DEC 17 1981

Gentlemen:

As you know, considerable regulatory attention has focussed on the serious quality assurance problems that have been identified at a number of nuclear power plants under construction. Congressional hearings have been held recently concerning these problems and the NRC is considering whether special actions need to be taken at plants under construction to confirm that quality assurance requirements in design and construction have been met.

Because of the importance being given to these issues, I am enclosing a number of documents which I hope you will find useful in evaluating the effectiveness of your overall quality assurance program. I will try to keep you informed of ongoing developments as they affect your facility.

Sincerely,

Original signed by
A. Bert Davis

James G. Keppler
Regional Administrator

Enclosures:
1. NRC Order Suspending Diablo Canyon License
2. Letter from Denton to PG&E re: Diablo Canyon Design Verification
3. Summary of Zimmer Investigation and Notice of Violation
4. Zimmer Quality Confirmation Program
5. NRC Testimony before the House Subcommittee on Energy and the Environment
6. Chairman Palladino's Remarks to the AIF - 12/1/81

RIII	RIII	RIII	RIII
Streeter/np	Spessard	Davis	for Keppler
12/16/81	12/16/81	12/17	12/17

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DEC 17 1981

Docket No. 50-358

Cincinnati Gas and Electric
Company
ATTN: Mr. Earl A. Borgmann
Senior Vice President
Engineering Services and
Electric Production
139 East 4th Street
Cincinnati, OH 45201

Gentlemen:

As you know, considerable regulatory attention has focussed on the serious quality assurance problems that have been identified at a number of nuclear power plants under construction, including your Wm. H. Zimmer Nuclear Power Station. Congressional hearings have been held recently concerning these problems and the NRC is considering whether special actions need to be taken at plants under construction to confirm that quality assurance requirements in design and construction have been met.

Because of the importance being given to these issues, I have sent a number of related documents to holders of power reactor operating licenses and construction permits within Region III with the hope that they will find them useful in evaluating the effectiveness of their overall quality assurance programs. For your information, copies of those documents are

IE31

enclosed. I will try to keep you informed of ongoing developments as they affect your facility.

Sincerely,

Original signed by
A. Bert Davis

James G. Keppler
Regional Administrator

Enclosures:
1. NRC Order Suspending Diablo Canyon License
2. Letter from Denton to PG&E re: Diablo Canyon Design Verification
3. Summary of Zimmer Investigation and Notice of Violation
4. Zimmer Quality Confirmation Program
5. NRC Testimony before the House Subcommittee on Energy and the Environment
6. Chairman Palladino's Remarks to the AIF - 12/1/81

cc w/o encls:
J. R. Schott, Plant Superintendent
Resident Inspector, RIII
Harold W. Kohn, Power Siting Commission
Citizens Against a Radioactive Environment
Helen W. Evans, State of Ohio

RIII	RIII	RIII	RIII
Streeter/np	Spessard	Davis	for Keppler
12/16/81	12/16/81	12/17	12/17

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DESIGNATED ORIGINAL

Certified By Nancy A. Prescott

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Victor Gilinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of	)	
PACIFIC GAS AND ELECTRIC COMPANY	)	Docket No. 50-275 OL
(Diablo Canyon Nuclear Power Plant, Unit 1)	)	

ORDER SUSPENDING LICENSE

CLI-81-30

1. On September 21, 1981, the Nuclear Regulatory Commission ("Commission" or "NRC") authorized the NRC staff to issue a license to Pacific Gas and Electric Company ("PG&E") for fuel loading and the conduct of tests at up to 5% of rated power at the Diablo Canyon Nuclear Power Plant Unit 1, CLI-81-22, 14 NRC ____. On September 22, 1981, the NRC staff issued such a license. License No. DPR-76. In taking these actions the Commission found that it was in the public interest to allow effectiveness, and the NRC staff found that the applicant was in compliance with NRC regulations and construction permit requirements relevant to the licensed activity.

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ENCLOSURE 1

2. In late September 1981, in the course of responding to a special NRC request for information, an error in the seismic design of equipment and piping in the containment annulus of Diablo Canyon Unit 1 was detected by PG&E and reported to the NRC. PG&E committed to postpone loading of fuel until the matter was resolved satisfactorily and initiated a reanalysis of portions of the seismic design of the facility. As a result, a number of different additional errors were found. Based upon information supplied by PG&E, and recent NRC staff inspections conducted at the offices of PG&E and URS/John A. Blume and Associates ("Blume") in San Francisco, Report Nos. 59-275/81-29 and 50-323/81-18, the NRC staff identified serious weaknesses in PG&E's quality assurance program. More specifically:

a. the PG&E quality assurance program did not appear to effectively exercise control over the review and approval of design information passed to and received from Blume,

b. the PG&E quality assurance program did not appear to adequately control the distribution of design information from Blume within affected internal PG&E design groups, and

c. the PG&E quality assurance program did not appear to define and implement adequate quality assurance procedures and controls over other service-related contracts.

3. This new information indicates that, contrary to statements made in PG&E's operating license application, certain structures, systems, and components important to safety at the plant may not be properly designed to withstand the effects of earthquakes, and further indicates that violations of NRC's regulations in 10 CFR Part 50, Appendix B have occurred. Had this information been known to the Commission on or prior to September 22, 1981, Facility License No. DPR-76 would not have been issued until the questions raised had been resolved.

4. Accordingly, the Commission suspends PG&E's license to load fuel and conduct tests at up to 5% of rated power pending satisfactory completion of the actions specified in attachment 1 to this Order. In furtherance of this, PG&E is hereby ordered to show cause pursuant to 10 CFR 2.202 and 50.100, why Facility License No. DPR-76 should not be suspended pending satisfactory completion of the actions specified in attachment 1, insofar as it authorizes fuel loading and other operation of Diablo Canyon Nuclear Power Plant Unit 1. Further, the Commission finds pursuant to 10 CFR 2.202(f) that, because it is now uncertain as to the extent which structures, systems, and components important to safety of fuel loading and testing at up to 5% of rated power will in fact withstand the effects of earthquakes, and because of the seriousness of the violations, the public health, safety and interest require that this Order be

immediately effective. Within 20 days of the date of this Order, PG&E may file a written answer to the Order under oath or affirmation and may demand a hearing. The issues to be addressed in any answer or hearing shall be whether the matters specified in paragraphs 2 and 3 are true and whether, as a consequence, the license should have been suspended as provided in this paragraph.

A separate statement by Commissioner Roberts is attached.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 19th day of November, 1981.

November 19, 1981

SEPARATE DISSENTING OPINION OF COMMISSIONER ROBERTS

I agree with the reverification program imposed on PG&E in this Order. I disagree, however, with two aspects of the action taken by the majority of the Commission today. First, I believe that suspension of the Diablo Canyon fuel load and low power license, without the opportunity for a prior hearing and the opportunity to cure provided by the Atomic Energy Act, the Administrative Procedures Act, and the Commission's regulations, is unwarranted in light of the minimal threat to the public health and safety that exists at this time and in light of the Commission's duty to exercise its emergency remedial powers responsibly. Second, I believe that the procedures outlined in this Order calling for the comments of adversary parties to the operating license proceeding on (1) the companies proposed by PG&E to undertake the reverification program and (2) the scope and acceptability of the proposed reverification program evidence an abnegation of the Commission's responsibility to use its technical expertise to assess independently and impartially any errors that may have occurred at the facility.

While there is no question that the Commission may suspend a license for false statements in the license application or for a violation of the Commission's regulations, the Commission has, in the past, held itself to a standard of exercising its emergency powers carefully and with due regard for taking action commensurate with the magnitude of the risk posed to the public health and safety. This is so because emergency actions "can radically and summarily affect the rights and interests of others, including licensees and those who depend on their activities." Licensees Authorized to Possess or Transport Strategic Quantities of Special Nuclear Material, CLI-77-3, 5 NRC 16, 20 (1977). Thus, in the past, "the Commission has said that if risks to the public are identified, the Commission must determine their magnitude and take appropriate remedial action." Petition for Emergency and Remedial Action, CLI-78-6, 7 NRC 400, 405 (1978) (emphasis added). Violation of a regulation does not, by itself, result in a requirement that a license be suspended. Id.

A wide range of remedial actions are available to the Commission. In this case, the Commission could have continued to rely on PG&E's written commitment not to take actions authorized by its license until PG&E had completed to the Staff's satisfaction the program required by

the Staff.[1/] Alternatively, the Commission could have inserted a technical specification[2/] or a license condition into the license to prevent fuel load. Finally, the Commission could have provided PG&E an opportunity for a prior hearing and an opportunity to cure before deciding whether to suspend the license.

In order to illustrate the severe and precipitous nature of the Commission's decision to suspend, it is important to note some of the facts before the Commission but omitted from the majority opinion. An underpinning of the Commission's September 21 Order authorizing issuance of the fuel load and low power license is the low risk that would be entailed by activities under this license. At present, fuel has not yet been loaded into the Diablo Canyon Unit 1 core and PG&E has committed in writing not to commence fuel load until it has received the concurrence of the Commission's Staff. Additionally, the Commission has two resident inspectors assigned to the site to monitor PG&E's activities. As the fuel intended for Unit 1 has not been loaded into the core and as assurance exists that it will not be loaded until satisfactory resolution of the present issues, minimal risk to the public exists at the present time.

1/ It is not the Commission's experience that licensees have taken action contrary to a written commitment such as that involved here. This is due, in part, to the Commission's extensive power to take summary action if a licensee rescinds its commitment. To illustrate this, I note that the Commission recently filed a motion opposing a request for an injunction of the Diablo Canyon low-power license in Jaffer v. Brown, No. 81-5878 (9th Cir., filed November 4, 1981) which stated: "The discovery of a series of errors in portions of the engineering analysis has forced deferral of the implementation of the low-power license by Pacific Gas and Electric. No action under the license will be undertaken until problems at the facility are resolved to the NRC's satisfaction." Thus, as a practical matter, the Commission's reliance on PG&E's written commitment is not unreasonable and the Commission has so stated in court as recently as November 10.

2/ To the extent that the Commission needs to take any legal action, it is important to note that under the present technical specifications and license, the risk to the public is minimal because PG&E can load fuel but cannot change the plant status to above a cold shutdown condition (Mode 5). This is because of Section 1.19 of the Diablo Canyon Unit 1 Technical Specifications which provides the following definitior of OPERABLE-OPERABILITY:

> A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s) and when all necessary attendant instrumentation, controls, electric power, cooling and seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component or device to perform its function(s) are also capable of performing their related support function(s). (footnote continued)

With regard to my second point of disagreement, the Commission has decided to request the comments of adversary parties to the operating license proceeding on (1) the companies proposed by PG&E to implement the reverification program and (2) the scope and acceptability of the reverification program. The Commission is under a duty as an independent regulatory agency to identify any errors which may have been made, to assess what risk, if any, to the public health and safety exists, and to determine what measures need to be taken so that the Commission has reasonable assurance that the public health and safety is protected. Incorporation of adversary parties into this reverification process is an abnegation of the Commission's responsibility to fulfill its duties independently and impartially.

