence until that system, subsystem, area, or component is verified. Appropriate safeguards and controls will be implemented to ensure that construction does not interfere with remaining PVQC activities or affect as-constructed SSCs that require verification.

A schedule control program will be implemented to inform management of developing and potential problem areas so that corrective action can be initiated. The basic elements of this program will include a plan based on critical path milestones, a monitoring system to measure progress and performance against the plan, and a reporting system to identify progress and deviations from the plan and to communicate this information to management.

8.2 TRAINING OF PVQC PERSONNEL

PVQC personnel will receive indoctrination, training, qualification, and certification commensurate with assigned duties. This includes an overall program orientation as well as training in specific procedures.

Training program description and lesson plans, including descriptions of the Quality Control examination and certification process, will be submitted to the NRC prior to the start of final training. Training schedules will be submitted to the NRC to allow for monitoring of the classes. The PVQC training program will be a part of the overall site master training plan.

Upon assignment to the PVQC, each employee will be notified of the requisite training applicable to their position. The employee will be required to complete satisfactorily all parts of the applicable training program prior to performing any work activities under the PVQC. Due to the estimated length of the PVQC, it is anticipated that extensive periodic training of PVQC employees will not be necessary. However, retraining, requalification, and recertification will be provided should it become necessary. Employees will be given additional training for new or revised PVQC procedures, as necessary.

Typical training requirements for PVQC personnel can be found in Appendix M. Prerequisite training may consist of reading, reading and reviewing with a supervisor, and formal training. The amount of training provided for each employee will depend upon their responsibilities.

All formal training classes will be conducted with written lesson plans containing content of the program, and an overview of the plan will be in a format such that a qualified instructor could readily teach it. Each lesson plan will be reviewed and approved for technical content. Attendees of the class and the dates of their attendance will be recorded.

In addition to the training requirements described above, quality control personnel and document reviewers will be qualified and certified in accordance with the requirements of ANSI N45.2.6-1978 (see References). Additionally, QC engineers performing or witnessing nondestructive examinations will be certified by test pursuant to SNT-TC-1A-1975 (see References).

PVQC training programs will consist of, but not be limited to, the following:

o indoctrination of all PVQC personnel concerning the purpose, scope, and implementation of quality assurance requirements and related procedures. This orientation will be completed before performing activities that may affect the quality of any PVQC activity

o training of each employee regarding the purpose, scope, and implementation of requirements in applicable manuals, standards, and procedures (including revisions) as specified in the training matrix

o testing of personnel as required by qualification or certification

o on-the-job training as specified in the training matrix

o optional training may be scheduled as required, including offsite training, such as seminars

Training will be documented, and the records will be maintained by the designated jobsite training coordinator.

8.3 PROGRESS REPORTS

Monthly progress reports for the PVQC will be issued by the Bechtel Project Director to inform CG&E and Bechtel management of the status of the PVQC, to provide early warning of developing and potential problems, and to recommend corrective actions. The progress reports will include a management summary briefly describing program status, items of concern, and areas of interest to management.

The reports will include a summary of key issues on the findings of PVQC, analyses of trends in nonconformances and identification of any generic deficiencies, findings from the quality assurance (QA) program, key findings by the Independent Auditor, analyses of problems in executing the PVQC, schedule status on detail activities, manpower status, identification of major areas of concern, as well as any corrective action to be taken by PVQC and recommended changes to the program. In reporting the status, the report will contain graphs, charts, or other visual aids, as appropriate, to display conditions and to clarify data for management review.

9.0 REFERENCES

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2. American National Standards Institute, ANSI/ASQC Z1.9-1980, Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming.

3. American Society for Nondestructive Testing, SNT-TC-IA-1975, "Recommended Practice for Nondestructive Testing Personnel Qualification and Certification".

4. American National Standards Institute, ANSI-N45.2.6-1978, "Qualifications of Inspection Examiner and Testing Personnel for Nuclear Power Plants".

5. Cincinnati Gas & Electric Co., (William H. Zimmer Nuclear Power Station), CLI-82-33, 16 NRC (November 12, 1982).

6. Cincinnati Gas & Electric Co., William H. Zimmer Nuclear Power Station Course of Action (October 5, 1983).

7. U.S. Nuclear Regulatory Commission, Docket No. 50-358, NRC Questions on the Course of Action, dated October 28, 1983.

8. U.S. Nuclear Regulatory Commission, Docket No. 50-358, NRC Questions on the Course of Action, dated November 15, 1983.

9. United States Department of Commerce, NBS HBK-91, National Bureau of Standards Handbook 91, Experimental Statistics.

10. U.S. Nuclear Regulatory Commission, NUREG-0969 Report of the NRC Evaluation Team on the Quality of Construction at the Zimmer Nuclear Power Station, (April 1983).

11. Torrey Pines Technology, Independent Review of Zimmer Project Management (August, 1983).

12. Cincinnati Gas & Electric Co., LOZ-83-0239 William H. Zimmer Nuclear Power Station/Unit 1, Course of Action (dated November 23, 1983)

13. Cincinnati Gas & Electric Co., LOZ-83-0249 William H. Zimmer Nuclear Power Station/Unit 1, Independent Audit of the Quality of Construction, (dated December 6, 1983)

APPENDIX A

CLASSIFICATION LIST

FOR

SAFETY-RELATED SYSTEMS, STRUCTURES, AND COMPONENTS

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (see Note d)	Comments
I. Civil Structures					
1. Reactor Building	I	I	E		
2. Service Water Pump Structure	I	I	E	NA	
3. Radwaste Building	NA	II	WN	NA	
4. Auxiliary Building	I	I	E	NA	
5. Turbine Building	NA	II	WN	NA	
6. Service Water Pipe Supports & Encasements	I(SD)	I	WS	NA	
II. Nuclear Steam Supply System (GE Supplied)					
1. Reactor Vessel	I	I	A	A	
2. Core Structure	I	I	A	NA	
3. Steam Dryer Assembly	NA	II	WN		
4. Jet Pumps	I	I	P		
5. Control Rod Drive	I	I	A	NA	
6. Head Spray Nozzle	I	I	P		
7. Reactor Vibration Instrument			WN		
8. Steam Separator Assembly	NA	II	WN		
9. Source Range Monitoring/Interm Range Monitoring Drive Unit			WN		
10. Main Steam Isolation and Relief Valve Accumulators	I	I	P		
11. Condensing Chambers	I	I	A		
12. T-Quencher and Base Supports	I	I	A	C	
13. Reactor Recirculation Pumps	I	I	P	A	
14. Recirc. Flow Control Hydraulic Power Units	NA	II	WN		
15. Low Frequency Motor Generators	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
II. Nuclear Steam Supply System (Cont'd) GE-Supply					
16. Control Rod Drive Water Pumps	I(SD)	II	WS		
17. Drive Water Filters	NA	II	WN	D	
18. Air Filters	NA	II	WN		
19. Control Rod Drive Hydraulic Control Unit	I	I	A	E	
20. Control Rod Drive Pump Suction Filter	I(SD)	II	WS		
21. Standby Liquid Control Storage Tank	I	I	P	B	
22. Standby Liquid Control Test Tank	I(SD)	II	WS		
23. Standby Liquid Control Pumps	I	I	A	B	
24. Traversing In-Core Probe Disposal Cask	NA	II	WN		
25. Traversing In-Core Probe Drive Mechanisms	I(SD)'	II	WS		
26. Traversing In-Core Probe Indexing Mechanisms	I(SD)	II	WS		
27. Traversing In-Core Probe Valve Assemblies	I	I	A		
28. Traversing In-Core Probe Chamber Shields	I(SD)	II	WS		
29. TIP Purge Equipment	NA	II	WN		
30. Motor Module	NA	II	WN		
31. Reactor Protection System Power Distribution Panel	I(SD)	II	WS	NA	
32. Motor Generator Sets	NA	II	WN		
33. Electrical Protection Assemblies	I	I	A		
34. Miscellaneous Cabinets, Typewriters, Monitors, etc. (equipment number series 1C91-XXXXX)'	NA	II	WN		
35. Off Gas Post Treatment Sample Panel	I(SD)	II	WS		
36. Off Gas Vial Sampler Rack #2	I(SD)	II	WS		
37. RHR HX Exchangers - Water Discharge to Rad Non Skid	I(SD)	II	WS		
38. Off Gas Vent Pipe Sample Panel (Spare)	I(SD)	II	WS		
39. Area Radiation Monitoring Cabinet 1A	I(SD)	II	WS		
40. Remaining Misc. Equipment #'s 1DXX-XXXXX	NA	II	WN		
41. RHR Heat Exchangers - Primary Side/ Secondary Side	I	I	A	B/C	
42. RHR Pumps	I	I	A	B	
43. Core Standby Cooling System Water Leg Pumps	I	I	A		
44. Low Pressure Core Spray Pump	I	I	A	B	
45. High Pressure Core Spray Pump	I	I	A	B	
46. Reactor Core Isolation Cooling Pump	I	I	A	B	

TYPICAL

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
II. Nuclear Steam Supply System (Cont'd) GE-Supply					
47. Reactor Core Isolation Cooling Steam Turbine Assembly	I	I	A	E	
48. Steam Line Plugs	I	I	P	NA	
49. Head Strongback	I	I	A	NA	
50. Refueling Platform Equipment Assembly	I	I	A		
51. Channel Storage Rack	NA	II	WN		
52. Remaining Racks and Containers (Equipment #'s 1F16-E00X)	I	I	P		
53. Remaining Misc. Equipment #'s 1F1X-E0XXX)	NA	II	WN		
54. Reactor Water Cleanup Regenerative Heat Exchangers	I(SD)	II	WS	C	
55. Reactor Water Cleanup Non-Regenerative Heat Exchangers	I(SD)	II	WS	C	
56. Reactor Water Cleanup Filter/Demineralizers	I(SD)	II	WS	C	
57. Reactor Water Cleanup Filter Demineralizer Control Panels	I(SD)	II	WS		
58. Remaining Reactor Water Cleanup System Tanks, Pumps, Agitators, Collectors, etc.	N/A	II	WN	C	
59. Panels, Instrumentation and Monitoring Cabinets numbered 1H13-P600; P604; P607; - P610;	I(SD)	II	WS		
60. Panels, Instrumentation and Monitoring Cabinets remaining 1H13-P601 thru P642	I	I	P		
61. MSIV Leakage Control System Panel	I	I	A		
62. Control Rod Drive & Reactor Vessel Temperature Record Panel	I(SD)	II	WS		
63. SRM-IRM Drive Control Relay Rack	I(SD)	II	WS		
64. Remaining Panels and Racks #ed 1H22-P001 through 1H22-P041	I	I	P		
65. ESS-1 & ESS-2 MSIV Leakage Control Panels	I	I	A		
66. All 1T49-XXXX equipment (Flammability Control)	I	I	A	B	
III. AC-Acid Systems					
All Equipment	NA	II	WN		

TYPICAL

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
IV. AF - Misc. Sump Pumps:					
All Equipment	NA	II	WN		
V. An - Annunciator Alarms:					
All Equipment	I(SD)	II	WS		
VI. AP - Auxiliary Power:					
1. Aux XFMR and Reserve XFMRs	NA	II	WN		
2. 6.9 + 4.16 KV SWGR(s)	I	I	A		
3. HTG BLR SWGR(s)	NA	II	WN		
4. 480V ESS Substations	I	I	A		
5. 480V BOP Substations 1A-3A, 1A-4A, 1B-3A, 1B-4A, 1C-2A	I(SD)	II	WS		
6. 480V BOP Substations 1A-3B, 1A-4B, 1B-3B 1B-4B, 1C-2B	NA	II	WN		
7. 480V RXMCC 1A & 1B	I	I	A		
8. 480V RXMCC 1C through 1G	I(SD)	II	WS		
9. 480V ABMCC 1A through 1F	I	I	A		
10. 480V TRMCC 1a through 1J; WBMCC-SBMCCs; CWMCC; CDMCCs; MDMCC's, HBMCC; GHMCC; Load Center 1A-5 and BOP Substation 1G-1	NA	II	WN		
11. 480V WSMCC 1A, 1B & 1C	I	I	A		
12. 480V Plug-in Bus 1A through 1D	I	I	P		
13. 480V Plug-in Bus 1E, 1F & 1G	NA	II	WN		
14. Primary containment Electrical Penetration E-1 through E-19	I	I	P		
VII. AS - Auxiliary Steam System:					
All Equipment	NA	II	WN		
VIII. CA - Condenser Vacuum System:					
All Equipment	NA	II	WN		

TYPICAL

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component		Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
IX.	CB - Condensate Booster System:					
	All Equipment	NA	II	WN		
X.	CD - Condensate System.					
	All Equipment	NA	II	WN		
XI.	CL - Chlorination System:					
	All Equipment	NA	II	WN		
XII.	CO - Carbon Dioxide (Fire Protection) System:					
	All Equipment	NA	II	WN		
XIII.	CP - Condensate Polishing Demineralizer System:					
	All Equipment	NA	II	WN		
XIV.	CW - Circulating Water System:					
	All Equipment	NA	II	WN		
XV.	CX - Misecallenous Cabinets, Panels and Data Acquisition Systems:					
	1. MCR Div. III Multiplexer (3F) - Eq. #1CX10J	I	I	A		
	2. All Remaining Equipment #s' 1CX__J	NA	II	WN		
XVI.	CY - Cycled Condensate Systems:					
	All Equipment	NA	II	WN	D	

