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PACIFIC GAS AND ELECTRIC COMPANY

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J. O. SCHUYLER
VICE PRESIDENT
NUCLEAR POWER GENERATION

February 17, 1984

PGandE Letter No: DCL-84-068

Mr. John B. Martin, Regional Administrator
U. S. Nuclear Regulatory Commission, Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596-5368

Re: Docket No. 50-275, OL-DPR-76
Diablo Canyon Unit 1
SSER 21 Items 61 and 102

Dear Mr. Martin:

Enclosed is PGandE's partial response to NRC questions on SSER 21 items 61 and 102, regarding the design control process. Enclosure 1 to this letter describes the design control process for the Diablo Canyon Power Plant. Enclosure 2, which describes the method for assuring closure of completed work, and Enclosure 3, which provides responses to questions raised at the January 19, 1984, exit interview will be transmitted on February 21, 1983.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

John B. Schuyler

J. O. Schuyler

Enclosures

cc: D. G. Eisenhut
H. E. Schierling
Service List

ENCLOSURE 1

DESIGN CONTROL PROCESS

During the NRC's investigations of SSER 21 items 61 and 102 in January 1984, PGandE was requested by the NRC to provide a history of the design control process at Diablo Canyon. This enclosure furnishes PGandE's response to the request.

Historical Development

During the initial design and construction phase of Diablo Canyon, final approved drawings (original and revisions) were prepared by PGandE's Engineering Department and issued to the Construction Department for implementation of construction. Any subsequent design changes were documented by a description of the change in the revision block on the design drawing. During the early construction period, the Engineering Department adopted a method to identify the reason for initiating the change. Each design change was also identified by ballooning (i.e., drawing cloud-like circles) around the change on the drawing. The Construction Department was responsible for issuing the drawings to the contractor responsible for implementing the work and for assuring that the work was completed in accordance with the approved drawings. PGandE formally documented requirements for this process when it issued initial design control quality assurance procedures in June 1970. These procedures were designated PRE 2 and PRE 3 in the Quality Assurance Manual.

During the 1970's Construction kept Engineering informed of status and completion via project schedules, telephone conversations, memoranda, monthly status reports, and site tours with Engineering personnel. Construction work was completed either in accordance with the issued drawings or, alternatively, as-built information was formally returned to Engineering for acceptance.

Between late [illegible] and mid-1974, the Engineering Department developed a procedure entitled "Engineering Change Order" (ECO), to improve control of the design change process. This procedure was adopted by June 1974 for mechanical/nuclear and electrical work. The procedure contained instructions for revising design drawings for Engineering approval. The ECO required the following documentation:

1. Description of the change
2. Purpose of the change
3. Drawings affected by the change
4. Approval of the ECO prior to drawing revision and issuance.

This documentation identified the involved discipline(s) and was sequentially numbered, logged, and tracked by the Project Engineer's office. The ECO was also used to advise Construction of pending changes and to transmit approved design change sketches to Construction so work could continue while a drawing was being revised.

In June 1978, with the issuance of the Engineering Manual, the ECO was replaced by the Design Change Notice (DCN). The DCN process, as defined in Engineering Manual Procedure 3.6, "Design Change," is essentially a refinement of the ECO process. The DCN improved upon the ECO by:

1. Requiring more extensive review, coordination, and approval prior to issuance of the design change

2. Stating the reason for the change

3. Allowing delegation to Construction to initiate and approve design changes, which would be followed by Engineering concurrence.

Like ECOs, DCNs were numbered, logged, and tracked by the Project Engineer's office and their implementation documentated on construction schedules. The DCNs were the primary means by which Engineering makes drawing revisions. The DCN identified the scope of work to be accomplished. In addition, the DCN allowed Construction to proceed as portions of the design are completed in order to permit more efficient use of construction manpower.

The following example illustrates a situation where construction proceeded while a DCN was being revised. In the case of electrical work, an electrical conduit layout is the first construction activity after the system (schematic) design has been completed. Typically, the first revision of a DCN would be issued for Construction to install the conduit. Depending on the amount of work involved, several revisions may be required for conduit and equipment layout. The next construction activity involves wire placement, and may require another revision to the DCN. The final revision(s) would cover electrical schematics and wire terminations. Throughout this process, Construction may also initiate revisions to resolve interferences from other construction activities.

Development of Current Program

In April 1980, PGandE established the Nuclear Power Generation Department to consolidate the management and operation of its nuclear power plants under one organization. This department became the interface between engineering and construction activities at DCPP. With the exception of certain piping designs, designs were issued by Engineering and transmitted to the Nuclear Projects (NP) group within the Nuclear Power Generation Department. Nuclear Projects then transmits the design to Construction.