2/ (continued)
In view of the above definition and references to it throughout the Limiting Conditions For Operation in the Unit 1 Diablo Canyon Technical Specifications, the licensee is legally precluded from entering into operational modes above cold shutdown (Modes 1, 2, 3 and 4) because systems technically affected by the seismic design error would not meet the definition for OPERABLE-OPERABILITY. For example, the supports for the containment fan coolers which may be affected by the mirror image error are addressed in section 3.6.2.3 "Containment Cooling System." This section reads as follows:

> At least two independent groups of containment fan coolant units shall be OPERABLE with a minimum of two units to one group and one unit to the other group.

Since, in view of the known potential design errors, the Containment Cooling System might not be capable of performing its specified function. Therefore, the licensee would be legally obliged to remain in a cold shutdown condition.

Attachment 1

1. Provide the following information for NRC review:

For All Seismic Service-Related Contracts Prior to June 1978

(a) The results of an independent design verification program on all safety-related activities performed prior to June 1, 1978 under all seismic-related service contracts utilized in the design process for safety-related structures, systems and components.

Information concerning this program should address quality assurance procedures, controls and practices concerning the development, accuracy, transmittal, and use of all safety-related information both within PG&E and within each contractor's organization, as well as the transmittal of information between PG&E and each contractor. It should also include performance of a suitable number of sample calculations related to each contract to verify the adequacy and accuracy of the design process for affected safety-related structures, systems and components. The information to be provided concerning this design

verification program should be based on and include the following program elements.

(1). A review of all quality assurance procedures and controls used by each pre-June 1978 seismic service related service contractor and by PG&E with regard to that contract; a comparison of these procedures and controls with the related criteria of Appendix B to 10 CFR 50; and an identification of any deficiencies or weaknesses in the quality assurance procedures and in controls of the contractor and PG&E.

(2). Development of a network for the design chain for all safety-related structures, systems, and components involved. This should include all interfaces where design information was transmitted between PG&E internal design groups and each contractor.

(3). A review of the implementation of quality assurance procedures and controls used by and for:

- PG&E internal design groups,

- each contractor internal design group(s),

- transmittal of information between PG&E and each contractor,

- transmittal of contractor developed information within PG&E; and

identification of any deficiencies or weaknesses in the implementation of quality assurance procedures and controls by each contractor and by PG&E.

(4). Development of criteria for the conduct of this design verification program should consider the relevant guidelines contained in ANSI N45.2.11, Section 6.3.1.

(5). Development of criteria for selection of a suitable number and type of sample calculations related to the design of safety-related structures, systems and components involved. The purpose of these sample calculations should be to

verify the design process, particularly in the areas of any identified contractor or PG&E quality assurance weaknesses or deficiencies as determined from the procedure and implementation reviews discussed in steps 1 through 3 above. Criteria for expanding the sample size when problems in verification are encountered should also be developed.

(b) A technical report that fully assesses the basic cause of all design errors identified by this program, the significance of design errors found, and their impact on facility design.

(c) PG&E's conclusions on the effectiveness of this design verification program in assuring the adequacy of facility design.

(d) A schedule for completing any modifications to the facility that are required as a result of this program. For modifications that you propose not completing prior to fuel load, the bases for proceeding should be provided.

2. The following information shall be provided for NRC review and approval. NRC will make its decision on these proposed companies after providing the Governor of California and Joint Intervenors in the pending operating license proceeding 15 days for comment.

Qualifications of Companies Proposed To Conduct Independent Reviews

A description and discussion of the corporate qualifications of the company or companies that PG&E would propose to carry out the independent design verification program discussed in 1 above, including information that demonstrates the independence of these companies.

3. As soon as practicable following NRC approval of the company or companies to conduct the independent design verification program, the following information shall be provided for NRC review and approval. NRC will make its decision on the acceptability of the program plan after providing the Governor of California and Joint Intervenors in the pending operating license proceeding 15 days for comment.

Program Plan For The Design Verification Programs

A detailed program plan for conducting the design verification programs discussed in 1 above. The

information provided should include the bases for the criteria proposed to be used for selection of a suitable number and type of sample calculations to be performed under these programs and the bases for the criteria proposed to be used for expanding the sample size based upon the results of the initial samples.

4. Status Reports

Starting on Friday, November 27, 1981, and continuing while the suspension is in effect, a semi-monthly status report on the second and fourth Friday of each month, on all of the ongoing reanalyses efforts and design verification programs being conducted by and for PG&E, including but not limited to the program referred to in paragraph 1, should be submitted to the Regional Administrator, Region V and the Director, Office of Nuclear Reactor Regulation.

5. NRC Review

Prior to authorization to proceed with fuel loading, the NRC shall be satisfied with the results of the seismic design verification program referred to in paragraph 1, and with any plant modification resulting from that program that may be necessary prior to fuel loading. The NRC may impose additional requirements prior to fuel loading necessary to protect health and safety based upon its review of the program or any of

the information provided by PG&E pursuant to paragraph 4. This may include some or all of the requirements specified in the letter to PG&E, dated November 19, 1981.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 19, 1981

Docket No. 50-275

Mr. Malcolm H. Furbush
Vice President - General Counsel
Pacific Gas & Electric Company
P. O. Box 7442
San Francisco, California 94120

Dear Mr. Furbush:

SUBJECT: DIABLO CANYON UNIT 1 - INDEPENDENT DESIGN VERIFICATION PROGRAMS

The Commission's Memorandum and Order (CLI-81-30) dated November 19, 1981 suspends your license to load fuel and operate Diablo Canyon Unit 1 at power levels up to 5% of full power, and specifies the programs that must be satisfactorily completed before license suspension will be lifted.

Also, based upon recent NRC inspections conducted at PG&E and the Blume Offices in San Francisco, the NRC staff has identified a number of serious Quality Assurance (QA) program weaknesses related both to the errors in the Unit 1 seismic design and to the implementation by PG&E of applicable criteria of Appendix B of 10 CFR Part 50. We have preliminarily concluded that:

a. the PG&E QA Program did not appear to effectively exercise control over the review and approval of design information passed to and received from Blume.

b. the PG&E QA Program did not appear to adequately control the distribution of design information from Blume within affected internal PG&E design groups, and

c. The PG&E QA Program did not appear to define and implement adequate quality assurance procedures and controls over other service-related contracts particularly in the pre-June 1978 time period.

Accordingly, you are required to provide the following additional information, under oath or affirmation, for NRC review and consideration prior to issuance of any operating license authorizing operation of Diablo Canyon Unit 1 above 5% power:

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ENCLOSURE 2

1. For All Non-Seismic Service - Related Contracts Prior to June 1978

   (a) The results of an independent design verification program of all safety-related activities performed prior to June 1, 1978 under all non-seismic service contracts utilized in the design process for safety-related structures, systems and components.

   Information concerning this program should address quality assurance procedures, controls and practices concerning the development, accuracy, transmittal, and use of all safety-related information both within PG&E and within each contractor's organization, as well as the transmittal of information between PG&E and each contractor. It should also include performance of a suitable number of sample calculations related to each contract to verify the adequacy and accuracy of the design process for affected safety-related structures, systems and components. The information to be provided concerning this design verification program should be based on and include the results of conducting the program elements set forth in Enclosure A.

   (b) A technical report that fully assesses the basic cause of all design errors identified by this program, the significance of design errors found, their impact on facility design.

   (c) PG&E's conclusions on the effectiveness of this design verification program in assuring the adequacy of facility design.

   (d) A schedule for completing any modifications to the facility that are required as a result of this program. For modifications that you propose not completing prior to operations above 5% power, the bases for proceeding should be provided.

2. For PG&E Internal Design Activities

   (a) The results of an independent design verification program of PG&E internal design activities performed on Diablo Canyon Unit 1 related to the development of the design of a suitable sample of safety-related structures, systems or components. The extent of the information provided related to this program should be that which is necessary to determine whether the overall PG&E quality assurance procedures and controls described in its QA Manual and associated procedures since 1970, have been fully and effectively implemented. This information should also include a suitable number of sample calculations to verify the adequacy and accuracy of the PG&E internal design activities for the sample of safety-related structures, systems, or components. The information to be provided concerning this design verification program should be based on and include the results of conducting the program elements set forth in Enclosure B.

(b) A technical report that fully assesses the basic cause of all design errors identified by this program, the significance of design errors found, and their impact on facility design.

(c) PG&E's conclusions on the effectiveness of this design verification program in assuring the adequacy of facility design.

(d) A schedule for comp'eting any modifications to the facility that are required as a result of this program. For modifications that you propose not completing prior to operations above 5% power, the bases for proceeding should be provided.

3. For All Service-Related Contracts Post-January 1, 1978

(a) The results of an independent design verification program of a suitable sample of the activities performed on Diablo Canyon Unit 1 by each service-related contractor that were completed subsequent to January 1, 1978 related to the development of the design of safety-related structures, systems and components. The extent of the information provided related to this program should be that which is necessary to determine whether the overall contractor and PG&E quality assurance procedures and controls that were in effect during this time period were fully and effectively implemented. This information should also include a suitable number of sample calculations to verify the adequacy and accuracy of the sample contractor and PG&E design activities for safety-related structures, systems and components. The information to be provided concerning this design verification program should be based on and include the results of conducting the program elements set forth in Enclosure C.

(b) A technical report that fully assesses the basic cause of all design errors identified by this program, the significance of design errors found, and their impact on facility design.

(c) PG&E's conclusions on the effectiveness of this design verification program in assuring the adequacy of facility design.

(d) A schedule for completing any modifications to the facility that are required as a result of this program. For modifications that you propose not completing prior to operations above 5% power, the bases for proceeding should be provided.

In addition to the above, we require that you provide the following information for NRC review and approval as soon as practicable.

4. Qualifications of Companies Proposed To Conduct Independent Reviews

   A description and discussion of the corporate qualifications of the company or companies that PG&E would propose to carry out the various independent design verification programs discussed in 1 through 3 above, including information that demonstrates the independence of these companies.

NRC will make its decision on these proposed companies after providing the Governor of California and Joint Intervenors in the pending operating license proceeding 15 days for comment.

As soon as practicable following NRC approval of the company or companies to conduct the various independent design verification programs, you should also provide the following information for NRC review and approval.

5. Program Plan For the Design Verification Programs

   A detailed program plan for conducting the various design verification programs discussed in 1 through 3 above. The information provided should include the bases for the criteria proposed to be used for selection of a suitable number and type of sample calculations to be performed under these programs and the bases for the criteria proposed to be used for expanding the sample size based upon the results of the initial samples. In addition, the criteria for selecting the sample safety related structures, systems and components and sample contractor activities in the design verification programs under 2 and 3 above should be provided.

NRC will make its decision on the acceptability of the program plan after providing the Governor of California and Joint Intervenors in the pending operating license proceeding 15 days for comment.

To keep the NRC currently informed regarding your progress on the items discussed in 1 through 3 above, you are required to provide semi-monthly status reports on the ongoing reanalysis efforts and design verification programs being conducted by and for PG&E. These status reports should be submitted on the second and fourth Friday of each month to the Regional Administrator, Region V and the Director, Office of Nuclear Reactor Regulation. Should these reports or any other information that becomes available to the NRC indicate that the NRC requirements described in this letter should be expanded or supplemented, PG&E will be promptly informed.