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XVII. DC - DC Batteries:					
1. 250V DC TB MCC 1A	NA	II	WN		
2. Computer Room Non-1E Batteries and Chargers	NA	II	WN		
3. 250V DC Distribution Cabinets C-A and C-B	NA	II	WN		
4. All other 1DC_ _E_ Equipment	I	I	A		
XVIII. DG - Diesel Generator Auxiliary System:					
1. Diesel Generators	I	I	A		
2. Diesel Generator Heat Exchangers	I	I	A		
3. Diesel Generator Air Compressors	I(SD)	II	WS		
4. Diesel Generator Heaters	I(SD)	II	WS		
5. Reducers w/Turning Vanes 16 CYL	NA	II	WN		
6. Reducers w/Turning Vanes 12 CYL	NA	II	WN		
7. Diesel Generator Technical Support Center	NA	II	WN		
8. Diesel Oil Day Tank	I	I	P		
9. All Remaining Equipment 1DG_ _ _ _	I	I	P		
XIX. DL - Laundry Floor Drain Sump Pumps					
All Equipment	NA	II	WN		
XX. DM - Service Water Pump Structure Sump Pumps					
All Equipment	NA	II	WN		
XXI. DO - Diesel Fuel Oil System:					
1. Diesel Oil Storage Tanks	I	I	P		
2. Diesel Fuel Oil Transfer Pumps	I	I	A		
3. Diesel Oil Transfer Pumps	NA	II	WN		
4. Technical Support Oil Storage Tank	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XXII. EH - Turbine Generator:					
All Equipment	NA	II	WN		
XXIII. ES - Extraction Steam System:					
All Equipment	NA	II	WN		
XXIV. FC - Fuel Pool Cooling & Cleanup System:					
1. Fuel Pool Cooling Pumps	I(SD)	II	WS	C	
2. Fuel Pool Heat Exchangers	I(SD)	II	WS	C	
3. Refueling Bellows	I	I	P		
4. Remaining 1FC_ _ _ _ Equipment	NA	II	WN	C	
XXV. FP - Fire Protection System:					
All Equipment	NA	II	WN	NA	
XXVI. FW - Reactor Feedwater System:					
All Equipment	NA	II	WN		
XXVII. GS - Turbine Gland Seal System:					
All Equipment	NA	II	WN		
XXVIII. HC - Cranes, Hoists and Trolleys					
1. Main Reactor Building Crane	I	I	P		
2. Power Distribution Panel (eq. #1HC72J)	I(SD)	II	WS		
3. All Remaining 1HC_ _ _ _ Equipment	NA	II	WN		
XXIX. HD - Heater Drain System:					
All Equipment	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XXX. HT - Station Freeze Protection					
1. 9KVA, 480-208/120 Transformers for Panels 1PLE7JA & B	I	[illegible]	A		
2. All Remaining 1HT_ _E Equipment	NA	II	WN		
XXXI. HY - Hydrogen System					
All Equipment	NA	II	WN		
XXXII. IA - Instrument Air System					
1. Instrument Air Dryers Prefilters and After Filters	I(SD)	II	WS		
2. Instrument Air Compressors, Receivers. Compressor After Coolers, & Compressor Pulsation Dampeners	NA	II	WN		
XXXIII. IN - Drywell Pneumatic System					
1. Drywell Pneumatic Nitrogen Cylinders & Racks	I	I	P		
2. Drywell Pneumatic System Dryers, Dryer Outlet Filters & Prefilters	I(SD)	II	WS		
3. Drywell Pneumatic Compressors and System Air Receiver	I(SD)	II	WS		
4. All Remaining 1IN_ _ _ _ Equipment	NA	II	WN		
XXXIV. IP - _____					
1. 120 VAC Instrument Buses	I	I	A		
2. DC to AC Inverter Equip (1A & 1B), 120 VAC Uninter & Computer Distr. Panel	I(SD)	II	WS		
3. All Remaining 1IP_ _ _ _ Equipment	NA	II	WN		
XXXV. LL Lighting System					
All Equipment	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XXXVI. MC - Makeup Condensate Storage System					
All Equipment	NA	II	WN		
XXXVII. MP - Main Power					
All Equipment	NA	II	WN		
XXXVIII. MS - Main Steam					
All Equipment	NA	II	WN		
XXXVI. OG - Off Gas System					
1. Off Gas Guard Beds, Prefilters, Dryers, After-Filters, and Blowers	I(SD)	II	WS	D	
2. All Remain 1OG_ _ _ _ Equipment	NA	II	WN	D	
XL. OH - Caustic System					
All Equipment	NA	II	WN		
XLI. OT - Turbine Oil System					
All Equipment	NA	II	WN		
XLII. PA - _____					
1. Misc. Automatic Control Cabinets	I	I	P		
2. Electrical Transducer Power Supply Cabinet and 480V Power Distribution Panel Aux Bldg Hoists & Trolleys	NA	II	WN		
3. All Remaining 1PA_ _ J Equipment	I(SD)	II	WS		

TYPICAL

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XLIII. PL - Panels					
1. HVAC Tube Condensing Unit Control Panels (1 PLB3J to C1J)	I	I	A		
2. Heat Tracing Control Panels (1PLE7JA and B)	I	I	A		
3. Switchgear Remote MUX CAB (1PLG9JA and B)	I	I	A		
4. Valve 1E112-F009 Alternate Power Supply Panel (1PLL4J)	I	I	A		
5. Diesel Generator Control Panels (1PL10JA, B & C)	I	I	A		
6. ESS-1, 2, 3 Essential Relay Panels (1PL12JA, B & C)	I	I	A		
7. Control Room Vent and Air Cond. Eqpt. Control Panels (1PL14JA&B)	I	I	A		
8. Primary Containment H_2/O_2/Fission Products Sample Panels (1PL40JA&B)	I	I	A		
9. Diesel Generator Room Vent Panels (1PL60JA, B & C)	I	I	A		
10. Service Water Pump Cooling Panels (1PL61JA & B)	I	I	A		
11. Remote Shutdown Panels (1PL67JA&B)	I	I	A		
12. ESS-1&2 SGTSET (1PL69JA&B)	I	I	A		
13. Service Water Strainer Control Panels (1PL75JA&JB)	I	I	A		
14. Switchgear Heat Removal Unit Control Panels (1PL91,92,&93J)	I	I	A		
15. Carbon Dioxide Fire Protection Panels - DG room (1PLC7JA,B&C)	I(SD)	II	WS		
16. Drywell Pneumatic Compressor Control Panels (1PLD1J)	I(SD)	II	WS		
17. Primary Containment Vent Water Chiller Panels (1PLD6,7,8&9J)	I(SD)	II	WS		
18. Ionization Detector Monitoring Panel for Cable Spreading Room (1PLE6JA)	I(SD)	II	WS		
19. Cable Spreading Room Fire Protection Panel (1PLE6JB)	I(SD)	II	WS		
20. Misc. Building & Area CAMs (1PL38JA thru E)	I(SD)	II	WS		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XLIII. PL - Panels (Cont'd)					
21. Service Water Pumps Minimum Flow Bypass Control Panel (1PLL3J)	I(SD)	II	WS		
22. Off Gas Instrument Panel 1B (1PL30JB)	I(SD)	II	WS		
23. Misc. Atmospheric Rad. Sample & Diff. Pressure Controls (1PL31JA&B; 1PL33J: 1PL37JA through JG)	I(SD)	II	WS		
24. Turbine Building HVAC Control Panel (1PL38J)	I(SD)	II	WS		
25. Reactor Building Process sample Instr. Panel (1PL50J)	I(SD)	II	WS		
26. Laboratory HVAC Control Panel (1PL51JB)	I(SD)	II	WS		
27. Fuel Pool Filter Control & Instrument Panels (1PL54JA&B)	I(SD)	II	WS		
28. Service Water Pump HOuse Vent Panel (1PL63J)	I(SD)	II	WS		
29. Station Ventilation Purge & Primary Cont. HVAC Panel (1PL65JB)	I(SD)	II	WS		TYPICAL
30. Drywell to Suppression Chamber VAC Relief Valve Control Panel (1PL79J)	I(SD)	II	WS		
31. Cleanup & Fuel Pool Phase Separator Tank Instr Panel (1PL84J)	I(SD)	II	WS		
32. Reactor Bldg. Floor Drain Tanks Instrument Panel (1PL87J)	I(SD)	II	WS		
33. Reactor Bldg. Equipment Drain tank Instr. Panel (1PL96J)	I(SD)	II	WS		
34. Off Gas System Solenoid Valve Panel 1B (1PL98JB)	I(SD)	II	WS		
35. All Remaining Equipment (Panels) #1PL_ J	NA	II	WN		
36. Post Accident Sampling System HVAC Control Panel (1PL65JC)	I(SD)	II	WS		
37. Reactor Building hVAC Control Panel (1PL37J)	I(SD)	II	WS		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XLIV. PM -					
1. Generator and Station Auxiliary Panel (1PM01J)	I	I	A		
2. Leak Detection Panel/Station Services Panel (1PM06 & 08J)	I	I	A		
3. HVAC & Standby Gas Treatment Panel (1PM07J)	I	I	A		
4. Radiation Monitoring & Recording Panel (1PM17J)	I	I	A		
5. Primary Containment & Reactor Vessel Logic Panel (1PM18j)	I	I	A		
6. Control Room Ionization Detect Relay Panels (1PM19JA & B)	I	I	A		
7. Main Control Room Isolator Cabinets (1PM23JA & B)	I	I	A		
8. SRVM System Panel (1PM25J)	I	I	A		
9. Meterlogical Data Output Teletype (1PM14J)	NA	II	WN		
10. Turbine Condenser/Feedwater Heaters & Aux. Panels (1PM02 & 03J)	I	I	P		
11. Generator & Station Transformer Recorder Panel (1PM04J)	I	I	P		
12. Station Totalizing Panel (1PM05J)	I	I	P		
13. Fire Protection & Deluge Valve Control Panel (1PM09J)	I	I	P		
14. Status of excess Flow Check Valves - Indication Panel (1PM13J)	I	I	P		
15. 345 KV Switchyard Mimic Bus Panel (1PM16j)	I	I	P		
16. All Remaining 1PM_ _J Equipment	1(SD)	II	WS		
XLV. PR - Process Radiation					
All Equipment	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
XLVI. PS - Process Sampling					
1. Sample Station 1PL50J Chiller	I(SD)	II	WS		
2. PASAS Power Center	I(SD)	II	WS		
3. All Remaining 1PS_ _ _ _ Equipment	NA	II	WN		
XLVII. RE - Reactor Building Equipment Drains					
1. Reactor Building equipment Drain Tank (1REO1T)	I(SD)	II	WS		
2. All Other 1RE_ _ _ Equipment	NA	II	WN		
XLVIII. RF - Reactor Building floor Drain System					
All Equipment	NA	II	WN		
XLIX. SA - Service Air System					
All Equipment	NA	II	WN		TYPICAL
L. SH - Station Heating System					
All Equipment (*)	NA	II	WN		
LI. TD - Turbine Drains & Vents					
All Equipment	NA	II	WN		
LII. TE - Turbine Building Equipment Drains					
All Equipment	NA	II	WN		
LIII. TF - Turbine Building Floor Drain System					
All Equipment	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
LIV. TG - Turbine Generator					
All Equipment	NA	II	WN		
LV. TO - Turbine Oil System					
All Equipment	NA	II	WN		
LVI. VA - Auxiliary Building HVAC					
Aux. Bldg. Charcoal Bed Room Exhaust Fan (1VA03C) (No Other VA Equipment Listed)	I	II	WS		
LVII. VC - Control Room & Aux. Equip. Room HVAC					
1. Control Room HVAC Heating Coils (1VC01AA & AB)	NA	II	WN		
2. Control Room HVAC Toilet & Kitchen Exhaust Fans (1VC06 & 07C)	NA	II	WN		
3. Control Room HVAC Humidifiers (1VC14MA&B)	I(SD)	II	WS		
4. Control Room HVAC Humidifier Boiler (1VC15B)	I(SD)	II	WS		
5. All Remaining 1VC____ Equipment	I	I	A		
LVIII. VD - Diesel Generator Room Ventilation					
All Equipment	I	I	A		
LIX. VG - Standby Gas Treatment System					
All Equipment	I	I	A	NA	
LX. VH - Service Water & C.W. Pump Structure Ventilation					
1. Service Water Pump Cooling System Fans 1A - 1D	I	I	A		
2. Service Water Pump Cooling system Heat Exchangers 1A - 1D	I	I	A		
3. All Remaining 1VH____ Equipment	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
LXI. VJ - Machine Shop Ventilation System					
All equipment	NA	II	WN		
LXII. VL - Laboratory HVAC System					
1. Laboratory HVAC Exhaust Air Filter Package and Air Handling Unit (1VL04 & 05S)	I(SD)	II	WS		
2. Laboratory & SW GR Makeup Air Filter, Heating Coil, and Air Fan (1VL07F, 09A, and 20C)	I(SD)	II	WS		
3. All Remaining 1VL_ _ _ Equipment	NA	II	WN		
LXIII. VP - Primary Containment Ventilation System					
1. Primary Containment Ventilation Fans	I	I	P		
2. Primary Containment Ventilation Cooling Coils (1VP03AA & AB)	I	I	P		
3. Primary Containment Ventilation Construction Filters (1VP07FA & B)	NA	II	WN		
4. Primary containment Cooling Coils (1VP10AA thru 12AB)	NA	II	WN		
5. All remaining 1VP_ _ _ _ Equipment	I(SD)	II	WS		
LXIV. VQ - Primary Containment & Suppression Pool Purge					
1. Primary containment Purge Electric Heaters	NA	II	WN		
2. All Remaining 1VQ_ _ _ _ Equipment	I(SD)	II	WS		
LXV. VR - Reactor Building Ventilation System					
1. Reactor Building Ventilation Fans 1A-1C	I(SD)	II	WS		
2. Reactor Building Ventilation Exhaust Fans 1A-1C	I(SD)	II	WS		
3. All Remaining 1VR_ _ _ _ Equipment	NA	II	WN		