In early 1981, PGandE formed a task force to research and develop a system that would incorporate changes in the design control process to accommodate the demands of an operating plant. The task force was comprised of individuals from all affected PGandE organizations including Engineering, Construction, Quality Assurance, Nuclear Projects, and Plant Operations.

The guidelines for this program were developed after reviewing TMI requirements, PGandE commitments, and the need for controlling the as-built documentation during operation of the plant. As an initial step in developing the system, the task force surveyed other utilities to determine how they were meeting these requirements. After reviewing the responses, the task force modeled the procedures after those developed by Duke Power Company.

Description of Current Program

In May 1982, Nuclear Power Generation Procedure W606, "Plant Modification Follower," was issued . This procedure identified the requirements and responsibilities for controlling as-built documentation. In July 1982, Engineering Procedure EMP 3.60N, "Design Changes for Operating Nuclear Power Plants," was issued. These procedures established a method for ensuring that all construction and other activities were complete prior to finalization and issuance of design drawings to Operations. As part of this process, a configuration control system was implemented to ensure that no design drawings would be issued unless:

1. Safety questions in the design were reviewed and resolved
2. Construction was completed
3. Construction was accepted by Operations and Engineering
4. As-built documentation was maintained, controlled, and assembled until the revised design drawings were issued.

Under this process all designs changes were issued as discipline design change packages rather than design drawings. Construction would work only to the design package. Any revision to the design package would be completely self contained, i.e. it would not require reference to previous revisions. The task force recognized that this was a significant modification to the design change process. Accordingly, those DCNs that had been issued prior to the new procedure were "grandfathered"; that is, they were revised without superseding all previous revisions. However, all other requirements of Procedure 3.60N would have to be met.

Construction activities were henceforth conducted using only the DCN design package rather than using approved issued drawings as was done prior to the issuance of EMP 3.60N. Engineering issued DCN design packages containing approved sketches which were identified to the DCN and to the drawing on which the design would be incorporated. Occasionally, the same sketch was issued with different design packages to make a self-contained design package for the contractor to complete the work without reference to other documents. This methodology was chosen so that, until the modification was completed, the Operations Department possessed only drawings which reflected the actual plant configuration. The design sketches attached to DCNs are generally controlled by the creation of a "master" drawing from the original drawing. DCN changes are made on the master, and the change is converted to a sketch with an alpha-numeric revision number. This master allows Engineering to maintain a composite of all changes affecting a drawing. Engineering uses both a Records Management System (RMS) and DCN tracking logs sorted by drawing number to assist in controlling design changes.

The RMS is a computer-based document storage and retrieval system that contains a list of issued drawings. When a DCN is issued for construction, any drawing to be revised is "flagged" in the RMS to show that a DCN is outstanding.

Originally, DCNs were tracked by a manual DCN log. In May 1982, this system was converted to the computer-based, real time DCN tracking system which greatly expanded the tracking process. The current DCN tracking system allows for tracking of DCNs from inception through final closeout.

The flow chart attached to EMP 3.60N shows the detailed activities of the engineering process and provides a general overview of Construction and Operations activities. Implementation of the DCN process by Construction is detailed in Project Instruction PI 17, "Document Control Operating Instructions." Implementation of the process by Operations is detailed in Administrative Procedure, AP C-1 S1, "Onsite Review and Handling of Plant Modifications." The overall DCN process is summarized as follows:

1. Engineering completes and approves a design package by discipline, and transmits it to Nuclear Plant Operations in San Francisco (NPO-SF).

2. NPO-SF reviews the DCN, completes the written safety evaluation, and transmits the DCN package to NPO at Diablo Canyon (NPO-DC).

3. NPO-DC reviews the package for operational requirements (e.g., additional training), obtains the Plant Staff Review Committee (PSRC) approval of the safety evaluation, and assigns and transmits the work to Construction.(1)

4. Construction Document Control makes distribution to the responsible groups. The Construction Resident Engineer assigns the work responsibility to a contractor and monitors the work. After the work has been completed, Construction routes the completed package (including as-builts) to all Resident Engineers for review and sign-off. After Construction verifies that all construction activities (including construction testing) have been completed, the package is transmitted back to NPO-DC.

5. NPO-DC reviews the returned package for operational acceptability, distributes the design sketches within NPO for use in operating the plant, and returns the package to Engineering.