In the interest of efficient evaluation of your submittals, we request that you submit as soon as practicable a response to the request for additional information that was enclosed in the Staff's Meeting Summary dated October 19, 1981, on the October 14-16 meetings with PG&E.

Sincerely,

Harold R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosures:
As stated

cc: See Next Page

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ENCLOSURE A

Elements Which Should be Included in the Design Verification Program of Non-Seismic Service Related Contracts Prior to June, 1978

1. A review of all quality assurance procedures and controls used by each pre-June 1978 non-seismic service contractor and by PG&E with regard to that contract; a comparison of these procedures and controls with the related criteria of Appendix B to 10 CFR 50; and an identification of any deficiencies or weaknesses in the quality assurance procedures and in controls of the contractor and PG&E.

2. Development of a network for the design chain for all safety-related structures, systems, and components involved. This should include all interfaces where design information was transmitted between PG&E internal design groups and each contractor.

3. A review of the implementation of quality assurance procedures and controls used by and for:

   - PG&E internal design groups,
   - each contractor internal design group(s),
   - transmittal of information between PG&E and each contractor,
   - transmittal of contractor developed information within PG&E; and

an identification of any deficiencies or weaknesses in the implementation of quality assurance procedures and controls by each contractor and by PG&E.

4. Development of criteria for the conduct of this design verification program should consider the relevant guidelines contained in ANSI N45.211, Section 6.3.1.

5. Development of criteria for selection of a suitable number and type of sample calculations related to the design of safety related structures, systems and components involved. The purpose of these sample calculations should be to verify the design process, particularly in the areas of any identified contractor or PG&E quality assurance weaknesses or deficiencies as determined from the procedure and implementation reviews discussed in steps 1 through 3 above. Criteria for expanding the sample size when problems in verification are encountered should also be developed.

ENCLOSURE B

Elements Which Should be Included in the Design Verification Program of PG&E Internal Design Activities

1. A review of all quality assurance procedures and controls used by internal PG&E design groups by selecting for detailed examination certain safety related structures, systems or components as representative samples of the overall facility design. A comparison of the PG&E procedures and controls used for the sample structures, systems or components with the related criteria of Appendix B to 10 CFR 50; and an identification of any deficiencies or weaknesses in these PG&E quality assurance procedures and controls.

2. Development of a network for the design chains for the sample structures, systems or components involved. This should include all interfaces where design information was transmitted between internal PG&E design groups.

3. A review of the implementation of quality assurance procedures and controls used in the design of the sample structure, systems or components by internal PG&E design groups, and an identification of deficiencies or weaknesses in the implementation of quality assurance procedures and controls by internal PG&E design groups.

4. Development of criteria for the conduct of this design verification program should consider the relevant guidelines contained in ANSI N45.211, Section 6.3.1.

5. Development of criteria for selection of a suitable number and type of sample calculations related to the design of the sample structures, systems or components involved. The purpose of these sample calculations should be to verify the design process, particularly in the areas of any identified PG&E quality assurance weaknesses or deficiencies as determined from the procedure and implementation reviews discussed in steps 1 through 3 above. Criteria for expanding the sample size when problems in verification are encountered should also be developed.

ENCLOSURE C

Elements Which Should be Included in the Design Verification Program of Service-Related Contracts After January 1, 1978

1. A review of quality assurance procedures and controls used by each post January 1, 1978 contractor and by PG&E with regard to that contractor by selecting for detailed examination certain activities of the contractor as representative samples of the entire activities carried out; a comparison of the procedures and controls used by the contractor and PG&E for the sample activities with the related criteria of Appendix B to 10 CFR Part 50; and an identification of any deficiencies or weaknesses in the quality assurance controls of the contractor and PG&E

2. Development of a network for the design chain for the structures, systems or components involved with the sample activities. This should include all interfaces where design information was transmitted between PG&E internal design groups and each contractor.

3. A review of the implementation of quality assurance procedures and controls used in the conduct of the sample activities by and for:

   - o PG&E internal design groups,
   - o each contractor internal design group(s),
   - o transmittal of information between PG&E and each contractor,
   - o transmittal of contractor developed information within PG&E; and

an identification of any deficiencies or weaknesses in the implementation of quality assurance procedures and controls by each contractor and by PG&E.

4. Development of criteria for the conduct of this design verification program should consider the relevant guidelines contained ir ANSI N45.211, Section 6.3.1.

5. Development of criteria for selection of a suitable number and type of sample calculations related to the sample activities involved. The purpose of these sample calculations should be to verify the design process, particularly in the areas of any identified contractor or PG&E quality assurance weaknesses or deficiencies as determined from the procedure and implementation reviews discussed in steps 1 through 3 above. Criteria for expanding the sample size when problems in verification are encountered should also be developed.

SUMMARY OF ZIMMER INVESTIGATION

REASON FOR INVESTIGATION

On November 18, 1980, a former Quality Control (QC) Inspector for the Wm. H. Zimmer Nuclear Power Station contacted NRC Region III (RIII) and provided allegations concerning quality assurance (QA) program implementation at Zimmer. The individual was interviewed and an investigation of these allegations began in early 1981.

On January 5, 1981, the Government Accountability Project of the Institute for Policy Studies (a non-government agency), on behalf of Thomas Applegate, requested that the Merit Systems Protection Board investigate the conduct of an earlier investigation by RIII of allegations provided by Applegate. A list of nineteen allegations, many of them new, was included in the GAP letter.

Region III initiated an investigation of the above matters. The NRC's Office of Inspector and Auditor was assigned the task of determining the quality of the earlier investigation by RIII.

SUMMARY OF FACTS

Since January 12, 1981, the U.S. Nuclear Regulatory Commission (NRC) has been investigating alleged quality assurance and quality control irregularities at the Zimmer nuclear facility. This investigative effort is comprised of four areas as follows: (1) allegations received on November 18, 1980, from a former Quality Control Inspector working at another construction site; (2) allegations received in January 1981 from the Government Accountability Project of the Institute for Policy Studies on behalf of Thomas Applegate; (3) allegations received from numerous contractor workers and former plant workers during the course of the investigation; and (4) other problems identified by NRC inspectors during the course of the investigation. The allegations, the investigation findings and conclusions, and the items of noncompliance identified during the investigation are briefly described in the table at the end of this summary.

The investigative effort, which is still ongoing, has thus far resulted in the interviews of over 90 individuals. The investigation and NRC independent measurements have resulted in the expenditure of approximately 350 staff days onsite by NRC personnel and NRC contractor personnel. Although the investigation is continuing, a report covering efforts to date is being issued at this time in recognition of the public interest in this matter.

In a related matter, the Government Accountability Project, in a letter to the Merit Systems Protection Board of the U.S. Office of Personnel Management, dated December 10, 1980, charged that NRC had failed to perform a thorough and complete investigation into allegations made in February 1980 by Applegate and requested a separate investigation into that matter. An investigation has been performed by the NRC Office of Inspector and Auditor to review those charges.

The current investigation has identified a number of quality assurance related problems at the Zimmer site. The majority of the problems identified to date focus on the ineffectiveness of controls implemented by the

licensee and its contractors for assuring the quality of work performed. In that regard, numerous deficiencies have been found concerning: false records, traceability of materials, harassment/intimidation of Quality Control Inspectors, handling of nonconformances, and the licensee's overview of ongoing work.

Based on these findings, consideration was given to the need to suspend construction activities. However, recognizing the nature of the problems disclosed (largely programmatic), and the fact that ongoing work would not compromise the ability to accurately determine the quality of completed work, it was concluded that halting construction activities was not required. Rather, attention was placed on establishing controls to assure the quality of ongoing and future work and to define a program to both confirm the quality of completed work and correct any identified deficiencies.

Following a meeting with NRC on March 31, 1981, the utility implemented several actions to correct identified quality assurance weaknesses and to preclude their recurrence. These actions, which included augmented QA staffing, upgraded procedures, improved training of QC Inspectors, reinspection (100%) by the licensee of contractor QC inspections, and other QC and QA program improvements were confirmed in an Immediate Action Letter to the licensee on April 8, 1981.

By letter dated May 11, 1981, the Government Accountability Project requested the Regional Director to recommend suspension of the construction permit because of repeated noncompliances with NRC regulations and numerous allegations of inadequate construction practices. The information provided was carefully considered; however, it was concluded that there was insufficient basis to recommend such action.

The impact of the identified quality assurance deficiencies on the actual construction has yet to be determined. Limited independent measurements were performed by the NRC in selected areas of concern in an attempt to characterize the actual safety significance of these deficiencies. Although a few problems requiring corrective action were identified, the majority of the tests and examinations disclosed no hardware problems.

Recognizing the significant quality assurance problems identified during this investigation, the NRC has required the licensee to establish a comprehensive Quality Confirmation Program to determine the quality of plant systems important to nuclear safety. The NRC will confirm the adequacy of the licensee's program and is making additional independent verifications. Deficiencies identified by these programs will require resolution prior to issuance of an Operating License.

ZIMMER INVESTIGATION

Appendix A

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTIES

Cincinnati Gas and Electric Company
Wm. H. Zimmer Nuclear Power Station

Docket No. 50-358
Construction Permit No. CPPR-88
EA 82-12

As a result of the investigation conducted at the Wm. H. Zimmer Nuclear Power Station in Moscow, Ohio, on January 12 - October 9, 1981, the violations listed below with multiple examples were identified. The numerous examples of the violations demonstrate your failure to exercise adequate oversight and control of your principal contractors, to whom you had delegated the work of establishing and executing quality assurance programs, and thereby fulfill your responsibility of assuring the effective execution of a quality assurance program. Your failure manifested itself in a widespread breakdown in the implementation of your quality assurance program and caused the NRC to require an extensive quality confirmation program to provide confidence that safety-related structures, systems, and components will perform satisfactorily in service. Included in the breakdown were findings we consider to be particularly disturbing relating to false records and harassment and intimidation of quality control inspectors.

Because of the significance of not having complete and accurate records, not maintaining a work atmosphere where quality assurance personnel are not harassed or intimidated, and not assuring implementation of an effective quality assurance program which identifies and corrects construction deficiencies, and in accordance with the Interim Enforcement Policy, 45 FR 66754 (October 7, 1980), the Nuclear Regulatory Commission proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended, ("Act"), 42 U.S.C. 2282, and 10 CFR 2.205 in the amounts set forth for the violations listed below.

A. 10 CFR 50, Appendix B, Criterion XVII states, in part, "Sufficient records shall be maintained to furnish evidence of activities affecting quality."