TYPICAL

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
LXVI. VS - Service Building HVAC					
All Equipment (*)	NA	II	WN		
LXVII. VT - Turbine Building Ventilation System					
1. Turbine Bldg. Vent Decontamination Area Exhaust Fan and Filter	I(SD)	II	WS		
2. PASAS Room Air Cooler, Supply Air Filter, Cooling Coil, and Supply Fan	I(SD)	II	WS		
3. All Remaining 1VT_ _ _ _ Equipment	NA	II	WN		
LXVIII. VV - TSC & Gate House HVAC					
All Equipment (*)	NA	II	WN		
LXIX. VW - Radwaste Facility Ventilation System					
1. Radwaste Building Ventilation Exhaust Fans	I(SD)	II	WS		
2. All Remaining 1VW_ _ _ _ Equipment	NA	II	WN		
LXX. VX - Switch Gear Heat Removal System					
All Equipment	I	I	A		
LXXI. VY - Core Standby Cooling System					
All Equipment	I	I	A		
LXXII. WE - Radwaste Demineralization System					
All Equipment	NA	II	WN		
LXXIII. WF - Radwaste Building Floor Drain System					
All Equipment	NA	II	WN		

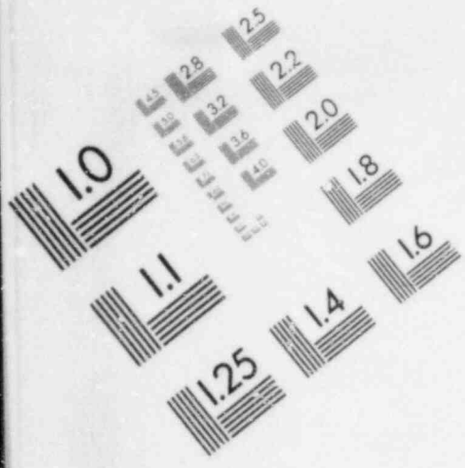
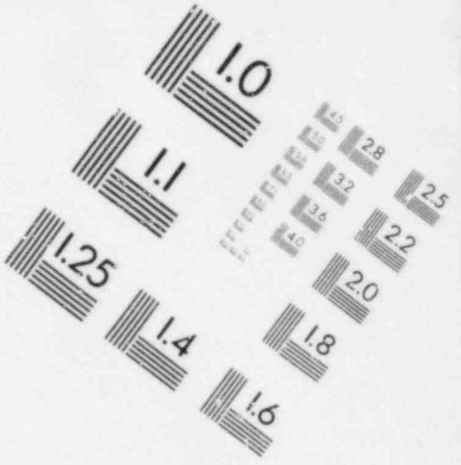
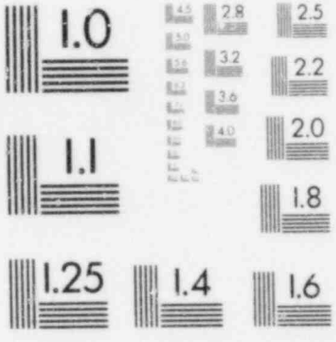
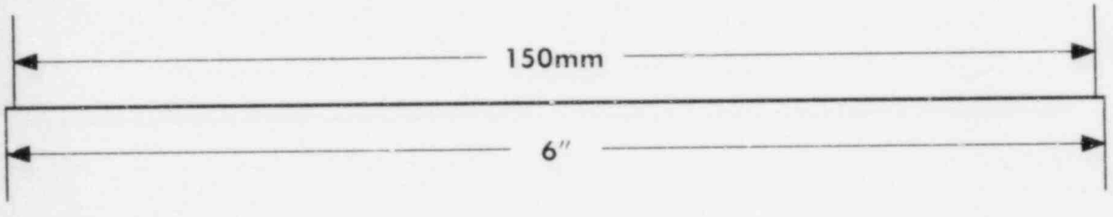
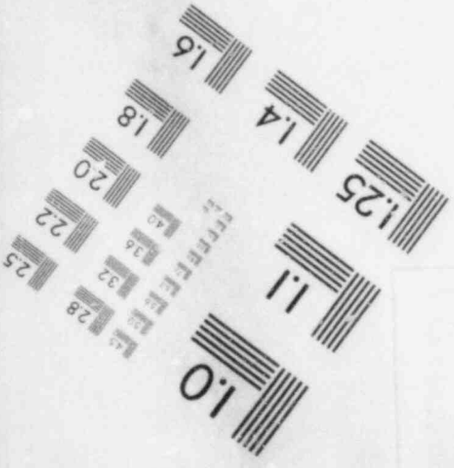


IMAGE EVALUATION TEST TARGET (MT-3)









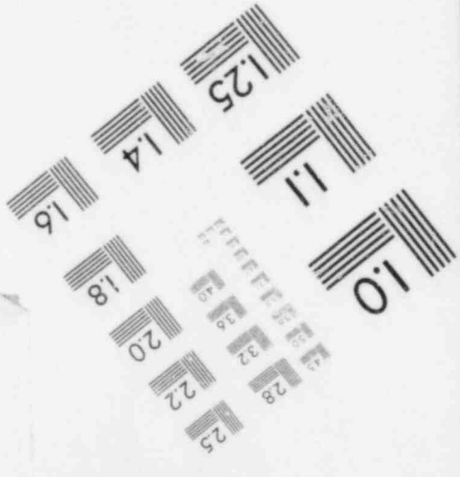
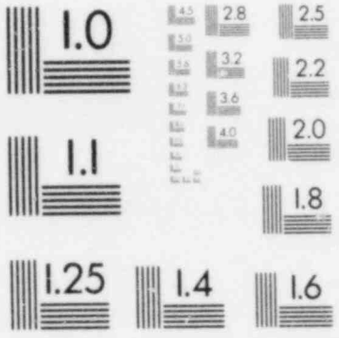
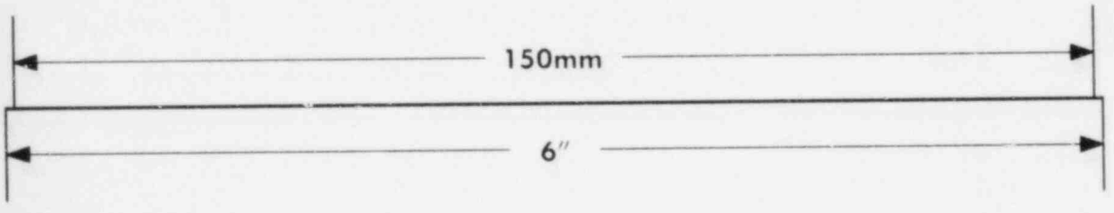


IMAGE EVALUATION
TEST TARGET (MT-3)





STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component	Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
LXXIV. WG - Gland Water System					
All Equipment	NA	II	WN		
LXXV. WM - Makeup Demineralizer System					
All Equipment	NA	II	WN		
LXXVI. WR - Reactor Building Closed Cooling Water System					
1. Reactor Building Closed Cooling Water Expansion Tanks	I	I	P		
2. Chemical Feeders	NA	II	WN		
3. All Remaining 1WR ___ Equipment	I	I	A		
LXXVII. WS - Service Water System					
1. Service Water Pumps 1A - 1D	I	I	A		
2. Service Water Strainers 1R & 1B	I	I	P		
3. Traveling Screens	I(SD)	II	WS		
4. Auxiliary WS Pump	NA	II	WN		
5. Dechlorination Tank, Agitator, and Pumps	NA	II	WN		
6. Effluent Monitor Pumps	NA	II	WN		
LXXVIII. WT - Turbine Building Closed Cooling Water System					
All Equipment	NA	II	WN		
LXXIX. WW - Well Water System					
All Equipment	NA	II	WN		
LXXX. WX - Solid Radwaste					
All Equipment	NA	II	WN		

STRUCTURES, COMPONENTS AND SYSTEM CLASSIFICATION

Principle Component		Seismic Category (See Note a)	Quality Assurance Requirements (See Note b)	Essential or Non-Essential (See Note c)	Quality Group Classification (See Note d)	Comments
LXXXI	WY -					
	All Equipment	NA	II	WN		
LXXXII	WZ -					
	All Equipment	NA	II	WN		

NOTES

a.) Seismic Categories:

Seismic Category "I"

The equipment and piping are designed in accordance with the seismic requirements for the SSE.

Seismic Category "I(SD)"

The equipment or piping supports are Seismically Designed.

Seismic Category "NA"

The seismic requirements for the SSE are not applicable to the equipment and/or the piping.

b.) Quality Assurance Requirements:

Quality Assurance Group "I"

The equipment shall meet the quality assurance requirements of 10 CFR50, Appendix B.

Quality Assurance Group "II"

The equipment shall meet the quality assurance requirements defined in the purchase specification.

c.) Essential or Non-Essential:

Essential - "A"-Active

A safety-related piece of structure, components, or systems which must remain functional within a defined response both during and after all postulated dynamic events.

Essential - "P"-Passive

A safety-related piece of structures, components, or systems which is not required to remain functional, but must maintain its structural and pressure integrity both during and after all postulated dynamic events.

Non-Essential, Seismic - "WS"

Structures, components, or systems which do not perform any nuclear safety-related function but which must maintain their structural integrity during any postulated dynamic event.

NOTES
(Cont'd.)

Essential or Non-Essential:

Non-Essential, Non-seismic - "WN"

Structures, components, or systems which are not required to maintain either functional or structural integrity during or after any postulated dynamic event.

d.) Quality Group Classification is defined as found in FSAR Section 3.2.

APPENDIX B

TYPICAL VISUAL INSPECTION ACTIVITIES

SSCs identified on the approved Classification List will be subject to visual inspections. The visual inspections will be performed on accessible SSCs. The essential attributes will be defined by the responsible designer. The following are typical visual inspection attributes.

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
Piping/mechanical	Large bore piping	Elevation, size, slope, heat numbers, welding, welders identification, line/spool identification, code data nameplate identification (when required), visual damage Visual/measurement
	Small bore piping	Elevation, size, slope, heat numbers, welding, welder identification, line/spool identification, code data nameplate identification (when required), visual damage Visual/measurement
	Valves and operators, position indicators	Elevation, size, location, valve type, flow direction, bolts (if flanged), gaskets, welding (if welded), welder identification, heat numbers, manufacturer, position indicator (open/closed), packing, alignment,

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
		operator manufacturer and type, operator stem orientation, nameplates, tag number Visual/measurement
	Pumps, gear boxes, and couplings	Elevation, size, location, type, direction of rotation, manufacturer, heat numbers, motor manufacturer and type, welding (if welded), bolting, gaskets, alignment, nameplates, gear box type, gear box manufacturer, gear box lubrication, coupling type and fit, tag numbers Visual/measurement
	Hangers	Elevation, size, location, type, welding, welder identification, shims, bolting, thread engagement, identification, spring loading (as applicable) pipe clearance, clamping to pipe Visual/measurement

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
	Supports	Size, location, elevation, welding, welder identification, anchor bolt type, anchor bolt size, clamping, thread engagement, heat numbers, identification Visual/measurement
	Snubbers	Size, location, elevation, type, manufacturer, setting, bolting, welding, welder identification, leakage, fluid levels, identification Visual/measurement
	Restraints	Size, location, elevation, welding, welder indentification, placement, fit, bolting, thread engagement, identification Visual/measurement

NOTE: The above-listed attributes/characteristics are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
Electrical	Exposed conduit	Size, material type, visible damage, routing, bend radius, smoothness, number of bends, distance between pull points, ground connection, fittings, bushings, Seismic II/I criteria, identification, end seal after cable installation, channel separation Visual/measurement
	Trays and wireways	Size, material, type and construction. identification, routing, proper fittings, grounding, dropouts and spillovers, covers and mounting, splice types, and visible damage Visual/measurement
	Supports	Type and configuration, spacing or location, material type, welding, welder identification (when required), concrete expansion anchors and connections, identification (when required), and visible damage Visual/measurement

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
	Junction boxes	Size and type, location, orientation, identification (when required), mounting, connection to conduit, and visible damage Visual/measurement
	Penetrations	Identified and installed at correct location and elevation, proper bolting and thread engagement, protection of machined surfaces (if not closed), proper orientation, and visible damage. Visual/measurement
	Busses	Identification, proper support, routing, configuration, connections made, no oxide grease used (when required), boots, clearance to conductive material maintained, and visible damage Visual/measurement
	Cables	Type, scheme identification, correct termination point, routing, channel separation, clamping, bundling, proper lugs and connectors used, conductor insertion into lug, proper crimp,

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
		conductor and insulation undamaged, bend radius, support, insulation or stress cone installed, termination tight Visual/measurement
	Panel boards	Identification, location, mounting, grounding, shipping splits properly joined, internal interconnections completed, expansion anchors, welded attachments, and visible damage. Visual/measurement
	Motor control centers	Identification, location, mounting, grounding, shipping splits properly joined, interconnecting jumpers installed, bus bars connected, welded attachments, concrete expansion anchors, and visible damage Visual/measurement