6. Engineering reviews and accepts the package (including any as-builts and minor revisions) before relying upon the change to perform its safety function. Engineering incorporates the information into design drawings, and then approves and issues the drawings.

7. NPO-DC receives and distributes the design drawings to replace the design sketches which accompany the DCN.

In 1979, as required by EMP 3.7, NPO-DC and Engineering jointly identified the drawings necessary to safely maintain and operate the plant. These drawing were identified as Priority I, and Engineering committed to issuing these drawings within thirty days after receipt of the completed design package from NPO in accordance with EMP 3.60N. During this limited period, NPO-DC relies upon the DCN package to represent the as-built condition of the plant.

Project Procedure W606, which was issued in May 1982, allowed the use of Minor Revisions to the DCN to facilitate construction. Minor Revisions were

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approved by Construction or Operations under their respective delegation of design authority. In addition, the Plant Engineer reviewed the Minor Revision for safety implications. The Minor Revisions process was authorized by Construction Procedure PI-11 in July 1982.

When the use of Minor Revisions began, Engineering recognized that it should be the approval authority for evaluating the criteria to allow use of the Minor Revisions. The Project Procedures were revised in August 1983 to require Engineering approval of Minor Revisions.

Minor Revisions are attached to and noted on the design package. Although Minor Revisions are initially approved at the site, the complete design package is reviewed and accepted by Engineering prior to relying on the structure, system, or component to perform its intended safety function.

During the verification program, Constructon was asked to review all DCNs issued prior to promulgation of EMP 3.60N to verify that the work had been completed. (These DCNs are easily identifiable since the numbering system was changed with the implementation of EMP 3.60N.) Revisions to those DCNs that were "grandfathered" under EMP 3.60N were also easily identifiable since they were required to have a Plant Modification Follower (PMF) attached. The PMF documents completion of all Engineering, Construction, and Operation activities. Construction documented completion of work using the DCN tracking system. This documentation process was formalized in DCP Project Procedure III-10, which was issued on November 2, 1983. This procedure requires that all of the DCNs that Construction had not verified as completed be returned and documented under the requirements of EMP 3.60N.

The design control process for Diablo Canyon has evolved in response to changing interpretations of standards and new requirements. The evolving process described above provides assurance that the design change process was adequately controlled.

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J. O. SCHUYLER
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NUCLEAR POWER GENERATION

February 25, 1984

PGandE Letter No: DCL-84-75

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(Previously Provided in
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The design control process for Diablo Canyon has evolved in response to changing interpretations of standards and new requirements. The evolving process described above provides assurance that the design change process was adequately controlled.

ENCLOSURE 2

METHOD FOR ASSURING COMPLETION OF WORK

During the NRC's investigation of items 61 and 102, PGandE was requested to provide a description of how PGandE assured that contractors had completed the work assigned to them. This enclosure furnishes PGandE's response to the request.

PGandE has monitored and documented the completion of construction activities by different methods through the construction phase. This process is comprised of four basic components for assuring that work was complete.

1. The quality assurrance requirements in the construction specifications required the contractors to develop in-process and final installation inspection programs. These included requirements for PGandE approval of the procedures and established the quality documentation requirements. These inspection activities have been monitored and audited continuously by PGandE.

2. PGandE and the contractors maintained schedules and reporting systems to monitor and report status of completion on a bulk basis. As work progressed to closure, the schedules became increasingly detailed, which allowed for a clear identification of outstanding work activities. Generally, these schedules were a matrix between construction disicplines and plant systems. PGandE assigns construction engineers and inspectors to monitor the contractors' work and report on work status and progress. Generally, the ratio between and PGandE inspectors and the contractor work force ranged between 15 and 20 percent, which provided accurate detailed reporting.

   When systems, subsystems, or components were essentially complete, punch lists were established and maintained by both PGandE and the contractors based on records review and plant walkdown. In 1978, this system was enhanced by the implementation of a computer-based task tracking system. Completion of work for systems, subsystems, or components was indicated by closure of all outstanding tasks and punch list items.

   Certain categories of work, such as installation of the Nuclear Steam Supply System components and preparation of lifts for concrete pours, required PGandE inspection sign-off on work travelers prior to proceeding to the next construction activity or release to PGandE. These records have been retained.

   Coupled with this work status monitoring system was a contractor work completion notice system. Construction items such as piping installation, wire installation and termination, and equipment installation were released by written notice to PGandE from the contractors. Even though these records were not considered quality-related, most of them have been retained. The quality documents

generated during construction which testify to proper installation in accordance with specifications, drawings, and design requirements were retained.