Contrary to the above, records were identified that did not furnish evidence of activities affecting quality in that they were false. Examples of false records are as follows:

1. Isometric drawings, weld inspection records, or other records did not furnish evidence of the actual piping components installed in the 11 pipelines in the diesel generator cooling water, starting air and fuel oil systems, in that the heat numbers recorded on the drawings or weld inspection records did not match the heat numbers or color coding marked on the respective components. The 11 pipelines were:

8111200350

1DG28AB1	1DGC5AA3/4	1DG28AE1
1DG27AB1	1DGF6AA1/2	1DG25AC2
1DG01AB1	1DGC5BA3/4	1DG11AA3
1DGF2AA1/2	1DGF6BA1/2	

2. The Kaiser Nonconformance Reporting Log did not reflect all reports initiated as evidenced by the following:

   a. The original entry for a report (CN-4309) initiated by a QC Inspector on January 7, 1981, relating to deficient weld fit-up was obliterated by the use of white correction fluid and there was no other record of this report in the Noncompliance Report (NR) system.

   b. The original entry for a report (CN-5412) initiated by a QC Inspector on February 3, 1981, and relating to violation of a hold tag was obliterated by the use of white correction fluid and there was no other record of this report in the NR system.

   c. A report (NRC-0001) initiated by a QC Inspector on February 11, 1981, relating to excessive weld weave was not assigned a number and there was no other record of this report in the NR system.

3. Written statements as to planned actions which were made to justify voiding reports E-1661 (voided 11/11/80), E-1662 (voided 11/11/80), and E-2466 (voided 6/30/80) were not taken.

4. Written statements relating to the availability of records which were made to justify voiding reports E-1777 (voided 4/30/79) and E-5108 (voided 6/20/80) were false.

5. Reports CN-5476, CN-5477, and CN-5479 were knowingly improperly voided (2/27/81) and copies deleted from the NR system at the direction of the Kaiser QA Manager.

This is a Severity Level III violation (Supplement II). (Civil Penalty - $50,000).

B. 10 CFR 50, Appendix B, Criterion I states, in part, "The persons... performing quality assurance functions shall have sufficient...organizational freedom to identify quality problems...including sufficient independence from cost and schedule."

The Wm. H. Zimmer QA Manual, Section 1.2.3 describes QC Inspectors as members of QAD (Quality Assurance Division) and Section 1.2.4 states, in part, "QAD has been assigned sufficient...organizational freedom to identify quality problems..."

Contrary to the above, QC Inspectors did not have sufficient freedom to identify quality problems and were not sufficiently independent from cost and schedule. The results of interviews indicate that some QC Inspectors were: (a) harassed by construction workers and supervisors; (b) not always supported by QC management; and (c) intimidated. The following are examples of insufficient freedom of QC Inspectors, including insufficient freedom from cost and schedule, which occurred between Summer 1978 and March 11, 1981:

1. Five QC Inspectors interviewed executed signed sworn statements wherein they claimed they were doused with water (while engaged in the performance of inspection duties) by construction personnel. Two other QC Inspectors made similar statements.

2. A QC Inspection supervisor claimed that over his objections qualified QC Inspectors who were doing thorough jobs were reassigned by QC management because of complaints by construction personnel.

3. Two QC Inspectors executed signed sworn statements wherein they claimed they had been harassed by being searched for alcohol by security personnel at the request of construction supervisory personnel. One other QC Inspector made a similar statement.

4. A QC Inspector executed a signed sworn statement wherein he claimed the QA Manager had threatened to fire him after construction personnel complained he had used a magnifying glass to visually inspect a weld when in fact he was using a mirror and either device was an acceptable tool.

5. A QC Inspector executed a signed sworn statement wherein he claimed he was struck by a stream of water from a fire extinguisher while performing an inspection.

6. A QC Inspector executed a signed sworn statement wherein he claimed he was threatened with bodily harm by a construction person if he did not pass a weld.

7. A Lead QC Inspector executed a signed sworn statement wherein he claimed:

   a. He was accused by the QA Manager for holding up a concrete pour when in fact the delay was caused by the concrete trucks being late.

   b. Construction management frequently approached QC Inspectors and challenged their inspection findings and questioned their judgement.

c. The QA Manager said things like, "our job here is to accept, not reject, and we are here to get this plant built."

8. A Lead QC Inspector executed a signed sworn statement wherein he claimed he was relieved of his inspection duties because he continued to submit legitimate nonconformance reports over construction management objections for deficient welds on pipe support hangers. He also stated that QA management had previously told QC Inspectors to not write anything to make Kaiser look bad.

9. A QC Inspector executed a signed sworn statement wherein he claimed he was told by QA management to accept inspected items that were unacceptable.

This is a Severity Level III violation (Supplement II). (Civil Penalty - $50,000).

C. 10 CFR 50, Appendix B, Criterion II requires holders of construction permits for nuclear power plants to document, by written policies, procedures, or instructions, a quality assurance program which complies with the requirements of Appendix B for all activities affecting the quality of safety-related structures, systems, and components and to implement that program in accordance with those documents.

Contrary to the above, Cincinnati Gas and Electric Company and its contractors did not adequately document and implement a quality assurance program to comply with the requirements of Appendix B as evidenced by the following examples:

1. 10 CFR 50, Appendix B, Criterion XV states, in part, "Nonconforming items shall be reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures."

Kaiser Procedure QACMI G-4, "Nonconforming Material Control," provides detailed instructions for the review and disposition of reports (Nonconformance Reports) of nonconforming items. Contrary to the provisions of QACMI G-4, the sample of NRs reviewed indicate significant deficiencies with the nonconformance reporting system in the areas of voiding of reports, not entering reports into the system, improper dispositioning of reports, and incomplete report files. The deficiencies identified were as follows:

a. Two NRs related to documentation deficiencies had been improperly voided in that records used to justify the voiding did not provide evidence necessary for proper voiding. (NR-E-2233 voided 1/24/80, NR-E-2237 voided 12/19/79)

b. One NR related to nond ructive examination of a T-quencher weld had been erroneously closed (not voided) by administrative error. (NR-E-2996 closed 3/17/81)

c. Two NRs related ondestructive examinations of service water system welds had been incorrectly dispositioned (not voided). (NR-E-2836 closed 11/13/80, NR-E-2596 closed 4/16/80)

d. Five reports had been voided by personnel other than the QA Manager. (CN-5122 voided 1/2/81, CN-5476 voided 2/27/81, CN-5477 voided 2/27/81, CN-5479 voided 2/27/81, CN-4389 voided 12/02/80)

e. In one case during revisions of the report some nonconforming items were removed from a NR without adequate justification. (NR-E-2466 voided 6/30/80)

f. The following nine reports had not been issued NR numbers and/or copies of the reports had not been retained in the Site Document Center:

CN-4389	CN-4957
CN-4930	CN-4958
CN-4931	CN-4959
CN-4955	CN-5122
CN-4956	

2. 10 CFR 50, Appendix B, Criterion XVI states, in part, "Measures shall be established to assure that conditions adverse to quality, such as... deviations... and nonconformance are promptly identified and corrected."

The Wm. H. Zimmer QA Manual, Section 15.2.2 states, "HJK is responsible for identifying and reporting nonconformances in receiving inspection, construction, or testing activities which are delegated to HJK Quality Assurance Procedures to assure that nonconforming items are conspicuously marked to prevent their inadvertent use or installation."

AWS Code D1.1-1972, Section 3 and 8.1.5 define requirements for weld quality and address slag, weld profiles, blowholes, porosity, and undercut.

AISC, Seventh Edition (1969), Page 4.113 requires 1/2 inch minimum radius for re-entrant corners.

Contrary to the above, the following nonconforming conditions were not identified and corrected:

a. Based on an inspection of the 25 structural hanger support beams described in Item C.4 below:

(1) Several welds on nine beams did not conform with AWS D1.1-1972 requirements in that they contained unacceptable slag, weld profiles, blowholes, porosity, and/or undercut.

(2) Five beams did not conform with AISC requirements in that the re-entrant corners were notched, creating potential stress risers, instead of being rounded with required radii.

(3) Four beams, two of which had unacceptable welds as described in Item C.2.a.(1) above, did not conform with design documents in that they were not specified on any design document.

b. Based on an inspection of about 100 cable tray hangers in the Cable Spreading Room, four did not conform with AWS D1.1 1972 requirements in that the welds contained unacceptable slag, weld profiles, blowholes, porosity, and/or undercut.

3. 10 CFR 50, Appendix B, Criterion XVI states, in part, "Measures shall be established to assure that conditions adverse to quality, such as...deviations...and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

The Wm. H. Zimmer QA Manual, Section 16.5 states, in part, "Vendors, contractors, and subcontractors are required to determine cause and corrective action to prevent recurrence of errors which could result in significant conditions adverse to quality."

ASME Code, Section III-1971 Edition, Article NB-3661.5(b) states, in part, "...a gap of approximately 1/16 in. shall be provided between the end of the pipe and the bottom of the socket before welding."

ASME Code, Section III-1971 Edition , Winter 1972 Addenda, Articles NA-4130(a), NA-4420, NA-4510, NA-4442.1, NB-4122, NA-4451, NB-4230, and NB-3661.5(b) require, in part, in-process inspections for pipe fitup, weld procedure, weld filler metal traceability, and welder qualifications...

Contrary to the above, the NRC inspectors identified the following nonconforming conditions that had not been corrected and action had not been taken to preclude their repetition.

a. Licensee records indicate that the socket engagement (fitup) for more than 439 socket welds was not verified in accordance with ASME Code, Section III-1971 Edition, Article NB-3661.5(b) and the condition was not corrected in that the corrective action was not commensurate with the ASME Code. The welds date back to 1979.

b. Licensee records indicate that the in-process inspections for more than 22 welds in the diesel generator cooling water, starting air, and fuel oil piping systems were not performed by Kaiser in accordance with ASME Code, Section III-1971 Edition, Article NB-3661.5(b), et al., and the condition was not corrected in that the corrective action was not commensurate with the ASME Code. The welds date back to 1978.

c. Five licensee QA audits (audit performed 8/8-9/74 - no number, and Audit Nos. 78/07, 78/09, 78/10, 80/04) of Sargent & Lundy identified repetitive problems concerning S&L not performing certain design calculations, reviews, and verifications and action was not taken to preclude repetition.

4. 10 CFR 50, Appendix B, Criterion VIII states, in part, "Measures shall be established for the identification and control of materials... These measures shall assure that identification of the item is maintained..."

The Wm. H. Zimmer QA Manual, Section 8.2 states, in part, "H. J. Kaiser Company procedures provide that within the H. J. Kaiser Company jurisdiction the identification of items will be maintained by the method specified on the drawings, such as heat number, part number, serial number, or other appropriate means. This identification may be on the item or on records traceable to the item. The identification is maintained throughout fabrication, erection, and installation. The identification is maintained and usable in the operation and maintenance program."

Contrary to the above, based on an inspection by NRC inspectors in March 1981 of approximately 25 structural hanger support beams located in the Blue Switchgear Room and the Cable Spreading Room, the identification of the material in nine of those beams was not maintained to enable verification of quality.

5. 10 CFR 50, Appendix B, Criterion III states, in part, "Measures shall be established to assure that applicable regulatory requirements and the design basis...are translated into...drawings..."