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
	Motors	Mounting, identification, location, shaft rotation and lubrication, and visible damage
		Visual/measurement

NOTE: The above-listed attributes/characteristics are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
Civil	Concrete structures	Location (line and grade), voids, honeycombs, embedded debris, form mismatch, surface irregularity, exposed rebar, column size and location Visual/measurement
	Penetrations	Location, azimuth and elevation, envelope dimensions, identification (mechanical), visible damage, welder identification, weld number, weld quality, material type, displacement/distortion, and concrete Visual/measurement
	Soils	Type, estimated sieve analysis for gradation, organic and inorganic debris, moisture content, grade Visual/sample
	Anchor bolts	Size, grade, type material, orientation, location, identification, visible damage, full thread engagement, grouting Visual/measurement

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
	Embedments	Elevation, location, orientation, identification, bolt hole locations (when bolted), grouting, envelope dimensions, visible damage
		Visual/measurement
	Painting/preservation	Dry film thickness (spot check) on steel, holidays, runs, sags, pinholes, crazing, texture, color match, coating material
		Visual/measurement

NOTE: The above-listed attributes/characteristics are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
Structural	Steel structures	Size, type, location, welding, welder identification, bolting, thread engagement, hole location, copes, length, heat numbers (when applicable), visible damage Visual/measurement
	Galleries, ladders, stairs	Size, type, location, fabrication, bolting type, size and thread engagement, welding, configuration, material, grouting (when required), mark numbers (when applicable), and visible damage Visual/measurement
	Equipment supports	Size, type, location, bolting type, size and thread engagement, welding, welder identification (when required), support contact, grouting (when required) identification, visible damage Visual/measurement

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
	Bolting	Location, diameter and length, type, proper thread engagement, washers, hole size, number of bolts, visible damage, configuration Visual/measurement
	Welding	Location, size, type, weld and welder identification (when required), code acceptability, visible damage Visual/measurement
	Special doors	Location, size, type, hinges, locks, assembly, identification, visible damage, freedom of operation Visual/measurement

NOTE: The above-listed attributes/characteristics are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
HVAC	Ducts, vents, and dampers	Size, location, elevation, routing, identification, joint configuration, type, gasketing, visible damage, coating (as applicable), envelope dimensions Visual/measurement
	Supports	Size, location, method of attachment (weld size and type, code weld acceptance, bolting size and type, thread engagement), clearances, coating application (when applicable) visible damage Visual/measurement
	Fans and blowers	Size and type, mounting, location, connection to ducting, tag number identification, rotational freedom and direction, protection, visible damage, motor size and rating Visual/measurement

NOTE: The above-listed attributes/characteristics are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX B (CONTINUED)

Plant Area	GSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
Insulation	Structural	Location, material thickness, adhesion
		Visual/measurement
	Equipment/components	Location, identification, material type and thickness, adhesion, protective covering (when required)
		Visual/measurement
	Piping	Location, size, pipe identification, type and thickness, adhesion, protective covering (when required)
		Visual/measurement

NOTE: The above-listed attributes/characteristics are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented

APPENDIX B (CONTINUED)

Plant Area	SSC Within Each Area	Attributes and Characteristics Subject to Visual Inspection Under PVQC
Instrumentation	Tubing	Size, type, material type, routing, radii, connections (nuts fitting, welds), line marking, smooth bends (no flat spots), and visible damage Visual/measurement
	Supports	Type, size, mounting type and location, inserts, fit to tubing/welding, and/or bolting acceptable, and visible damage Visual/measurement
	Instrumentation, recorders, indicators, alarms, etc.	Location, type, recorders, identification, connection to tubing/supports, mounting, flow directions, visible damage, and protection Visual/measurement

NOTE: The above-listed attributes/characteristics are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX C

TYPICAL REVIEW METHODOLOGY FOR THE MATERIAL DOCUMENTATION REVIEW

(FOR PIPING)

The following is a typical example of document reviews that may take place to check the adequacy of a valve or an instrument. The document reviews would typically consist of three major steps as follows:

I. Pre-Purchased Document Review

The document reviewers would check the purchase order to assure that the design specifications and regulatory and code requirements were detailed in the purchase order to the vendor.

A review is made to assure that QA requirements are provided for in the purchase order. These QA requirements typically include provisions for the vendor to 1) qualify their sub-suppliers, 2) specify the records required of the vendor (such as data sheets, performance curves, CMTRs, code data sheets, shipping and storage requirements, etc.) and 3) properly document nonconformance and/or purchase order exceptions. Any special shipping requirements, record retention requirements, and document review approval by the vendor will be reviewed for inclusion in the purchase order if required by specification or code. Any source inspection or audit requirements will be reviewed for inclusion in the purchase order. Past Zimmer problems from audit reports, NCR inspection reports, etc., are also reviewed to identify any additional requirements.

Once the requirements are identified, they are incorporated into the QV checklists, which will be utilized for the detailed review and verification of the receiving and installation documentation.

Provisions in the purchase order for documents, such as specifications, that are to be sent to the vendor, will be reviewed. The approved vendors list (AVL) will be checked to assure the vendor was qualified to supply material during that time period.

II. Receiving Documentation

The receiving documentation review includes jobsite receiving reports, documentation from vendors, and source inspection reports (when required).

Receiving reports (MRRs) will be reviewed according to the checklist to assure the quality-related aspects of the document are properly completed for such things as quantity and description of material received. In addition, receipt inspection reports are reviewed to assure that the form 1) is adequate for the purpose intended, 2) is properly completed (noting exceptions as required), 3) properly identifies the material, 4) identifies the required documents, and 5) is traceable to the material. In addition these

APPENDIX C (CONTINUED)

receipt inspection reports will be reviewd to assure that configuration checks, which are required to be performed upon receipt, were actually made, proper storage was provided, and nonconformance or discrepancies were identified.

Documentation from the vendor is reviewed according to the checklist to assure that it meets the pruchase order requirements. A review of the documents will be made to assure that the required technical or purchase order forms are included. Also, source inspection releases, if required by the P.O., will be reviewed. Where concern exists that documentation may have been falsified, additional checks against vendor retained data and the results of visual and physical tests, will be made.

Finally, the source inspection reports, and audit and shop releases will be technically reviewed for adequacy.

III. Storage, Maintenance, and Installation Documents

As part of a separate review, storage and maintenance documents for safety-related SSCs will be reviewed against pre-defined checklists to assure that these SSCs meet vendor and design specifications.

Installation documents will also be reviewed against pre-defined checklists. The inspection documents will be reviewed to assure the forms are adequate for the purpose intended. The data on the document will be reviewed to assure that required inspections have been made, hold points have been verified, cleanliness requirements have been met, special processes have been performed (such as non-destructive examinations), inspectors have been certified and craftmen have been qualified (when required), and nonconforming items have been documented. Where concern exists that documentation may have been falsified, additional checks against vendor retained data and the results of visual and physical tests, will be made.

APPENDIX D

TYPICAL TYPES OF DATA TO BE COLLECTED DURING THE MATERIAL DOCUMENTATION REVIEW

1. Heat number
2. Heat code
3. NRs
4. Description of material
5. Supplementary tests
6. Material specification
7. Material grade
8. Size
9. Purchase order number
10. Vendor
11. Code
12. Class
13. Code cases used

The above-listed types of data are typical of those to be collected. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX E

TYPES OF CONSTRUCTION INSTALLATION DOCUMENTATION TO BE REVIEWED

Welding procedure/procedure qualification records

Welder qualification records

Welding consumables, identification, and traceability

Preweld inspection report (weld prep., cleanliness, alignment, fit up)

Welding records

Stress relief records

Visual inspection reports

NDE report(s) and radiographs

Work traveler(s)

Bolt-up records

Group placement records

Dimensional control records

Alignment records

Rotation/operability verification records

Electrical check records

Calibration records

Cable pull records

Termination records

Environmental test records

Hydrostatic test records

Batch plant records

Cylinder test reports (3, 7, and 28-day strengths)

Rebar placement records

APPENDIX E (CONTINUED)

Embedment placement records

Concrete placement records

Equipment/material identification records

Repair records

Nonconformance reports

Inspection reports

Test reports

Field design change records

Certified as-built records/drawings

Note: The above-listed documents/records are typical of those to be reviewed/evaluated. The listing is not intended to be complete, and it is recognized that there may be additions, deletions, and/or substitutions necessary as the PVQC is implemented.

APPENDIX F

EXAMPLES OF CONFIRMATORY PHYSICAL INSPECTIONS

AREA/DISCIPLINE	ATTRIBUTES AND CHARACTERISTICS
I. Bolting/Concrete Expansion Anchor Bolts	1. Tension (Pull) Test A) Verify proper installation of installed bolt B) Verify proper tensioning and integrity of bolt 2. Torque Test A) Verify nut installation with required torque applied
II. Welding/Piping	1. Testing of weld deposited filler material (production welds) A) Perform NDE -Radiography -Dye penetrant testing -Ultrasonic testing -Magnetic Particle testing -Material sampling -Fiber optics and TV camera inspections -Plastic impressions of questionable areas for outside analysis B) Mechanical tests -Tensile test -Bend test -Charpy V-notch -Etc C) Chemical (spectrographic) analysis D) Hydrostatic testing of piping systems

APPENDIX F (CONTINUED)

AREA/DISCIPLINE	ATTRIBUTES AND CHARACTERISTICS
III. Material Traceability/Piping	1. Testing Installed Pipe A) Physical analysis -Tensile test -Bend test -Charpy V-notch -Etc B) Chemical (spectrographic) analysis
IV. Cable & Terminations/Electrical	1. Megger Test A) Verify cable insulation integrity 2. Hi-Pot Test A) Confirm insulation characteristics by measuring leakage current B) Verify proper construction/installation of stresscones 3. Resistance Test A) Verify continuity of circuits 4. Signal tracing to determine cable routing 5. Time domain reflectometers to identify discontinuities
V. Motors/Electrical	1. Megger Test A) Verify winding insulation integrity

APPENDIX F (CONTINUED)

AREA/DISCIPLINE	ATTRIBUTES AND CHARACTERISTICS
	2. Polarization Index Test A) Verifies acceptable moisture level in motor windings 3. Conductivity and chemical residue testing for break-down of internal components
VI. Concrete/Civil/Masonary Walls	1. Strength Test A) Rebar mapping of area with sonic or radar units to determine appropriate area to obtain samples B) Core drill to obtain sample for compression test to verify adequate concrete strength C) Schmidt Hammer and Windsor Probe test to verify concrete strength D) Hammer testing to check concrete for voids

NOTE: The above is a typical listing of physical inspections; it is not intended to be a complete list of examples. There may be additions and/or substitutions necessary as the PVQC is implemented.

APPENDIX G

LIST OF REPRESENTATIVE QUALITY PROBLEMS

The following is a list of representative quality problems previously reported and the action planned for further PVQC evaluation.

Task Description	PVQC Response/Action
1. QCP	
Problem:	
a) Some unacceptable structural welds have been identified.	Structural welds in this category will be verified by means of: 1) Accepting the results of QCP per the program discussed in Section 4.3. 2) All other similar structural welds will have a review of the weld documentation and visual inspection of the welds, or 3) Physical inspections to provide data not provided by documentation and visual inspections. 4) Confirmatory physical inspections.
b) Some structural welds were painted before inspection.	Paint shall be removed from structural welds in this category, which shall be verified by means of: 1) A review of all weld documentation and visual inspection of the welds, or 2) For a selection of welds, review of the documentation, and physical and visual inspection of those welds.

Task Description	PVQC Response/Action
	3) Physical inspections to provide data not provided by documentation and visual inspections. 4) Confirmatory physical inspections.
1. I & E Report #81-27 Problem: a) The ultrasonic thickness measurement of welds and adjacent base material revealed a wall thickness of .758 inch in the base material adjacent to weld HP-12A. The minimum wall thickness in accordance with commercial design tables is .862 inch thick.	Welds in this category will be verified by ultrasonic testing and by means of: 1) A review of all weld documentation and testing of the welds, or 2) For a selection of welds, review of the documentation, and ultrasonic testing will be performed.
b) The visual examinations of piping welds revealed six welds that exceeded the ASME Code allowable enforcement height on the outside of the weld.	Welds in this category will be verified by visual examination and review of the weld documentation

Task Description	PVQC Response/Action
1. Report M-38 Problem: There is a concern regarding material traceability in five 10-inch recirculation pipe welds. The concern involves the potential use of carbon steel filler material in stainless steel welds.	1) Weld documentation will be reviewed and if material traceability for the weld is not available, this condition will be noted on an NCR. 2) All other similar structural welds will have a review of the weld documentation and visual inspection of the welds, or
Report M-50 Problem: A number of ASME piping welds were radiographed in the as-welded condition which resulted in the inability to properly identify and evaluate weld discontinuities.	After proper surface conditioning of all welds in this category visual and physical inspections.

Task Description	PVQC Response/Action
National Board Task Report Problem: Task NBT 3, Item 1 Summary All material purchased by HJK must be received from material manufacturers qualified by HJK as meeting requirements Code.	CG&E, HJK, and other contractors will provide an AVL to PVQC as discussed in Section 4.3. PVQC will review a group to determine the validity of the results. If acceptable, PVQC will ensure the material was purchased from an approved vendor.
Problem: Task NBT 23 Some weld procedures have not been properly qualified for all essential variables as required by ASME. Example: HJK Weld Procedure SPPM 3.1.50, Rev. 0	Weld procedures will be reviewed for compliance to ASME requirements.