3. The releases (described in Item 2 above) provide the basis for performing the construction testing to prove proper installation. Construction testing consists of electrical megger tests, electrical dry run tests, instrument loop tests, instrument calibration, and hydrostatic tests. The tests are performed in accordance with procedures and systems that are in place to assure completion of all required tasks. These tests are documented and their completion allows release to the startup organization for testing.

4. The startup group performs tests to demonstrate performance as specified by system descriptions and design criteria. These documented test procedures and results are reviewed and accepted by Operations prior to release from Construction.

Further, as discussed in Enclosure 1, during the design verification program, Construction was asked to review all DCNs issued prior to promulgation of EMP 3.60N (July 1982) to verify that the work had been completed. Construction documented completion of work using the DCN tracking system. This review provides further assurance that work associated with all DCNs was completed.

These methods provide confidence that construction has been completed as specified by design. Further, this program has been reinforced by the Corrective Action Program described in the Phase I Final Report as well as recent changes made in the system used to verify work completion. The Corrective Action Program included verification of construction for many classes of work performed prior to 1982, such as piping and supports, equipment installations, raceway supports, HVAC supports, and structural installation. In 1982, systems were expanded to assure that the contractors verify, in writing, that all construction work has been completed.

ENCLOSURE 3

RESPONSE TO QUESTIONS RAISED BY THE NRC

During the NRC exit interview on January 19, 1984, at Diablo Canyon, several questions were raised relating to design control. A restatement of the NRC questions and items of interest, along with PGandE's response follow.

1. The NRC requested PGandE to determine if minor revisions of Design Change Notices have been applied properly.

   PGandE Response:

   The Project procedures allowed minor changes to design as needed to correct design discrepancies and to facilitate construction, as long as the intent of the original design is maintained. The NRC provided three specific DCN examples where the use of minor revisions may represent possible deviations from the intent of the procedure. PGandE has reviewed these three DCNs and reached the following conclusions.

   In one case, the use of minor revisions was considered a deviation from the intent of the procedure which governs whether a minor revision can be used or a DCN revision is required. The minor revisions to the other two DCNs were deemed to be consistent with the requirements for revisions; however, there were minor procedural inconsistencies in the documentation. A review of these three DCNs and other applications of minor revisions to DCNs indicates that such applications have, at times, exceeded the intent of the minor revision procedure. PGandE has initiated a Nonconformance Report (NCR). To prevent a further recurrence of deviations from the design process, the use of DCN minor revisions was eliminated. A Technical Review Group has determined cause, investigated generic implications, reached resolution, established corrective action to prevent recurrence, and reviewed reportability aspects. This deviation is not considered to constitute a reportable occurrence.

   Moreover, this deviation does not have any safety significance because all DCNs, including minor revisions, are returned to Engineering as a design package for review and acceptance. This review and acceptance occurs before the system, structure, or component can be placed into operation to perform its intended safety function. Minor revisions to a DCN are reviewed against criteria and calculations to establish acceptability. Additional calculations are performed as necessary to show compliance with criteria. If a minor revision lacks clarity, Engineering contacts the Onsite Project Engineering Group or Construction to obtain additional information or reviews the installation at the plant site.

2. The NRC requested PGandE to describe the method used to assign the quality assurance requirements to the DCNs issued in 1981 for replacement of Barton transmitters. In addition, the NRC requested a description of the method used to determine completion of this activity.

PGandE Response:

The DCNs issued for replacement of the Barton transmitters identified the specific instruments to be replaced and the instruments to be installed. The DCNs identified this work to be safety related. The instrumentation schematic drawings, which are provided under controlled distribution to all contractors that perform instrument-related work, identified the instruments as Class 1. This work was assigned to the H. P. Foley Company by either a Work Request or a Field Change Order and the DCNs were provided to Foley through the construction drawing control system. Since the installations are clearly identified as safety-related, the PGandE Engineering QA/QC program was applied to design and procurement, and the contractor's QA/QC program, as mandated by contract specification, was applied to installation work.

The installation activities were determined to be complete either upon receipt by PGandE of the Work Request from the contractor which verifies work completion, or upon verification of completion by PGandE field inspection. The construction activities were identified as complete upon documentation of completion of testing and release to the startup organization. The startup activities were identified as complete upon completion of testing and acceptance of the test procedures and results by Operations .

3. The NRC requested PGandE to determine if there is a need to maintain a cross-reference between DCNs and contractor Work Requests, since PGandE documents work completion by DCN, and contractors document work completion by Work Request.