The Wm. H. Zimmer FSAR, Section 8, provides the design basis for electrical cable separation that includes the following:

Associated cables (Green/White, Blue/White, and Yellow/White) from more than one Division cannot be routed in the same raceway. (FSAR Paragraph 8.3.1.13.2)

Vertical separation of three feet or more must be maintained between cables from different Divisions. (FSAR Paragraph 8.3.1.11.2.1.d)

Instrument (low-level signal) cables cannot be routed in the same raceway with power and control cables. (FSAR Paragraph 8.3.1.12.1.3)

The Wm. H. Zimmer QA Manual, Section 3.3.2. states, "Composite... drawings are prepared, translating the design concepts into layouts of structures, systems, and components necessary for the construction of the plant."

Contrary to the above, as of March 1981, the FSAR design basis for electrical cable separation had not been translated into drawings and this resulted in the following cable installation deficiencies in the Cable Spreading Room:

a. Associated Cable (Yellow/White) No. RE053 for Division 1 was routed in the same raceway (two-inch conduit and Class IE Sleeve No. 79) as Associated Cable (Blue/White) No. RE058 for Division 2. Also, Associated Cable No. RE053 was routed so that in places there was only a vertical separation of four inches between it and cables in Blue Tray No. 2072C for Division 2.

b. Instrument Cable (Green) No. WS714 and others for Division 3 were routed in the same raceway (Tray No. 4638B) as Associated Control Cables (Yellow/White and Blue/White) for Divisions 1 and 2. This deficiency was due, in part, to a design which specified the installation of a Green Instrument Tray (No. 3029K) inside a White Control Tray (No. 4638B).

c. Many Associated Cables from all three Divisions were routed in the same raceway (White Tray No. 4080K) including Cable (Blue/White) No. TI192, Cable (Yellow/White) No. RR781, and Cable (Green/White) No. TI816.

d. Associated Cables (Yellow/White) No. TI942 and No. TI943 for Division 1 were routed in the same raceway (White Tray Riser No. RK4627) as Associated Cables (Blue/White) No. TI808 and No. TI760 for Division 2.

e. Many Associated Cables (Yellow/White) for Division 1 were routed in the same raceway (White Tray Riser No. 4139) as Associated Cables (Blue/White) for Division 2.

6. 10 CFR 50, Appendix B, Criterion III states, in part, "Design control measures shall be applied to...the delineation of acceptance criteria for inspections and tests."

The Wm. H. Zimmer QA Manual, Section 3.13.1 states, in part, "Design control measures also apply to delineation of acceptable criteria for inspections and tests."

Weld acceptance criteria are required by the ASME Code, Section III-1971 Edition and the AWS D1.1-1972 Code.

Contrary to the above:

a. The weld acceptance criteria used by H. J. Kaiser Company from July 1980 to January 1981 were not applied to weld inspections during that period in that the weld acceptance criteria for such items as the drywell support steel were deleted.

b. The acceptance criteria for Weld 55H (isometric drawing PSK-1WS-32) performed on Service Water System Line No. 1WS17A18 by H. J. Kaiser Company in November 1979 were not applied in that they were designated as not applicable.

7. 10 CFR 50, Appendix B, Criterion XI states, in part, "Test results shall be evaluated to assure that test requirements have been satisfied."

The Wm. H. Zimmer QA Manual, Section 11.1 states, in part, "Test programs to assure that essential components, systems, and structures will perform satisfactorily in service are planned and performed in accordance with written procedures and instructions at vendor shops and at the construction site."

ASME Section III-1971 Edition, Winter 1972 Addenda, Appendix IX, Paragraph IX-3334.4 states, in part, "The shim thickness shall be selected so that the total thickness being radiographed under the penetrameter is the same as the total weld thickness..."

M. W. Kellogg Co. (pipe manufacturer and agency performing the prefabricated pipe weld radiography in question) Radiographic Procedure No. ES-414, dated September 26, 1972, Paragraph 4.1.8, states, "Wherever required, shims shall be used to produce a total thickness under the penetrameter equal to the nominal thickness of the base metal plus the height of the crown or reinforcement."

Contrary to the above, the licensee's review of 187 radiographs did not assure that test requirements were satisfied in that the licensee failed to detect that the penetrameter shimming was insufficient to satisfy the requirements of M. W. Kellogg Procedure

No. ES-414 or the ASME Code. This deficiency was identified during the NRC review of approximately 800 radiographs involving 206 prefabricated pipe welds in such systems as main steam, feedwater, and diesel generator support systems.

8. 10 CFR 50, Appendix B, Criterion III states, in part, "These measures [design control] shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled...The design control measures shall provide for verifying or checking the adequacy of design."

The Wm. H. Zimmer QA Manual, Section 3.4 states, in part, "Design reviews are conducted to assure that the appropriate quality standards are specified and included in design documents."

The Wm. H. Zimmer QA Manual, Section 3.6 states, "Measures are established to assure that any deviations from the applicable standards are controlled."

The Wm. H. Zimmer QA Manual, Section 3.11.2 states, in part, "At S&L, design verification reviews are performed...."

The Wm. H. Zimmer FSAR Section 8.3.3.1.1 states that cable ampacity is based on IPCEA Publication No. P-46-426. An additional limitation on cable ampacity as stated in Section 8.3.3.1.3 is that "the summation of the cross-sectional areas of the cables shall not exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area in any case."

AWS D1.1-1972 Code, Section 3.6.4, states, "For building and tubular structures, undercut shall be no more than 0.01 inch deep when its direction is transverse to primary tensile stress in the part that is undercut, nor more than 1/32 inch for all other situations."

Contrary to the above:

a. As of March 1981, design control measures had not been established to assure that deviations from design conditions (quality standards) identified by Sargent & Lundy engineers were controlled. For example, Sargent & Lundy noted on a calculation sheet dated December 27, 1979, that the design thermal loading for two power cables (VC016 and VC073) in Yellow Tray No. 1057A would allow the cables to be thermally overloaded and no program existed to control those design deviations.

b. As of March 1981, design control measures had not been established by Sargent & Lundy to provide for verifying or checking the adequacy of the design for the thermal loading of power cable sleeves and the physical weight loading of cable trays.

c. As of March 1981, the cable ampacity design by Sargent & Lundy was not based on IPCEA P-46-426 and the FSAR limits on cross-sectional area.

d. As of March 1981, the design allowable undercut on cable tray hanger welds was not based on AWS D1.1-1972 Code (appropriate quality standard). The design undercut was instead based on Sargent & Lundy Specification H-2713, Supplement 7, Sargent & Lundy Standard EB-117, and H. J. Kaiser Procedure SPPM No. 4.6, "Visual Examination," Revision 8, Paragraph 5.2.9, allowed up to 1/16 inch undercut.

9. 10 CFR 50, Appendix B, Criterion X states, in part, "A program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity."

The Wm. H. Zimmer QA Manual, Section 10.1.2 states, in part, "Inspections are performed in accordance with written procedures which include requirements for check lists and other appropriate documentation of the inspections and tests performed."

AWS D1.1-1972 Code, Section 3.10.1, requires work to be completed and accepted before painting.

Contrary to the above:

a. As of March 1981, a QC inspection program had not been established to require verification of separation of electrical cables routed from the Cable Spreading Room to the Control Room. An example of a nonconforming condition that should have been identified by such a program was Blue Cables RI103 and CM111 that had been routed into Tray Riser (Green) No. 3025A, which extended from Tray (Blue) No. 2077A in the Cable Spreading Room to the Control Room.

b. The programs established for in-process and final inspections of welds on 180 cable tray hangers located in the Cable Spreading Room were not executed as required in the AWS D1.1-1972 Code. Specifically, the final weld inspections were made after the welds were painted (Galvanox).

10. 10 CFR 50, Appendix B, Criterion V states, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

The Wm. H. Zimmer QA Manual, Section 5.1 states, "Construction, fabrication, and manufacturing activities which affect the quality of the facility are accomplished in accordance with written instructions, procedures, and drawings which prescribe acceptable methods of carrying out those activities."

The Wm. H. Zimmer QA Manual, Section 3.12 states, in part, "Design changes...including field changes, are subject to design change control measures commensurate with those applied to the original design."

Contrary to the above:

a. Kaiser Procedure QACMI G-14, "Surveillance Reports," (SR) was not appropriate to the circumstances in that it allowed in-process nonconformances which constitute field changes to be dispositioned within 30 days without being subjected to design control measures commensurate with those applied to the original design. Examples of nonconformances so dispositioned were identified in SRs F-2899, F-2903, and F-2914.

b. Kaiser Procedure QACMI G-14 was not followed in that SRs F-2909, F-3070, F-3071, F-3072, F-3073, F-3074, F-3075, F-3076, F-3083, and F-7019 were not dispositioned within 30 days and were not transferred to Nonconformance Reports as required by Paragraph 5 of QACMI G-14.

11. 10 CFR 50, Appendix B, Criterion VII states, in part, "The effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee...."

The Wm. H. Zimmer QA Manual, Section 7.3.1 states, in part, "As part of the vendor selection process, S&L makes an independent evaluation of the bidders' QA programs as a part of their total bid evaluation."

Contrary to the above, as of March 1981, neither the licensee nor designee (Sargent & Lundy) had assessed the effectiveness of the control of quality by vendors who had supplied structural beams. Specifically, evaluations of the vendor (U.S. Steel Supply, PBI Steel Exchange, and Frank Adams Company) quality assurance programs for control of mill certifications and structural beams were not performed.

12. 10 CFR 50, Appendix B, Criterion XVII states, in part, "Sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include...monitoring of work performance, and...include closely-related data such as qualifications of personnel, procedures, and equipment."

    The Wm. H. Zimmer QA Manual, Section 17.1.4 states, in part, "Documentation of all performance surveillance includes personnel identification and qualification, procedure, type observation, date of performance, person or organization monitored, results and corrective action if required."

    Contrary to the above, the Bristol Steel and Iron Works Quality Control Steel Erection Report, which was a generic form for monitoring in-process steel erection, did not identify closely related data such as weld procedure numbers, types of welding material, welder identification, and specific welds inspected.

13. 10 CFR 50, Appendix B, Criterion XVIII states, in part, "A comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program."

    The Wm. H. Zimmer QA Manual, Section 18.1 states, in part, "QA Division conducts a comprehensive system of planned and periodic audits of S&L, HJK...to verify compliance with all aspects of the quality assurance program."

    Contrary to the above, during the past 9 years the licensee's QA Division did not perform an audit of the Sargent & Lundy nonconformance program.

This is a Severity Level II violation (Supplement II). (Civil Penalty - $100,000).