Task Description	PVQC Response/Action
Show Cause Order Problem: Paragraph 3	
a) Welds were performed by welders not qualified for weld thickness range in accordance with ASME requirements.	Welder qualifications will be reviewed for compliance to ASME requirements. Welds will be verified by means of: 1) A review of all weld documentation and visual inspection of the welds, and 2) For a selection of welds, non-destructive examinations will be performed. 3) Physical inspections to provide data not provided by documentation and visual inspections. 4) Confirmatory physical inspections
b) Hangers installed for the control rod drive system are of indeterminated quality	Hangers in this category will be verified by means of: 1) A review of all hanger documentation and visual inspection of the welds, and 2) For a selection of hanger welds, a physical non destructive examination will be performed.

Task Description	PVQC Response/Action
	3) Physical inspections to provide data not provided by documentation and visual inspection. 4) Confirmatory physical inspections.
1) Allegations (JULY 12, 1983) Concern: a) Audit 67 conducted by Henry J. Kaiser Co. in July 1981 has not been closed out to the auditor's satisfaction.	The Allegations now on file will be reviewed and the areas of discrepancies and violations will be documented for verification. Verification of these discrepancies may include: 1) A review of all documentation and visual inspection of accessible hardware of the area in question, and/or 2) For a selection of like discrepancies and violations, review of the documentation, and physical inspections will be performed. 3) Physical inspections to provide data not provided by documentation and visual inspections. 4) Confirmatory physical inspections.

Task Description	PVQC Response/Action
b) Comments on CG&E's response dated February 28, 1983, to an NRC request for information.	The Allegations now on file will be reviewed and the areas of discrepancies and violations will be documented for verification. Verification of these discrepancies may include: 1) A review of all documentation and visual inspection of accessible hardware of the area in question, and/or 2) For a selection of like discrepancies and violations, review of the documentation, and physical inspections will be performed. 3) Physical inspections to data not provided by documentation and visual inspections. 4) Confirmatory physical inspections.
1. ASME Report Dated June 23, 1982	
Problem:	
a) Welder performance qualification records were found with only "bend-accept" on the form. Type or number of tests was not stated.	All Past and present welder qualification records will be reviewed.
b) NDE reports did not include the qualification level of the NDE examiner	All NDE reports will be reviewed to ensure compliance with Code requirements.

Task Description	PVQC Response/Action
Net Report Paragraph 2.4.1.1.5(1) Identify all safety-related structures, piping, conduit, manholes, and so forth, founded on or in backfill that was not placed within the scope of the program outlined in the Dames & Hoore report (M.L. Kiefer letter).	Concern in this category will be verified as being acceptable by means of a review of all documentation and visual inspection.
Paragraph 2.4.1.1.5 (2) For all items identifed as a result of the effort outlined above (including the entire service water pipeline and duct run), investigate and determine the as-constructed backfill density conditions using appropriate ASTM field and laboratory sampling and test procedures, and/or perform sufficient engineering evaluations to demonstrate that indeterminate in situ densities are adequate considering all postulated loadings.	Concerns in this category will be verified as being acceptable by means of: 1) A review of all documentation and visual inspections, and 2) Review of documentation, and physical inspection for selected areas.

Task Description	PVQC Response/Action
Paragraph 2.4.2.2.5(1)	
For safety-related double wythe walls listed NET REPORT Table 3, demonstrate that all postulated wall loadings can be resisted assuming two independent walls rather thar one monolithic wall.	Design verification and resolution of nonconformances are not within the PVQC scope.
a) Appropriate modifications must be implemented for those walls found to be inadequate under the above assumption.	Resolution of nonconformances is not within the PVQC scope of work.
b) The applicant must identify any other safety-related masonry walls (solid or hollow) where collar joints were relied on for load resistence, and demonstrate their adequacy by either verification of collar joint fill and/or the engineering/modification approach described above.	Reference PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).

Task Description	PVQC Response/Action
Paragraph 2.4.2.2.5(2) For embedded seismic columns in all safety-related masonry walls, structural evaluation of the column end connections must be made assuming the conditions noted in the NET Report.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
Paragraph 2.4.2.2.5(3) For those walls where 80% or more of the joint reinforcement was relied on to resist load, in situ testing must be performed to establish that the required reinforcement exists. a) Where required reinforcement cannot be substained, appropriate remedial actions are required. b) In addition, it must be confirmed that the discontinuity of joint reinforcement across columns does not adversely affect current or previous wall evaluations.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).

Task Description	PVQC Response/Action
Paragraph 2.4.2.5(4) Where fire and/or ventilation seals are required, the type of in situ seal must be established and its adequacy to perform its intended function verified.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2)
Paragraph 2.4.2.3.1.4(1), (2), (3), (4) Inspection of structural steel welding in the reactor building, service water pump structure, and the auxiliary building revealed lack of fusion, weld undercut, arc strikes, undersize fillet welds, hole in base metal, excessive gap, overlap, gouges, etc.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2)
Paragraph 2.4.2.3.1.4(1) The NET review identified several discrepancies between the as-built connection details and those shown in the drawings (see NET Report, Table 5)	Concern in this category will be verified as being acceptable by means of a review of all documentation and visual inspection.

Task Description	PVQC Response/Action
Paragraph 2.4.2.3.1.5 The QCP must be expanded to include component mountings and steel added to structural members (e.g., beam cover plates).	PVQC will verify QCP data and perform any remaining inspections.
Paragraph 2.4.2.3.2.5(1) The applicant should implement a program for "inspection of accessible slotted connections to determine that the torques and fit-up conditions are compatible with design assumptions, with corrective actions taken as appropriate."	Reference: Cincinnati Gas & Electric Co., LOZ-83-165, November 9, 1983.
Paragraph 2.4.2.3.2.5(2) The applicant should formulate an inspection plan for all other accessible structural bolting to the extent justified by engineering evaluations.	Reference: Cincinnati Gas & Electric Co., LOZ-83-165, November 9, 1983.

Task Description	PVQC Response/Action
Paragraph 2.4.2.3.2.5(3) The applicant should formulate a statistical/engineering basis for the acceptance of bolting that was inaccessible based on the results of actions taken to address accessible bolting.	Reference: Cincinnati Gas & Electric Co., LOZ-83-165, November 9, 1983
Paragraph 2.4.2.3.3.5(1) Welds of support columns embedded in masonry walls are generally deficient and inadequate.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
Paragraph 2.4.2.3.3.5 (2,3) Evidence of deficient structural steel fillet welds records by the NET.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
Paragraph 2.4.2.4.5(1) All bolting in the intake flume structure must be verified to be A-325, Type 3.	Reference: Cincinnati Gas & Electric Co., LOZ-83-165, November 9, 1983

Task Description	PVQC Response/Action
Paragraph 2.4.2.4.5(2) An appropriate in-service inspection program must be implemented to ensure that corrosion levels are acceptable throughout the structure's service life.	In-service is not part of the PVQC scope.
Paragraph 2.4.2.4.5(3) S&L drawing deficiencies must be rectified.	Reference: Response/Action in Task Description Paragraph 2.4.2.4.5(3). Not in PVQC scope.
Paragraph 2.4.2.5.5 The applicant must formulate an inspection program to ascertain the adequacy of all RCI work (both design and construction)performed at Zimmer and to correct any significant deficiencies.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5.(2). Design review if not within the PVQC scope.
Paragraph 2.4.3.1.5(1) The removal of local indicators from the instruments in the automatic depressurization system/safety valve logic circuits should be justified.	Not in PVQC scope.

Task Description	PVQC Response/Action
Paragraph 2.4.3.2.2.5	
NET examination disclosed a number of examples for which the cable separation criteria of the FSAR and the construction specifications had not been met, mostly involving lack of separation between nonessential and essential cables.	Concern in this category will be resolved by means of a verification of all cable routing. Cable separation analyses based on routing will be performed outside PVQC scope.
The applicant will analyze all Class 1E and associated cables and their circuits sharing common raceways plus those cables and their circuits which do not maintain the specified separation distance in other locations such as panel interiors and transition between panels and raceways.	PVQC will inspect cables and their circuits to ensure specified separation is met in panels and raceways but evaluation of design separation is not in PVQC scope.
Paragraph 2.4.3.2.3.5	
One example of cable misrouting was identified.	Concerns in this area will be resolved by means of verification of all cable routing.
Paragraph 2.4.3.2.4.5	
Wiring termination discrepancies inside the panels inspected by NET were found but were infrequent and of a minor nature.	Concerns in this area will be resolved by means of review of all documentation and visual inspection.

Task Description	PVQC Response/Action
Paragraph 2.4.3.2.5.5 Findings resulting from NET's inspection of the as-built condition of cable trays and support systems at the Zimmer facility included configuration, bolting, tack weld, and weld deficiencies.	Reference: PVQC Response/Action in Task Descriptions Paragraph 2.4.1.1.5(2).
Paragraph 2.4.3.2.5.5 QCP Task IX personnel have been assigned to perform 100% reinspection of cable tray systems in the control room.	Reference: PVQC Response/Action in Task Descriptions Paragraph 2.4.1.1.5(2).
Paragraph 2.4.3.2.5.5 NET recommends that the applicant take steps to ensure consistency between Kaiser and CG&E inspection activities.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
Paragraph 2.4.3.2.6.5 Based on a number of recorded minor deficiencies, NET recommends that the applicant ensure that the scope of the QCP is sufficient to provide adequate assurance of conduit quality.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2)

Task Description	PVQC Response/Action
Paragraph 2.4.3.3.2.5 NET recommends that the applicant ensure that turnover of instrumentation to operations for preoperational testing will include a comprehensive system walkdown to verify that configurations are complete and acceptable.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
a) Preoperational testing of all instrumentation that had been previously completed should be repeated to demonstrate functionality.	Not within the PVQC scope.

Task Description	PVQC Response/Action
Paragraph 2.4.3.2.6.5	
The NET identifed a number of relatively minor deficiencies in the facility's conduit installation. These deficiencies included labeling, support welding, anchor bolts, loose fastners, broken sections of flex conduit, and a lack of seismic clearance. The occurrence of deficiencies was diffuse, and the overall quality of conduit installation was judged adequate by the NET. All deficiencies identified appeared to be readily correctable.	All concerns in this area will be verified as being acceptable by means of visual inspection.
Paragraph 2.4.3.3.3.5	
1) The applicant should expand the existing program associated with electrical switchgear and panel anchorage shimming to include verification of adequacy of all panel foundation welds for all safety-related switchgear and panels to provide for the required structural integrity.	All concerns in this are will be verified as being acceptable by means of a visual inspection.
2) The applicant must establish a program to verify the installed adequacy of foundation bolting and bolting interconnecting cabinets and modules through engineering evaluations and/or modifications.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2)

Task Description	PVQC Response/Action
Paragraph 2.4.3.4.5 "NET recommends that the applicant inspect electrical system and equipment identification during QCP tasks and turnover walkdown inspections to ensure proper system identification before operations."	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
Paragraph 2.4.3.5 1) NET found that electrical equipment labeling deficiencies were widespread.	
2) NET recommended that panel and equipment foundation bolting inspection be incorporated into the QCP.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
3) NET has recommended that the applicant ensure that the program to conduct final inspections of instrument racks be reviewed to ensure completeness.	
4) The NET recommends that the applicant compare NET's findings with the activities inspected by QCP to obtain added assurance that the scope of the QCP is sufficiently comprehensive.	Reports such as NET, National Board, ASME, 50.55(e), CARs, NCRs, and inspection reports will be addressed during the PVQC.

Task Description	PVQC Response/Action
Paragraph 2.4.3.6(4)	
1) NET recommends that the applicant reinspect those areas of extensive rework to identify equipment in need of repair.	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.5(2).
2) NET recommends that the applicant examine the program for protection of surrounding equipment to lessen damage caused by rework or modifications.	Will be examined under CCP.
Paragraph 2.4.4.1.4(2)(a)	
The applicant should clarify the existing practice of residual heat removal system hanger design not strictly in accordance with ANSI B31.7 intent nor as defined in the FSAR.	Not in the scope of the PVQC program.
Paragraph 2.4.4.1.4 (2b, 3, 5)	
Numerous system supports required in these areas were found by NET to be complete.	Concerns in this category will be resolved by reviewing all documents and visual inspections.

Task Description	PVQC Response/Action
Paragraph 2.4.4.1.4(2B) Corrosion and debris in two valves (F0047B and F052B) indicated poor equipment storage and inadequate inspections before installation.	All concerns in this category will be resolved by means of visual inspection and for selected SSCs, physical inspections.
Paragraph 2.4.4.1.4(3) Numerous arc strikes noted by the NET should "be inspected in the final walkdown inspection as discussed in the RHR walkdown paragraphs" (REF NET Report, Paragraphs 2.4.4.1.4 2a & B).	All concerns in this category will be resolved as being acceptable by means visual inspection.
Paragraph 2.4.4.2.4(6) NET inspection records indicate that design of supports for cable duct assemblies for safety-related incore reactor instrumentation inside the reactor cavity near the CRD mechanisms is grossly inadequate.	Not within the PVQC scope.