PGandE Response:

PGandE concurs that a formal cross-reference between Work Requests and DCNs would facilitate documentation assembly, auditing, and inspection activities. Therefore, starting January 23, 1984, all new and currently active Work Requests are cross-referenced to the DCN and maintained in the computer-based DCN tracking system. This process does not alter current systems and programs for work assignment and documentation since they provide adequate control.

4. The NRC requested PGandE to review the use of Work Requests and determine if they should be classified as quality-related documents.

PGandE Response:

Review of Work Requests has revealed that, although these documents contain quality requirements, such requirements for work performance are also contained in other documents which are provided to the contractor by controlled distribution. Examples of the other documents are specifications, drawings, contracts, Contract Change Orders, and DCNs. However, since the Work Requests do contain quality requirements, action has been taken by PGandE to identify and control these Requests as quality documents. This action is addressed by PGandE NCR DCO-84-SC-N004.

TWB

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PACIFIC GAS AND ELECTRIC COMPANY

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Re: Docket No. 50-275, OL-DPR-76
Docket No. 50-323
Diablo Canyon Units 1 and 2
Control Room Ventilation and Pressurization System

Dear Mr. Martin:

Mr. Phil Morrill of your office requested that Pacific Gas and Electric Company identify the design and construction status of Design Change Notice (DCN) DCO-EE-446. This DCN involves the Control Room Ventilation and Pressurization Systems (CRVPS). The status is given below.

The design associated with this DCN is complete and in compliance with all applicable criteria. Construction and startup testing are complete and responsibility for the CRVPS has been transferred to PGandE's Nuclear Plant Operations. All as-builts have been accepted and incorporated in the Priority 1 drawings. The revised drawings have been approved and are now in the process of reproduction and distribution. Incorporation of design changes on Priority 2 drawings is now in process.

A small amount of cable, approximately 80 feet, will require replacement to resolve a traceability concern identified in Contractor Nonconformance Report (CNCR) No. 8802-1015. Replacement will require responsibility for a portion of the system to be transferred from Nuclear Plant Operations to Construction. Repair, testing activities and CNCR resolution are scheduled to be completed by February 15, 1984.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

J O Schuyler

cc: Service List

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PACIFIC GAS AND ELECTRIC COMPANY

PG&E + 77 BEALE STREET • SAN FRANCISCO, CALIFORNIA 94106 • (415) 781-4211 • TWX 910-372-6587

J. O. SCHUYLER
VICE PRESIDENT
NUCLEAR POWER GENERATION

CANCER

February 7, 1984

PGandE Letter No.: DCL-84-045

FILE WITH ALLEGATION 61412

Mr. John B. Martin, Regional Administrator
U. S. Nuclear Regulatory Commission, Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596-5368

Re: Docket No. 50-275, OL-DPR-76
Docket No. 50-323
Diablo Canyon Units 1 and 2
Control Room Ventilation and Pressurization System

Dear Mr. Martin:

Mr. Phil Morrill of your office requested that Pacific Gas and Electric Company identify the design and construction status of Design Change Notice (DCN) DCO-EE-446. This DCN involves the Control Room Ventilation and Pressurization Systems (CRVPS). The status is given below.

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Sincerely,

J O Schuyler

cc: Service List

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Ltr
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PACIFIC GAS AND ELECTRIC COMPANY

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J. O. SCHUYLER
VICE PRESIDENT
NUCLEAR POWER GENERATION

February 17, 1984

PGandE Letter No.: DCL-84-066

Mr. John B. Martin, Regional Administrator
U. S. Nuclear Regulatory Commission, Region V
1450 Maria Lane, Suite 210
Walnut Creek, CA 94596-5368

Re: Docket No. 50-275, OL-DPR-76
Docket No. 50-323
Diablo Canyon Units 1 and 2
Control Room Ventilation and Pressurization System

Dear Mr. Martin:

In PGandE Letter No. DCL-84-045, dated February 7, 1984, it was stated that approximately 80 feet of cable required replacement to resolve a traceability concern identified in Contractor Nonconformance Report (CNCR) No. 8802-1015.

The generation of the CNCR and the question of traceability was due to an error made in documenting the cable reel number from which the cable was taken. The correct Class 1E color-coded cable had been used but exact reference to the reel which it came from was lost.

The cable in question has been replaced with traceable cable and the CNCR has been closed.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

J. O. Schuyler

cc: Service List
G. W. Knighton

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