Pursuant to the provisions of 10 CFR 2.201, Cincinnati Gas and Electric Company is hereby required to submit to this office within 30 days of the date of this Notice a written statement or explanation, including for each alleged violation: (1) admission or denial; (2) the reasons for the violation if admitted; (3) the corrective steps which have been taken and the results achieved; (4) the corrective steps which will be taken to avoid further violations; and (5) the date when full compliance will be achieved. Any statement or explanation may incorporate by specific reference (e.g., giving page and paragraph numbers) the provisions of your quality confirmation program and your actions in response to our Immediate Action Letter of April 8, 1981. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, Cincinnati Gas and Electric Company may pay the civil penalties in the cumulative amount of Two Hundred Thousand Dollars or may protest imposition of the civil penalties in whole or in part by a written answer. Should Cincinnati Gas and Electric Company fail to answer within the time specified, this office will issue an Order imposing the civil penalties in the amount proposed above. Should Cincinnati Gas and Electric Company elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalties, such answer may: (1) deny the violations listed in this Notice in whole or in part; (2) demonstrate extenuating circumstances; (3) show error in this Notice; or (4) show other reasons why the penalties should not be imposed. In addition to protesting the civil penalties in whole or in part, such answer may request remission or mitigation of the penalties. Any answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate by specific reference (e.g., giving page and paragraph numbers) to avoid repetition. Cincinnati Gas and Electric Company's attention is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing civil penalties.

Upon failure to pay any civil penalties due, which have been subsequently determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalties, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282.

FOR THE NUCLEAR REGULATORY COMMISSION

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland
this 24 day of November 1981

THE CINCINNATI GAS & ELECTRIC COMPANY

CINCINNATI OHIO 4520

E. A. BORGMANN
SENIOR VICE PRESIDENT

August 21, 1981
QA-1476

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

Attention: Mr. J. G. Keppler

RE: WM. H. ZIMMER NUCLEAR POWER STATION
UNIT 1 - QUALITY CONFIRMATION PROGRAM
W.O. #57300-957, JOB E-5590, FILE QA-21

Gentlemen:

The attached Quality Confirmation Program formalizes our plan of action to resolve concerns identified by Region III at the Wm. H. Zimmer Nuclear Power Station (ZPS-1).

This written program reflects the corrective action discussed in the Region III offices on April 10, 1981, and documented in your letter dated April 21, 1981, transmitting IE Inspection Report 50-358/81-14.

As described during our meeting of August 5, 1981, we will keep you informed as to the progress in developing procedures and in implementing the Quality Confirmation Program through periodic meetings with the Resident Inspectors assigned to the Zimmer Station.

Should you have any questions, please contact M.F. Rulli at (513) 553-6209 or H. R. Sager at (513) 553-2159.

Yours very truly,

E. A. Borgmann

EAB:mjl
Attachment
cc: NRC Resident Inspector
Attn: F. T. Daniels
NRC Office of Inspection and Enforcement
Washington, D.C. 20555
A. B. Davis
R. F. Warnick

ENCLOSURE 4

ZIMMER QUALITY CONFIRMATION PROGRAM

ZIMMER QUALITY CONFIRMATION PROGRAM

I. Concerning Structural Steel

Problem

1. Some unacceptable welds have been identified.

2. Some structural welds were painted before they were inspected.

3. Some beams have unacceptable re-entrant corners.

4. Some beams have been installed but are not shown on design drawings.

5. Several hundred feet of beams were received from an unapproved vendor and cannot be accounted for as to where installed or disposition (However all mill certs are available).

6. Heat number traceability has not been maintained for some beams and steel plate.

7. Cable tray foot connections have not been inspected and they are covered with fireproofing.

Action

1. Compare structural steel drawings against plant as built condition.

2. Determine which welds were not inspected or were inspected after the weld was painted or coated.

3. For embedments, uncover one end of beam. If bolted and drawing shows welded, do not assume other end is bolted. Uncover other end also. If welded and drawing shows bolted, uncover the other end also.

4. Remove paint and other material from the welds that may preclude proper weld inspection. If weld coating cannot be removed without affecting the surface of the weld, quantify the number of such welds and propose an alternative program for confirming the quality of these welds. The NRC/Region III must approve the alternate program.

5. Conduct a 100% visual inspection of accessible structural steel field welds or justify less.

6. Conduct a 100% visual inspection of accessible Bristol shop welds or justify less.

7. Perform 100% inspection of field cut re-entrant corners on beams which could affect safety related systems or equipment or justify less.

8. Determine the acceptability of welding procedures

I. Concerning Structural Steel (cont'd)

and welder qualifications used on the job, special requirements called out in the procedures, and types of weld rod specified for field welding.

9. Determine the acceptability of all field purchased steel plate and structural shapes received onsite.

10. To ensure that the structural steel problems are not generic within Zimmer, determine the acceptability of other field procured essential material (i.e. piping, weld rod, fittings, cable,etc.).

11. Write Nonconformance Reports on all unacceptable welds, unacceptable re-entrant corners, unacceptable materials, drawing errors or omissions, etc. Propose disposition to NRC/Region III for concurrence before starting corrective action.

II. Concerning Weld Quality

Problem

1. In-process inspections were not performed for some welds (i.e. cable tray hangers and beam welds).

2. Because of previous inspection findings indicating continuing problems with weld rod control (storage, temperature, issuance, documentation) there are questions as to whether or not field welds have been made using improper or unacceptable weld rod.

3. Weld rod heat numbers have been transferred to the Weld Data Sheet (KE-1) from the Weld 2 Form by individuals other than the QC inspectors who inspected the weld.

4. Weld inspection criteria deleted from the Weld Data Sheets from approximately July 1980 to February 1981.

Action

1. Identify code welds for which traceability of a credible weld rod heat number was required but not maintained (failure to perform required inspection or failure to maintain required documentation) or for which there is questionable traceability. Justify less than 100% determination.

2. Identify all Weld Data Sheets that were altered by transcribing information from the Weld 2 Forms. If the original entry on the Weld Data Sheet indicates an adequate weld, the NRC will accept that weld provided the welder's stamp on the material corresponds to the Weld Data Sheet entry.

3. For all AWS structural steel weld data sheets from July 1980 to February 1981 for which criteria were deleted for code welds made in the field, check to ensure that no hold points were violated. Review all Weld Data Sheets from July, 1980 to February 1981 and identify those with deletions, omissions, obvious errors, and applicable items marked "Not Applicable."

4. Verify proper weld procedure, welder's qualifications, fit up, and proper filler metal verification/control. Determine if any hold points were violated. For those code welds for which this information has not been adequately maintained, demonstrate that those welds are acceptable or provide justification for accepting the welds. Such demonstration or justification must be approved by NRC Region III.

5. For all code welds which lack traceability and quality documentation and for all code welds with questionable tracebility and quality documentation, identify on a nonconformance report. Quantify the number of such welds and propose a program to determine the acceptability of the welds and the acceptability of the material in the welds, The NRC/Region III must approve the program.

6. Review other in-process inspection records for possible alteration.

III Concerning Traceability of Heat Numbers on Piping

Problem

1. Some heat numbers found on installed small bore piping do not appear on the records of accepted heat numbers.

2. Some heat numbers recorded on isometric drawings do not match the heat numbers on installed piping.

3. Heat numbers could not be found on some installed small bore piping.

4. Some heat numbers recorded on the isometric drawings had been marked out and incorrect numbers recorded. (Heat number for a different size pipe).

Action

1. Conduct an inspection of 100% of the accessible field installed small bore piping identified on attached Enclosure 1 for traceability in accordance with ASME Code requirements.

2. For systems on Enclosure 2, attached, compare existing documentation against accessible field installed small bore piping for traceability in accordance with applicable code requirements. Conduct a sampling program utilizing lot sizes sufficiently large to statistically demonstrate a 95% confidence factor that 95% of the sample is acceptable.

3. Provide justification for acceptability of inaccessible small bore piping.

4. For large bore piping designated on Enclosures 1 and 2:

   a. Identify all field modifications

   b. Walkdown 100% of the large bore piping involved in the field modifications. Compare documentation against the installed large bore piping for traceability in accordance with ASME requirements.

   c. Justify less than 100% identification and walkdown.

5. If heat number traceability on ASME work can only be established by the Weld Data Sheet, then it will be necessary to establish the credibility of the heat number on the Weld Data Sheet.

6. Write nonconformance reports on all heat number deficiencies found, propose disposition to NRC/Region III for approval, proceed with dispositions after NRC concurrence.

IV Concerning Socket Weld Fitup

Problem

1. Socket weld fitup to assure disengagement was not verified on some small bore piping.

Action

1. Identify all small bore piping socket welds for which verification for disengagement does not exist as documented on QC inspection records.

2. In all ASME Class I, II, and III systems, radiograph 100% of accessible welds not having verification of disengagement or justify less. Provide justification for radiographing less than 100% of the inaccessible socket welds for which verification of disengagement does not exist.

3. Write Nonconformance Reports on all unacceptable socket weld fitups, propose disposition to NRC/Region III for approval, proceed with disposition after NRC concurrence.

V. Concerning Radiographs

Problem

Radiographic technique did not meet the ASME code in that the penetrameters were not adequately shimmed in approximately 180 out of 600 radiographs reviewed by the NRC.

Action

1. Demonstrate that the existing radiographs of large bore piping supplied by the CG&E piping fabricator are adequate to identify weld deficiencies by:

   a) Review the shop radiographs to identify those radiographs that are either unshimmed or inadequately shimmed to determine, for each pipe size and thickness, the films which contain the least sensitive penetrameter images (essential hole or slit) where the density of the penetrameter is the same or greater than the density of the area of interest.

   b) Reradiograph the welds identified above, if accessible, using, as nearly as possible, the original technique plus the penetrameter shimmed to at least the total weld thickness including reinforcement on the same film, all in accordance with the code.

   c) If the essential hole or slit in the penetrameter is visible after shimming to the total thickness of the weld including reinforcement, all radiographs of that pipe size and thickness will be determined to be acceptable.

2. This program must be acceptable to the National Board of Boiler and Pressure Vessel Inspectors and the State of Ohio.

VI Concerning Cable Separation

Problem

The NRC identified six examples of failure to meet cable separation criteria.

Note: The original FSAR criteria did not stipulate separation requriements from an essential cable tray to a non-essential tray. The FSAR criteria is to be clarified for separation of essential, associated and non-essential cable in both cable trays and conduits.

Action

1. Conduct a 100% inspection for separation of essential and associated cables:

   a) which are installed between the cable spreading room and the control panels in the main control room

   b) at all penetrations (walls or floor)

2. Perform a 100% computer assisted analysis of associated cables to provide assurance that the separation criteria for class IE circuts have been met.

3. Using the clarified separation criteria, conduct an inspection of associated cables to arrive at a 95% confidence level that 95% of associated cables are properly separated in trays and conduits.

4. Ths six examples are to be corrected.

5. Any problems identified in the above inspections and reviews are to be documented on nonconformance reports. Proposed disposition to be reviewed and concurred in by NRC/Region III prior to initiating action to accomplish the disposition.

Note: If there are conflicts between these commitments and new requirements imposed by NRR, the more conservative requirements will be applicable.

VII Concerning Nonconformances

Problem

1. Nonconformances documented on surveillance reports.

2. Nonconformances documented on punchlists.

3. Nonconformances documented on exception list.

4. Nonconformances not documented.

5. Nonconformances documented but not entered into the system.

6. Nonconformances voided rather than being dispositioned.

Action

1. Review all surveillance reports and identify all that should have been nonconformance reports.

2. Review QA pre-op turnover punchlists and exception lists to identify any items that should have been documented on Nonconformance Reports.