Task Description	PVQC Response/Action
Paragraph 2.4.4.2.5(1) The applicant should "review (pipe support) inspection and maintenance procedures and make appropriate revisions to provide additional assurance that deficiencies" such as those recorded by NET [REF: 2.4.4.2.4(7)(d & e)] "are identified and corrected."	Concerns in this category will be verified as being acceptable by review of all inspection and maintenance procedures.
Paragragh 2.4.4.2.5(2) The applicant should "reinspect all QC-accepted, safety-related small bore pipe supports for appropriate weld size and take appropriate remedial actions."	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).
Paragraph 2.4.4.2.5(3) 1) Undersized U-bolts on small bore piping must be subjected to appropriate evaluations and/or modifications. 2) Any generic implications must be addressed accordingly.	Reference: PVQC Response/Action in Task Descripiton Paragraph 2.4.1.1.5(2).

Task Description	PVQC Response/Action
Paragraph 2.4.4.2.5 (4) The applicant should institute a program to provide appropriate temporary supports and/or to restrict construction activities to ensure that excessive loads will not be imposed on unsupported small-bore piping and instrumentation lines.	Not within the PVQC scope.
Paragraph 2.4.4.3.5 (1) 1) "The applicant should establish a program to inspect and review separation of anchor bolts installed before the date of implementation of the current generic separation criteria." 2) "The anchor bolt inspections should cover the various disciplines which used anchor bolts in safety-related applications."	Reference: PVQC Response/Action in Task Description Paragraph 2.4.1.1.5(2).

Task Description	PVQC Response/Action
Paragraph 2.4.4.3.5(2)	
1) "The applicant should initiate an inspection program to randomly sample a minimum of 5% of the total number of safety-related supports with concrete expansion anchor bolts."	Concerns in this category will be resolved by a sample based inspection, review of the documentation and physical inspection of those samples. Deficiency correction is not within the PVQC scope.
2) "Identified deficiencies must be corrected."	
3) "The inspection program should be limited to inspection (NET) of anchor bolt torque."	
Paragraph 2.4.4.3.5(4)	
The applicant should review the adequacy of S&L anchor bolt specification regarding the abandonment of inadequate anchor bolts.	Not within the PVQC scope.
Paragraph 2.4.4.4.5	
"All safety-related piping drawings should be reviewed and revised to reflect the intended valve operator orientation. The review should ensure that the operator orientation in the piping analysis will be properly reflected in he design drawings."	Not within the PVQC scope.

Task Description	PVQC Response/Action
1) "Inspection efforts by the applicant's QC program and system walkdowns must confirm proper valve operator orientation."	All concerns in this category will be resolved by means of a visual inspections.
2) In cases where discrepancies are determined, the impact on the piping system analyses must be determined and any required corrective actons taken."	Not within the PVQC scope.
Paragraph 2.4.5.1.4(2g) The applicant should provide "further evaluation of his procedures and training of radiographic personnel.:	PVQC will review the procedures and training of radiographic personnel.
Paragraph 2.4.5.2.4(2) The applicant should evaluate the sensitized area noted in the recirculation Loop B, pump suction elbow longitudinal weld.	Test and physical inspections will be conducted by PVQC. Evaluation of results is outside PVQC scope.

Task Description	PVQC Response/Action
Paragraph 2.4.5.2.4(2) The applicant should perform additional examinations and evaluations to determine the extend of the martensitic/bainitic structure condition noted by NET.	Test and physical inspections will be conducted by PVQC. Evaluation of results is outside PVQC scope.
Paragraph 2.4.6.5(1) The applicant should retest "electrical protective relays before preoperational testing of diesel generators and associated systems."	Not within the PVQC scope.
Paragraph 2.4.6.5(2a) The applicant should verify the adequacy of the installation of the diesel generator and associated systems.	PVQC will perform documentation and visual inspections.
Paragraph 2.4.6.5(2b) The applicant should develop and implement an adequate inspection and maintenance program for the diesel generator and associated systems.	Not within the PVQC scope.

Task Description	PVQC Response/Action
Paragraph 2.4.7.4 (9 and 10) Mounting bolts on the NET Note 5 Ingersol-Rand pumps and on all similarly mounted safety-related mechanical components should be verified for proper torque. 1) "This bolting should include component to concrete anchorage and, where used, component to mounting plates or flanges." 2) "In addition, as part of the system turnover for preoperational testing, the presence and proper bending of lock tabs; should be verified." 3) "Instances in which deficiencies are found must be reviewed and evaluated/corrected."	Reference: PVQC//Action in Task Description Paragraph 2.4.1.1.5(2) for Paragraph 1 and 2. Not within the PVQC scope.
Paragraph 2.4.8.5(1) "The completion of (HVAC) thermal insulation installation and calibration of the position dampers should be adequately controlled by the final installation inspection procedure, NO. HVAC-6."	Not within the PVQC scope.

Task Description	PVQC Response/Action
Paragraph 2.4.8.5(2a) The applicant should identify (and correct) the will be lack of seven anchor bolts on the west side of filter package 1VC095 (B Train).	All identification of concerns in this category resolved by means of inspection. Correction is not within PVQC scope.
Paragraph 2.4.8.5.(2c) 1) "The applicant must determine that all HVAC equipment meets the (hot spot temperature) requirements assumed in design and take appropriate corrective actions." (NOTE: The acceptance criteria is not clear.) 2) "All HVAC equipment must be reviewed to ensure compliance with this specification and the applicant must take appropriate corrective actions."	Not within the PVQC scope for paragraphs 1 and 2.
Paragraph 2.4.8.5(3c) 1) "Flange bolting design must be re-evaluated for adequacy."	Not within the PVQC scope.
2) "The faulty condition on pinlocks on doors must be rectified before final system turnover."	All concerns in this category will be resolved by means of a visual inspection.

Task Description	PVQC Response/Action
Paragraph 2.4.8.5(4)	
1) The applicant should correct the absence of current calibration stickers for instruments placed in operating service.	Not within the PVQC scope.
2) The instrument group (operations) and quality assurance personnel, as necessary, should establish a frequency schedule for calibration and maintenance. This program should also address other programs such as damaged conduit.	
Paragraph 2.4.9.5	
The applicant should review the interface between operations and construction in relation to responsibility for maintenance and housekeeping. This review should include procedural controls, jurisdiction, and periodic inspections.	Not within the PVQC scope.
Paragraph 2.5	
An independent design audit (of the S&L design process) is recommended to satisfactorily resolve the issue of design adequacy.	Not within the PVQC scope.

APPENDIX H

DESCRIPTION OF PROJECT NONCONFORMANCE PROCEDURE

Existing project procedures for control of nonconformances were reviewed by a site interorganizational committee to determine whether the procedures and methods could be improved. As a result of the committee's review, it was determined that the procedures for documenting and controlling nonconformances and discrepancies should be replaced by a single, project-wide procedure.

A new procedure for controlling and documenting nonconformances is being developed. One prerequisite is that all affected Zimmer project organizations will use this NCR flowpath. They will identify responsibility, by title, for activities in compliance with the new requirements. These requirements comprise the following principal elements:

- Only one form, titled nonconformance report (NCR), shall be used to report, control, disposition, and complete nonconforming items.

- A nonconformance is defined as a deficiency in characteristic, documentation, or procedure that renders the quality of an item unacceptable or indeterminate with respect to project requirements including design criteria and specifications. Examples of nonconformances include physical defects; test failures; incorrect or inadequate documentation;

APPENDIX H (CONTINUED)

and deviations from prescribed processing, inspection, or test procedures.

- Other documents, such as the existing nonconformance reports (NRs), in-process inspection discrepancy reports (IIDRs), and field requests for design change will no longer be used to report nonconformances. NRs and IIDRs that were issued and validated prior to inception of the new NCR procedure, if found to be correct, will be transferred to CCP for processing. If it is determined these reports are incorrect as a result of PVQC, the NRs and IIDRs will be transferred to an NCR for clarification and processing.

- NCRs shall be initiated by those individuals who are assigned the responsibility to perform inspections to verify quality. Typically this includes cognizant field engineers and quality control personnel.

- The cognizant field engineer or quality control person shall be notified by any person who observes or becomes aware of a nonconforming condition. Upon determination that an NCR is warranted, an NCR shall be written, signed, logged and forwarded to the applicable discipline QCE for review and validation.

APPENDIX H (CONTINUED)

- Once an NCR has been logged it cannot be voided. Should it become necessary to discontinue processing the NCR for reasons of redundance, erroneous reporting, or other similar conditions, quality control shall state the basis for the action and sign off the appropriate block with PQCM or PQCE concurrence. No further action is required except for removal of hold tags, final distribution, and filing.

- All nonconforming items shall be segregated, tagged, marked, or appropriately identified to prevent inadvertent use or installation. Only quality control may remove hold tags or other identifiers from the nonconforming items.

- NCRs that have been logged, but not validated, shall be maintained as a quality record with a qualifying statement as to why the NCR was not processed. If the NCR originator disagrees with the decision not to validate the NCR, he has the right of recourse to as high a level of management as necessary to obtain satisfaction. A separate procedure will be issued to explain this method.

- All NCRs shall be reviewed by quality assurance to determine whether the nonconformance is possibly reportable under 10 CFR 50.55(e) or 10 CFR Part 21 in accordance with applicable procedures.

APPENDIX H (CONTINUED)

- During activities under the plan to verify the quality of construction (PVQC), NCRs will be issued, validated, tracked, and trended. Dispositioning of NCRs is not included within the scope of PVQC activities; however, there may be instances where a generic condition is discovered in which a standard resolution can be used for specific occurrences of applicable nonconformances.

  Dispositioning will be performed under the CCP.

APPENDIX I

BECHTEL DOCUMENT CONTROL

Bechtel Document Control (BDC) will establish a Records Center for in-process control of design and quality-related documents required to support the PVQC.

The BDC will be responsible for the the receipt, recording, and issuance of documents. This will include all CG&E and contractor documents. H.J. Kaiser will be responsible to control its ASME Section III quality documents under Bechtel documentation control center supervision and management.

BDC will maintain personnel within the center and will control access to all quality-related document files.

PVQC personnel will be required to acknowledge by signature their receipt of records. A list of personnel authorized to receive records shall be posted at the PVQC Records Center.

Accountability for records shall be maintained by requiring the periodic return of all records to the center. The frequency of returns will be determined by the Records Center Supervisor, and it will not exceed once a week. Provisions will be made in the document review work area to assure the security of records while they are being processed there.

APPENDIX J

PVQC COMPUTER APPLICATIONS

The PVQC has the option of using computer databases that will identify, collect, sort, compare, and status project information and allow variable reporting capability for support of the PVQC effort. Examples of key function databases desired for the PVQC effort include:

- o providing status of PVQC efforts and record PVQC nonconformances
- o relating baseline documentation to systems, structures, and components
- o concerns and previously written nonconformance reports from other reports (for example NET, QJP) to plant SSCs
- o sorting and printing out data to aid in the status determination phase of PVQC

The databases will contain, but not be limited to, the following information for use in the PVQC:

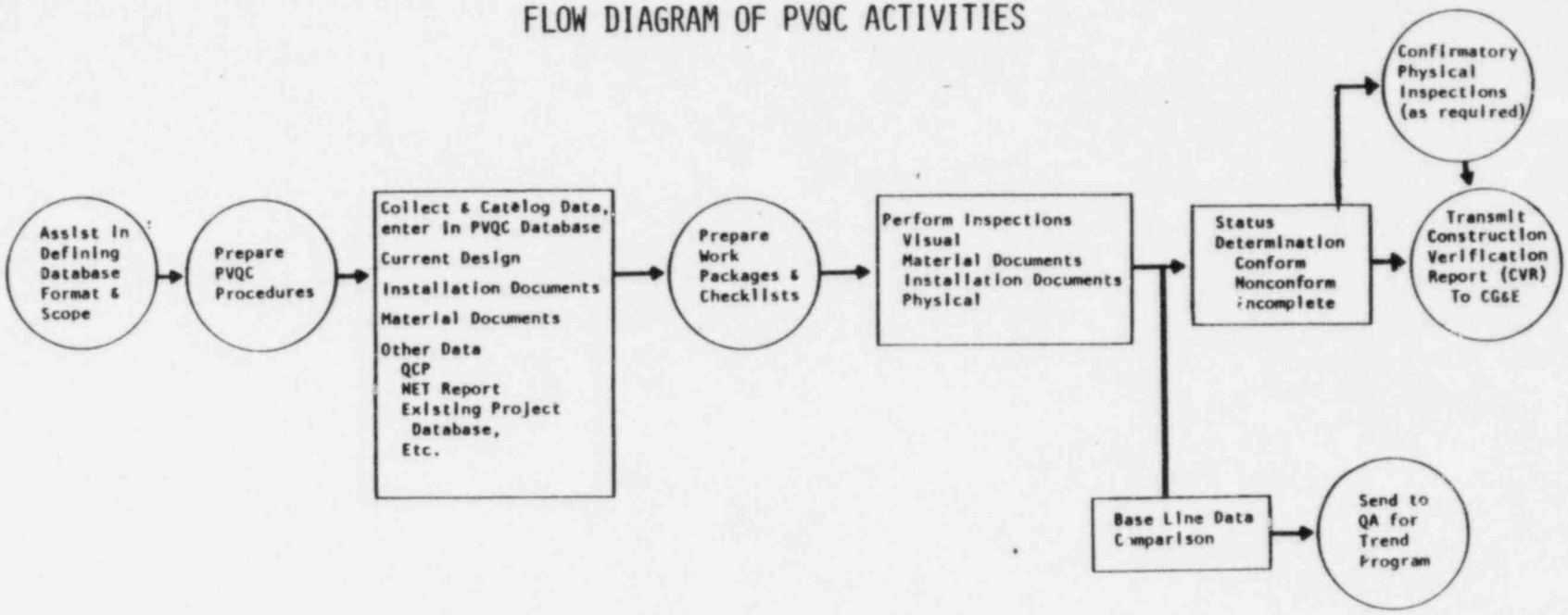
1. System, structure, and component identities including appropriate generic data such as the system, area, elevation, QA/QC requirements, or seismic class
2. Drawing, specification, and document numbers including revision, status, and date
3. Nonconformance and/or deficiency log identities including revision, status, and date
4. Status information regarding PVQC activities (such as date completed)
5. Information on welders and welding data (CWIS)

It will be the intent of PVQC to use the computer to the maximum extent practical to aid in the PVQC effort by replacing manual operations with proven computer applications.