3. By letter to each past and present QC inspector, solicit Nonconformance Reports that were not enterd into the system.

4. Write Nonconformance Reports for each such nonconformance identified.

5. Review all previously voided Nonconformance Reports. Proposed disposition to be reviewed and concurred in by NRC/Region III. Proceed with disposition after NRC concurrence.

6. Review at least 300 previously dispositioned Nonconformance Reports to assure proper disposition. If this review discloses any that have been improperly dispositioned, additional Nonconformance Reports (the number to be agreed to by NRC/Region III) will be reviewed.

VIII. Concerning Design Control and Verification

Problem

1. S&L had no formal procedure requiring verification of design calculations for thermal loading of power sleeves and dead weight loading of all trays.

2. Three examples were identified in which S&L design deviated from the FSAR:

   a) Cable Tray Loading: The actual design basis differed from that stated in the FSAR.

   b) Cable Separation: See Item 6, Concerning Cable Separation.

   c) Weld Acceptance Criteria: Site procedures take exception to AWS D1.1-1972 Inspection Acceptance Criteria for Undercut. The FSAR does not stipulate the exception.

3. S&L had no formal procedure for documenting design deviations when identified by engineers.

Action

1. Considering all disciplines, determine that procedures exist requiring design calculations for those items requiring a final verification after fabrication and/or installation. Items to include such areas as piping, pipe supports, electrical cable and cable trays, and structures. Define the items that have not been completed relative to final design calculations, verifications, and reviews and establish measures to assure their completion.

2. Review the adequacy of S&L's program for controlling deviations from the FSAR.

3. Review the FSAR for correctness and consistency with respect to the design by the responsible system engineers.

4. For item 2c. above, meet AWS code or change FSAR commitment to reflect the way the plant is built.

5. Designers shall review their files to identify all design deviations. These deviations shall be documented and properly dispositioned.

IX Concerning Design Document Changes

Problem

Some design document changes (DDC's) have not been adequately controlled through distribution and inspection.

Action

1. Establish an accurate and complete computer lising of DDC's. The list when finalized shall contain the status of every DDC including the status of construction.

2. Review each essential DDC and applicable QC records to determine if all in-process and final inspections have been performed. Justify less than 100%.

3. Document all deficiencies identified.

4. Take appropriate corrective action to resolve all deficiencies.

X Concerning Subcontractor QA Programs

Problem

1. The Bristol Project Superintendent was responsible for both the steel erection and the erection quality control.

2. The Bristol field inspection program failed to document specific welds inspected and details of the inspection.

Action

1. The quality of the Bristol work will be confirmed under Item I, "Concerning Structural Steel."

2. For all safety related activities performed by other than H.J. Kaiser and GE, provide assurance that QA programs were acceptable or that work is acceptable.

XI Concerning Audits

Problem

1. Past audits by C.G.& E. identified repetitive problems regarding design calculations and verifications not being performed. Corrective action by S&L and follow up by C.G.& E. was not adequate.

2. C.G.& E. had not audited S&L to verify compliance with and the effectiveness of the S&L nonconformance program.

Action

1. Past C.G.& E. audits of H.J.K., S&L, GE, EPD, EOTD, GED, & GCD are to be reviewed to determine the depth and adequacy of the audits particularly with respect to the 18 criteria of Appendix B to 10CFR50. Assure appropriate close out of audit findings.

2. Identify deficiencies in the past audit program. (Applicable Appendix B Criterion not audited).

3. Justify the acceptability of areas not audited and provide this justification to NRC Region III.

ENCLOSURE 1

1. CY-01 Cycle Condensate System - Essential Portions
2. DG-01 Diesel Generators
3. DO-01 Diesel Fuel Oil Systems
4. RD-02 Control Rod Drive Hydraulic System
5. RH-01 Residual Heat Removal System - Essential Portions
6. RI-01 Reactor Core Isolation Cooling System
7. SC-01 Stand-by Liquid Control System
8. Containment Isolation - Valves and Connecting Piping
9. HG-01 Primary Containment Combustible Gas Control System
10. HP-01 High Pressure Core Spray System
11. LP-01 Low Pressure Core Spray System
12. MS-01 Main Steam System to Second Isolation Valve
13. NB-02 Nuclear Boiler System - Automatic Depressurization
14. NB-04 Nuclear Boiler System - Reactor Pressure Vessel
15. VY-02 Core Stand-by Cooling - Equipment Cooling South
16. VY-03 Core Stand-by Cooling - Equipment Cooling North
17. WR-01 Reactor Building Closed Cooling Water System
18. WR-02 Reactor Water Closed Cooling Water System (Inside Containment)
19. WS-01 Service Water System - Essential Portions
20. Stand-by Gas Treatment
21. Feedwater - Essential Portions
22. Piping that comes in contact with Primary Coolant up to the first Isolation Valve Outside Containment

ENCLOSURE 2

1. CM-01 Containment Monitoring System (Possible Code Requirements)
2. FC-01 Fuel Pool Cooling and Clean-up System
3. PR-04 Liquid Process Radiation Monitoring System
4. PR-06 Off Gas Post Treatment Radwaste Monitoring System
5. RR-03 Reactor Recirculation Pumping System
6. RT-01 Reactor Water Clean-up System
7. IN-01 Dry Well Pneumatic System
8. LC-01 Leakage Control System
9. NB-01 Nuclear Boiler System - Jet Pump Instrumentation
10. OG-01 Off Gas Processing System
11. VR-02 Reactor Building Ventilation System
12. Reactor Building Equipment Drain
13. Dry Well Floor and Equipment Drains
14. Reactor Water Sample
15. Radwaste Collection
16. Recirculation Pump Seals System
17. Fire Protection
18. VP Primary Containment Ventilation
19. VC Control Room Ventilation
20. VX Switchgear Rooms Ventialtion

TESTIMONY OF

NUNZIO J. PALLADINO

UNITED STATES NUCLEAR REGULATORY COMMISSION

BEFORE THE

SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

UNITED STATES HOUSE OF REPRESENTATIVES

WASHINGTON, D.C.

NOVEMBER 19, 1981

ENCLOSURE 5

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE, I AM PLEASED TO APPEAR BEFORE YOU THIS MORNING TO DISCUSS QUALITY ASSURANCE FOR NUCLEAR POWER PLANTS.

I BELIEVE THAT AN EFFECTIVE QUALITY ASSURANCE (QA) PROGRAM IS A VITAL ELEMENT IN THE MANAGEMENT OF ACTIVITIES THAT MUST BE ACCOMPLISHED DURING THE DESIGN AND CONSTRUCTION OF EACH NUCLEAR POWER PLANT. QUALITY ASSURANCE SHOULD BE USED AS A FORMAL MANAGEMENT TOOL TO ATTAIN THE MUTUALLY COMPLEMENTARY GOALS OF ASSURING THAT THE DESIGN IS CORRECT AND THAT THE PLANT IS CONSTRUCTED IN FULL ACCORD WITH THE DESIGN. TO BE EFFECTIVE, A QA PROGRAM MUST HAVE THE FULL SUPPORT AND ATTENTION OF THE NUCLEAR INDUSTRY MANAGERS RESPONSIBLE FOR DESIGN AND CONSTRUCTION.

THE NRC LICENSING AND INSPECTION AND ENFORCEMENT PROCESSES ARE AIMED AT ASSURING THAT AN EFFECTIVE QA PROGRAM IS ESTABLISHED AND IMPLEMENTED TO PROVIDE THE NECESSARY CONFIDENCE THAT EACH NUCLEAR POWER PLANT FULLY SATISFIES NRC REQUIREMENTS.

AFTER REVIEWING BOTH INDUSTRY AND NRC PAST PERFORMANCE IN QA, I READILY ACKNOWLEDGE THAT NEITHER HAVE BEEN AS EFFECTIVE AS THEY SHOULD HAVE BEEN IN VIEW OF THE RELATIVELY LARGE NUMBER OF CONSTRUCTION-RELATED DEFICIENCIES THAT HAVE COME TO LIGHT. HOWEVER, RECOGNIZING THAT THERE IS A PROBLEM IS THE FIRST STEP TO FIXING IT. I HOPE THAT OUR TESTIMONY TODAY WILL DEMONSTRATE NRC'S RESOLVE TO DEAL FORCEFULLY WITH CONSTRUCTION RELATED DEFICIENCIES AND THE QA PROBLEMS THEY REVEAL.

MR. CHAIRMAN, ACCOMPANYING ME TODAY IS MR. WILLIAM DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS, MR. HAROLD R. DENTON, DIRECTOR OF THE OFFICE OF NUCLEAR REACTOR REGULATION, MR. RICHARD DEYOUNG, DIRECTOR OF THE OFFICE OF INSPECTION AND ENFORCEMENT, MR. JAMES G. KEPPLER, REGIONAL ADMINISTRATOR OF NRC REGION III, AND MR. JOHN COLLINS, REGIONAL ADMINISTRATOR OF NRC REGION IV. MR. DIRCKS WILL PRESENT THE REST OF NRC'S WRITTEN TESTIMONY, AFTER WHICH WE WILL BE PREPARED TO ANSWER ANY QUESTIONS YOU MAY HAVE.

TESTIMONY OF WILLIAM J. DIRCKS

BEFORE THE

SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

UNITED STATES HOUSE OF REPRESENTATIVES

WASHINGTON, D.C.

Quality Assurance for Nuclear Plants Under Construction

This testimony addresses the adequacy of quality assurance as it applies to nuclear power plants under construction, why identified construction or quality assurance deficiencies have not been detected on a more timely basis, and actions being taken to solve recognized problems.

The NRC looks to the power plant owners, the utilities themselves, to take the leadership role in assuring the quality of their plants and operations. This requires heavy emphasis and active involvement of top licensee management in QA programs. Careful attention is required in the selection of engineering specifications and QA procedures and practices for each task and their implementation by the workers on the job. Most importantly, there must be adequate resources of qualified personnel at management, operating, and staff levels.

NRC assesses the performance of the utilities and their major contractors during the design and construction phases. The NRC does not attempt to redo this work or inspect it completely since the NRC resources on a particular plant are only a small fraction of what we require a utility to devote to inspection, quality control, and quality assurance. The NRC's Regional Offices carry out a sampling inspection program aimed at determining compliance with the programmatic commitments. The regulatory requirements place the major inspection responsibilities for quality assurance

ON THE LICENSEE'S CONTRACTORS, WHICH ARE IN TURN INSPECTED AND AUDITED BY THE LICENSEE'S STAFF. THE NRC'S EFFORT IS AN AUDIT AND OVERVIEW OF THE LICENSEE'S AND ITS CONTRACTORS' QUALITY ASSURANCE ACTIVITIES. IN CARRYING OUT THESE INSPECTION ACTIVITIES, NRC INSPECTIONS COVER APPROXIMATELY 1-5 PERCENT OF THE INSPECTION ACTIVITIES PERFORMED BY THE LICENSEE AND ITS CONTRACTORS.