APPENDIX K

FIGUPE 1

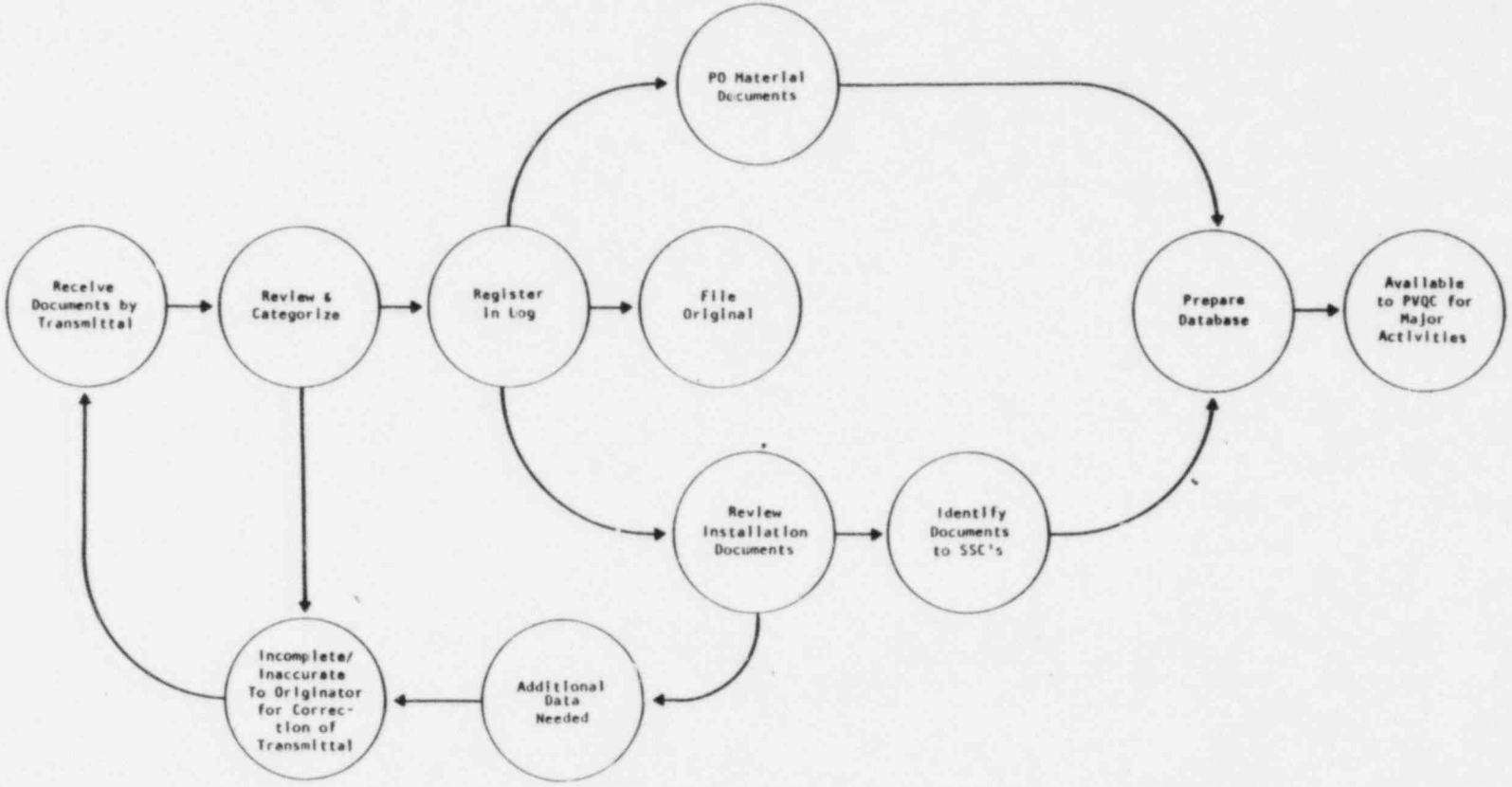
FLOW DIAGRAM OF PVQC ACTIVITIES



APPENDIX K

FIGURE 2

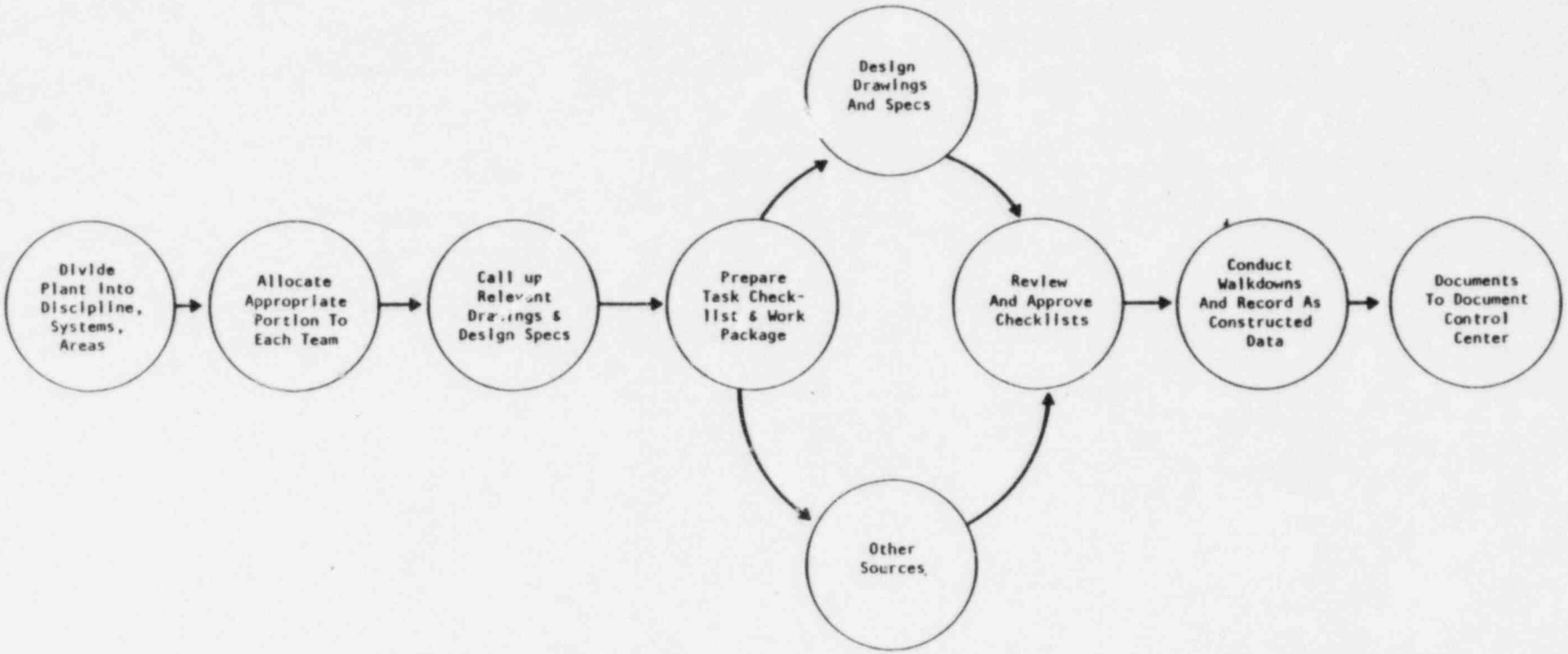
ACQUISITION OF DOCUMENTS



APPENDIX K

FIGURE 3

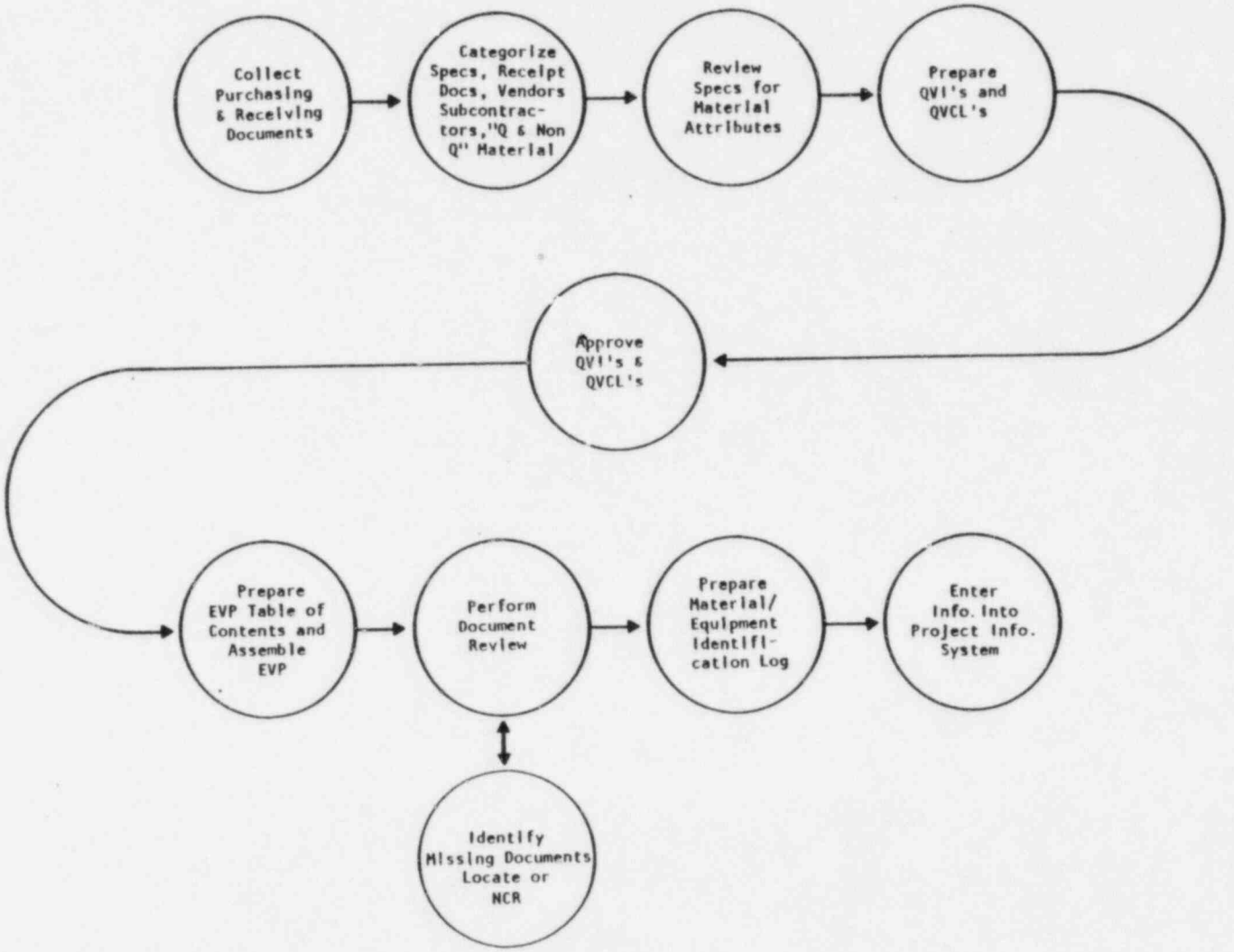
VISUAL INSPECTIONS



APPENDIX K

FIGURE 4

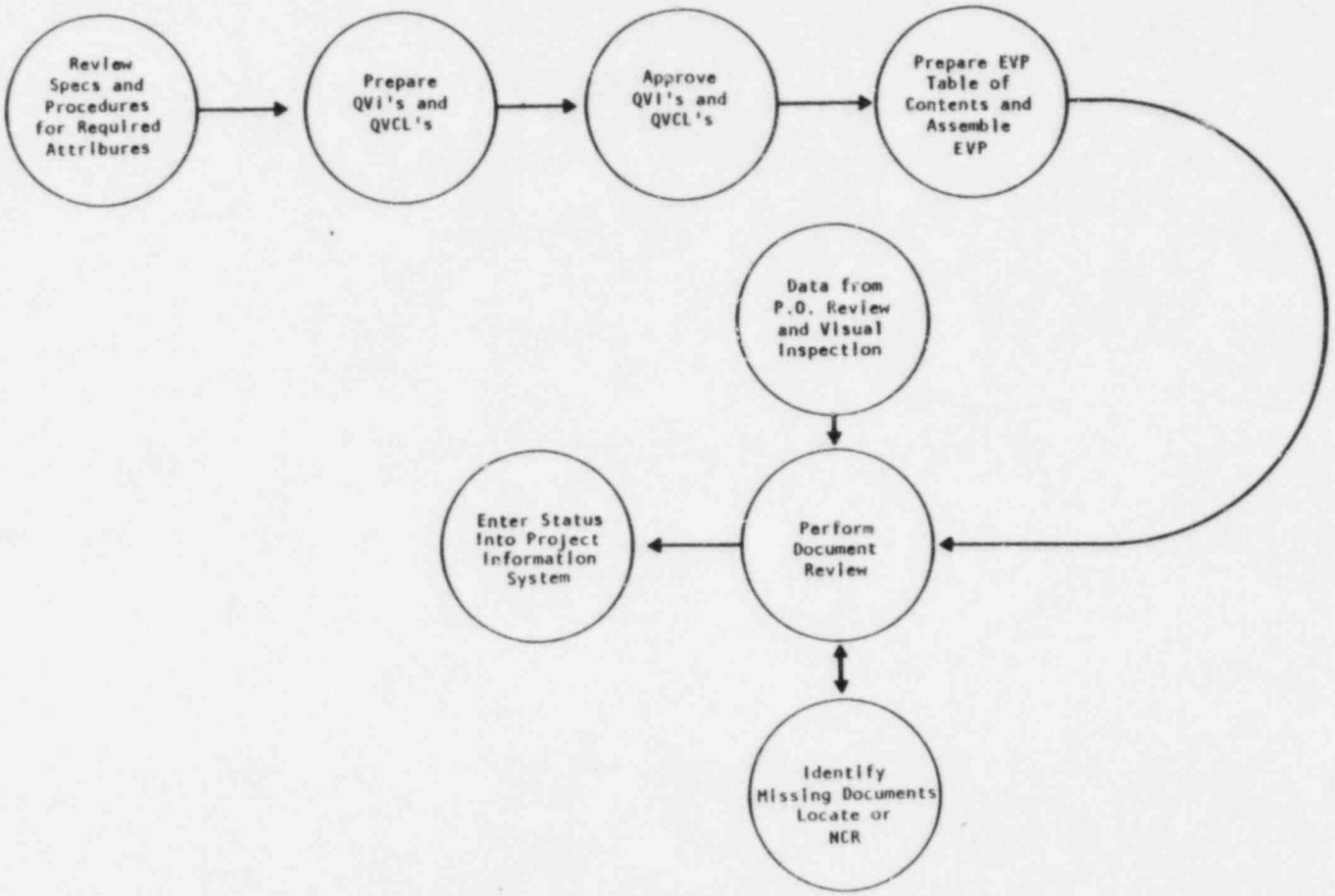
MATERIAL DOCUMENTATION REVIEW



APPENDIX K

FIGURE 5

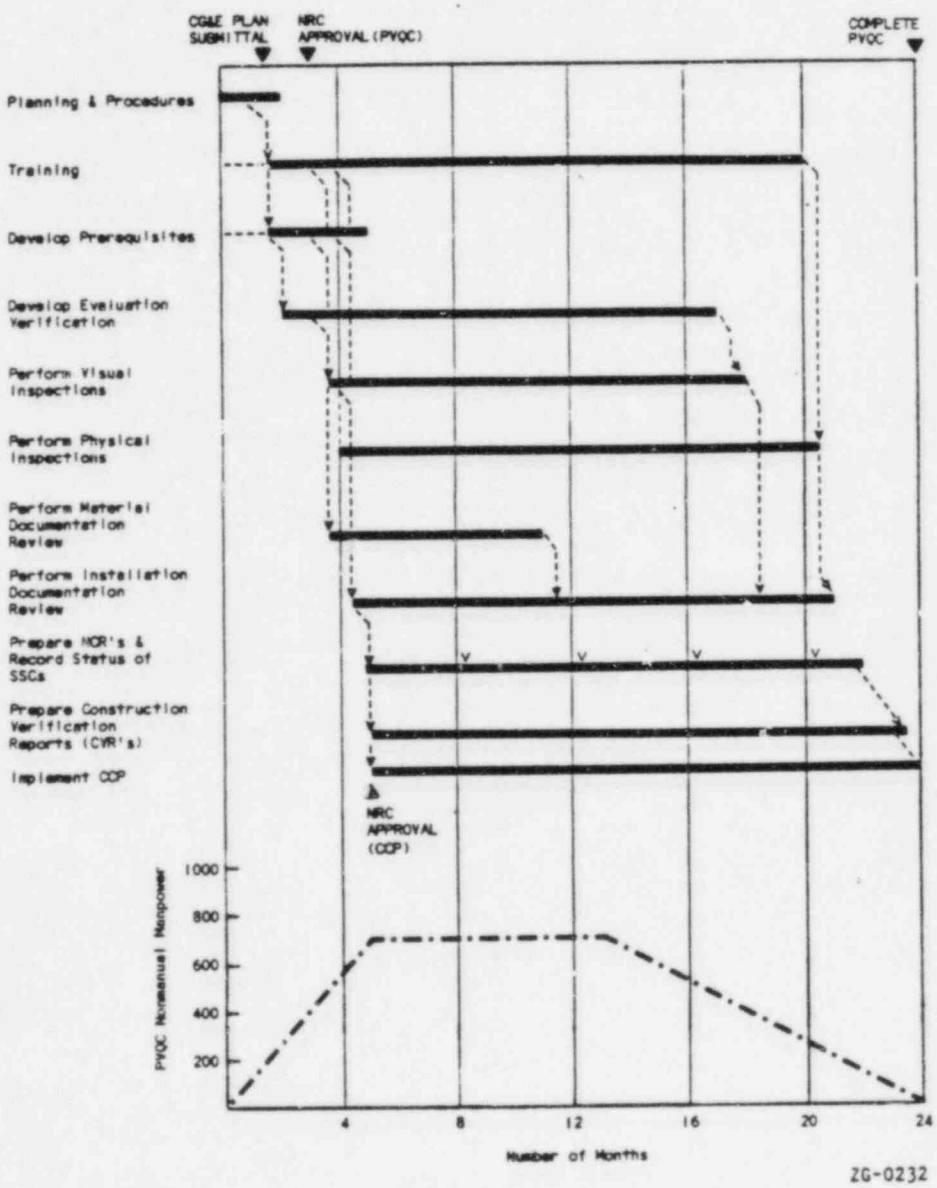
CONSTRUCTION INSTALLATION DOCUMENTATION REVIEW



APPENDIX L

FIGURE 8

PVQC IMPLEMENTATION SCHEDULE



APPENDIX M

PVQC TRAINING MATRIX (SAMPLE FORMAT)

Training Subject	Department/ Discipline	JOB TITLES				
		Field Eng. EE	Const. Super. Mech.	QC Insp. Weld.	QA Auditor	File Clerk
Jobsite Orientation	All	F	F	F	F	F
PVQC Orientation	All	F	F	F	F	F
QA Orientation	All	F	F	F	F	F
Safety Brief	Const.	FD	F	F	N	N
PVQCP ____	Const./EE	F	F	F	N	N
PVQCP ____	Eng./Mech.	F	F	F	N	N
Audit Training	QA	N	N	N	F,J	N
Walkdown Checklist	Const.	FD	F,J	F,J	FD	N
Document Control	Document Control	RO	RO	RO	F	N

LEGEND

N - Not Required
RO - Read Only
RR - Read and Review
F - Formal Training
J - On-the-Job Training
FD - Formal Training Delayed

APPENDIX N

INITIAL SYSTEMS, AREAS, AND COMPONENTS TO BE VERIFIED

Note: This program may be modified based on constraints identified during implementation of the PVQC.

Priority	Sub-Priority	Comments
1. Drywell	A. Structural steel	Review by elevation priority as follows: 1. El. 525 2. El. 535 3. El. 546/561 4. El. 572 5. El. 583 6. El. 590
	B. 2-1/2" & over pipe & welds C. 2-1/2" & over pipe supports D. 2" & under pipe & welds E. 2" & under pope supports F. Instrumentation G. Electrical H. HVAC I. Grating J. Bio-shield doors K. Painting L. Reflective insulation	Review in start-up system sequence as follows: 1. Residual heat removal (RH) 2. Control rod drive (RD) 3. Feedwater (FW) 4. Mainsteam (MS) 5. Reactor recirc. (RR) 6. Nuclear boiler (NB) 7. R.B. clsd clg water (WR) 8. Control rod pos. ind. (PI) 9. Fuel pool clg. (FC) 10. Reactor wtr. cleanup (RT) 11. Reactor core isol. clg. (RI) 12. High press. core spray (HP) 13. Low press. core spray (LP) 14. Standby liquid control (SC)
2. NSS & ECC systems (Outside drywell)	Service water (WS) Residual heat removal (RH) Control rod drive (RD) Feedwater (FW) Mainstream Reactor recirc (RR) Nuclear boiler (NB) R.B. clsd. clg. water (WR) Control rod pos. ind. (PI) Fuel pool cooling (FC)	Review in following order of commodity 1. 2-1/2" & over pipe & welds 2. 2-1/2" over pipe supports 3. 2" & under pipe, welds & supports 4. Instrumentation 5. Electrical 6. Civil/structural as required
3. Balance of essential systems	See Comments	Final integrated project schedule will be issued later.

APPENDIX O

PROBLEM RESOLUTION MATRIX

CONSTRUCTION INSTALLATON DOCUMENTATION	AS-CONSTRUCTED STATUS AS DETERMINED BY PVQC INSPECTION	COMPONENT NOT IN PLACE	COMPONENT CONSTRUCTION IN PROGRESS(2)	COMPONENT STATUS SAME AS CURRENT DESIGN DOC	COMPONENT STATUS NOT THE SAME AS CURRENT DESIGN DOC	
Installation documentation not available		I.W.	I.W./NCR(4)	NCR	NCR	I.W. = Incomplete Work(1)
Installation documentation incomplete		I.W.(3)	I.W./NCR(4)	C	NCR/I.W.	C = Complete Installation Documentation(5) or NCR
Installation documentation complete but inconsistent with as-constructed condition		I.W.(3)	NCR	NCR	NCR	NCR = Nonconformance
Installation documentation complete and accurate with as-constructed condition		I.W.(3)	I.W.	Conformance	I.W./NCR	

1. "Incomplete Work" will require new inspection documentation.

2. "Construction in Progress" is defined as obvious construction activity taking place at the time of the show cause and stop work order issuance.

3. Documentation to support the removal of the component must exist.

4. Such components are nonconforming if construction installation documentation should, but does not, exist for the completed portions of the component.

5. There may be cases where a component has been completed, but has not yet received an inspection, thereby rendering the installation documentaiton incomplete. In such cases, an inspection may be performed under PVQC and the construction installation documentation completed.

APPENDIX P

SPECIFIC EXAMPLES OF PHYSICAL TESTING METHODS

The following are examples of methods that can be explored to determine the acceptability of inaccessible material or material surfaces that are not exposed for visual examination. Three cases were considered (1) ASME III buried or embedded pipe, (2) concrete structures, and (3) electrical equipment.

1) ASME III Buried or Embedded Pipe

Available methods for visual internal pipe examination of inaccessible installations range from fiber optics units to T.V. cameras. These methods provide visual two dimensional inspection. For large diameter pipe visual internal examination may be performed by placing inspection personnel in the pipe (limited by physical conditions, pipe configuration and safety regulations). Personal visual inspection can be enhanced while in the pipe by use of a T.V. camera that allows more qualified personnel visual access from outside and produces tape record of the evaluation process and use of plastic impressions of questionable areas that can be processed as negatives to produce positive replicas for outside evaluation and future reference.

Physical inspections such as liquid penetrant, magnetic particle, eddy current, in-place metallography, ultrasonic examination (would require developement of unique procedures), and field metal analysis equipment (portable spectrometer) can be used to evaluate material grade and acceptability. In addition, destructive examinations such as scrapings and small diameter plugs can be removed for chemical analysis. Larger pipe wall material samples, above 2" x 2", can be removed for mechanical property testing. These methods would require engineering evaluation of the extent to which applicable codes or standards permit repairs and modifications (e.g. may require an ASME code case).

Different methods of gaining access to the pipe such as through valves (disassemble the valve allowing access through valve), small or identical branch connections (access through an accessible branch), limited excavation and open ended lines will be utilized.

Preliminary analysis of embedded and buried safety-related pipe indicates a total of 3678 linear feet and 845 welds in the service water cycled condensate and fuel pool cooling and cleanup systems. In total, this represents less than .4% of the total piping on the project. Of this total less than 500 linear feet are embedded in concrete. All of this piping is for low pressure service with a design pressure less than 200 psig. A program to perform an early documentation review of this inaccessible pipe is being developed so that the condition of weld and material traceability and quality is known at an early date.

APPENDIX P (CONTINUED)

2) Concrete Structures

Available physical verification techniques are: 1) hammer testing to locate prior consolidation areas, hollow/voids and poor repair work; 2) concrete strength tests such as Schmidt Hammer, Winsdor Probe, or selected core samples (e.g., 2" size which is destructive but can be repaired easily); 3) rebar location by use of sonic and/or radar units (not suitable for use in congested rebar areas), some of these units may distinguish between different size bars such as a #8 or #11 but not necessarily between #10 and #11 bars; 4) some radiographic methods could be developed that would have limited application for providing a definable rebar pattern. Application limits are based on source size, concrete thickness, and accessibility.

3) Electrical Equipment:

Available physical verification techniques are: 1) Megger testing for motors and electrical cable, 2) use of time domain reflectometer to identify discontinuity, 3) signal tracing to determine cable routing 4) high potential testing for capacity testing of equipment such as transformers; and 5) oil test(s) of electrical equipment oil reservoirs for conductivity and chemical residue that may indicate a breakdown of internal components.