THE NRC'S QUALITY ASSURANCE REQUIREMENTS ARE CONTAINED IN APPENDIX B TO PART 50 OF TITLE 10 OF THE CODE OF FEDERAL REGULATIONS, "QUALITY ASSURANCE CRITERIA FOR NUCLEAR POWER PLANTS AND FUEL REPROCESSING PLANTS." THESE CRITERIA PROVIDE A BASIS UPON WHICH THE NRC JUDGES THE ACCEPTABILITY OF QA PROGRAMS. THE CRITERIA OF APPENDIX B APPLY TO ALL ACTIVITIES AFFECTING SAFETY-RELATED FUNCTIONS OF NUCLEAR POWER REACTOR STRUCTURES, SYSTEMS, AND COMPONENTS.

QUALITY ASSURANCE IS DEFINED IN OUR REGULATIONS AS "ALL THOSE PLANNED AND SYSTEMATIC ACTIONS NECESSARY TO PRO ADEQUATE CONFIDENCE THAT A STRUCTURE, SYSTEM, OR COMPONENT WILL PERFORM SATISFACTORILY IN SERVICE." WHAT THIS MEANS IS THAT - FOR ITEMS HAVING SAFETY SIGNIFICANCE IN A NUCLEAR POWER PLANT:

- THE DESIGN IS VERIFIED TO BE CORRECT AND TO INCLUDE APPROPRIATE REGULATORY REQUIREMENTS;

- PROCUREMENT DOCUMENTS CONTAIN ADEQUATE INFORMATION AND ARE VERIFIED;

- INSPECTION OF PARTS, MATERIALS, AND PROCESSES ARE TIMELY AND ADEQUATE;

- DEFICIENCIES IN DESIGN, CONSTRUCTION AND INSTALLATION ARE IDENTIFIED AND APPROPRIATELY REMEDIED;

- THE QA PROCESS IS AUDITED AND REPORTED TO AN ORGANIZATIONAL LEVEL CAPABLE OF ASSURING EFFECTIVE CORRECTIVE MEASURES;

- RECORDS ARE KEPT WHICH CLEARLY DEMONSTRATE SUFFICIENCY OF ACTIVITIES AFFECTING QUALITY; AND

- THE ORGANIZATIONS PERFORMING QA FUNCTIONS HAVE SUFFICIENT INDEPENDENCE AND AUTHORITY TO IMPLEMENT THESE ACTIVITIES.

THIS DISCUSSION WILL FOCUS ON SOME EXPERIENCES THAT HAVE AND CONTINUE TO GENERATE WIDESPREAD PUBLIC INTEREST. SPECIFICALLY, THERE HAVE BEEN SOME SERIOUS QUALITY ASSURANCE BREAKDOWNS WITH BROAD REPERCUSSIONS AT THE MARBLE HILL, MIDLAND, ZIMMER, SOUTH TEXAS, AND DIABLO CANYON CONSTRUCTION SITES.

MARBLE HILL

IN 1979, WEAKNESSES WERE IDENTIFIED IN THE PROGRAM FOR THE PLACEMENT OF CONCRETE AND RELATED QUALITY ASSURANCE MEASURES AT THE MARBLE HILL NUCLEAR PLANT CONSTRUCTION SITE IN SOUTHERN INDIANA.

WE INVESTIGATED THESE PROBLEMS WHEN A CONCRETE WORKER RAISED ALLEGATIONS THAT HONEYCOMBING, VOIDS AND SURFACE DEFECTS WERE BEING IMPROPERLY PATCHED. THESE ALLEGATIONS, WHICH WERE SUBSEQUENTLY SUBSTANTIATED, LED TO A BROADER INVESTIGATION THAT ADDRESSED OTHER AREAS OF WORK AT THE SITE. ABOUT THE SAME TIME, CODE COMPLIANCE PROBLEMS WERE IDENTIFIED BY THE INDIANA BOILER CODE INSPECTOR AND THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS.

THESE EVENTS LED TO A HALTING OF ALL SAFETY-RELATED WORK AT THE SITE IN AUGUST 1979 -- A MOVE TAKEN BY THE UTILITY AND CONFIRMED BY AN NRC ORDER. WORK WAS NOT PERMITTED BY THE NRC TO RESUME UNTIL DECEMBER 1980, SOME 16 MONTHS LATER, WHEN THE UTILITY'S QUALITY ASSURANCE PROGRAM --AND THAT OF ITS CONTRACTORS -- HAD BEEN SUBSTANTIALLY UPGRADED AND THE ADEQUACY OF COMPLETED CONSTRUCTION WORK HAD BEEN VERIFIED. DELAYS IN CONSTRUCTION AND EFFORTS TO CORRECT THESE AND OTHER PROBLEMS ARE ESTIMATED TO HAVE COST THE UTILITY HUNDREDS OF MILLIONS OF DOLLARS.

MIDLAND

IN THE CASE OF THE MIDLAND FACILITY IN MICHIGAN, EXCESSIVE SETTLEMENT OF THE DIESEL GENERATOR BUILDING WAS OBSERVED IN 1978. THE UNEXPECTED SETTLING WAS SUBSEQUENTLY ATTRIBUTED TO INADEQUATE AND POORLY COMPACTED SOIL UNDER THE BUILDING. FURTHER INVESTIGATION BY THE LICENSEE REVEALED THAT OTHER SAFETY-RELATED SYSTEMS AND STRUCTURES WERE AFFECTED. ALL OF THESE SYSTEMS AND STRUCTURES WERE NEARING COMPLETION AT THE TIME THE PROBLEM WAS DISCOVERED. THE NRC'S INVESTIGATION DETERMINED THAT DESIGN AND CONSTRUCTION SPECIFICATIONS HAD NOT BEEN FOLLOWED DURING PLACEMENT OF THE SOIL FILL MATERIALS AND THAT THERE WAS A LACK OF CONTROL AND SUPERVISION OF THE SOIL PLACEMENT ACTIVITIES BY THE UTILITY AND ITS CONTRACTORS. THE COSTS ASSOCIATED WITH ASSURING PROPER SOIL COMPACTION AND DEMONSTRATING THE ADEQUACY OF THE PLANT DESIGN ARE SIGNIFICANT. THE MATTER HAS STILL NOT BEEN RESOLVED AND THE ISSUES ARE CURRENTLY BEING LITIGATED BEFORE AN NRC HEARING BOARD.

ZIMMER

AT THE ZIMMER FACILITY IN SOUTHERN OHIO, THE NRC HAS BEEN INVESTIGATING ALLEGED QUALITY ASSURANCE IRREGULARITIES SINCE JANUARY OF THIS YEAR. THIS INVESTIGATION EFFORT, WHICH IS STILL ONGOING, STARTED WITH ALLEGATIONS FROM A COUPLE OF SOURCES, BUT SOON BROADENED TO MANY WORKERS AND EX-WORKERS. TO DATE WE HAVE

INTERVIEWED APPROXIMATELY 100 INDIVIDUALS AND EXPENDED OVER 250 MAN-DAYS ONSITE PURSUING THESE ALLEGATIONS.

THE CURRENT INVESTIGATION HAS IDENTIFIED A NUMBER OF QUALITY ASSURANCE-RELATED PROBLEMS AT THE ZIMMER SITE. THE MAJORITY OF THE PROBLEMS IDENTIFIED TO DATE FOCUS ON THE INEFFECTIVENESS OF CONTROLS IMPLEMENTED BY THE LICENSEE AND ITS CONTRACTORS FOR ASSURING THE QUALITY OF WORK PERFORMED. IN THAT REGARD, NUMEROUS DEFICIENCIES HAVE BEEN FOUND CONCERNING TRACEABILITY OF MATERIALS, HANDLING OF NONCONFORMANCE, INTERFACE BETWEEN CONSTRUCTION AND QUALITY CONTROL, QUALITY RECORDS, AND THE LICENSEE'S OVERVIEW OF ONGOING WORK.

THE IMPACT OF THE IDENTIFIED QUALITY ASSURANCE DEFICIENCIES ON THE ACTUAL CONSTRUCTION HAS YET TO BE DETERMINED. AN EXTENSIVE REVIEW OF THE AS BUILT PLANT IS CURRENTLY BEING PERFORMED. LIMITED INDEPENDENT MEASUREMENTS WERE PERFORMED BY THE NRC IN SELECTED AREAS OF CONCERN IN AN ATTEMPT TO CHARACTERIZE THE ACTUAL SAFETY SIGNIFICANCE OF THESE DEFICIENCIES. ALTHOUGH A FEW PROBLEMS REQUIRING CORRECTIVE ACTION WERE IDENTIFIED, THE MAJORITY OF THE TESTS AND EXAMINATIONS DISCLOSED NO HARDWARE PROBLEMS.

BEFORE THE PLANT CAN BE LICENSED A COMPREHENSIVE QUALITY CONFIRMATION PROGRAM WILL HAVE TO BE CONDUCTED AND IDENTIFIED PROBLEM

AREAS RESOLVED. BY ITSELF, WITHOUT FACTORING IN ANY REWORK, THE QUALITY CONFIRMATION PROGRAM WILL BE BOTH COSTLY AND TIME CONSUMING. THE EFFECT OF THIS ON THE CONSTRUCTION SCHEDULE OF THE PLANT REMAINS TO BE DETERMINED.

SOUTH TEXAS

IN JANUARY 1981, HOUSTON LIGHTING AND POWER COMPANY (HL&P) INITIATED A DESIGN REVIEW OF THOSE PORTIONS OF THE ENGINEERING DESIGN WORK PERFORMED BY BROWN AND ROOT, INC., (B&R) FOR THE SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION (STP). THE PURPOSE OF THIS REVIEW WAS TO ASCERTAIN THE OVERALL ADEQUACY OF THE STP DESIGN. QUADREX CORPORATION WAS ASKED TO ASSIST HL&P IN A REVIEW OF THE FOLLOWING B&R TECHNICAL DISCIPLINES:

- CIVIL/STRUCTURAL
- COMPUTER PROGRAMS AND CODES
- ELECTRICAL/INSTRUMENTATION AND CONTROL
- GEOTECHNIC
- HEATING, VENTILATING AND AIR CONDITIONING
- MECHANICAL
- NUCLEAR ANALYSIS
- PIPING AND SUPPORTS/STRESS AND SPECIAL STRESS
- RADIOLOGICAL CONTROL

THE LICENSEE MET WITH QUADREX CORPORATION FOR THE FIRST TIME ON JANUARY 16, 1981, AND SEVERAL OTHER TIMES IN JANUARY AND FEBRUARY 1981, TO PLAN THE REVIEW. THE REVIEW BY QUADREX INVOLVED 12 ENGINEERING CONSULTANT PERSONNEL WHO SPENT MORE THAN SIX WEEKS IN AUDITING B&R DESIGN ENGINEERING DOCUMENTS AND INTERVIEWING VARIOUS B&R DISCIPLINE ENGINEERS. THE REPORT ON THE QUADREX EFFORT DATED MAY 1981, WAS SUBMITTED BY THE LICENSEE TO THE NRC LICENSING HEARING BOARD ON SEPTEMBER 28, 1981. BREIFLY, THE QUADREX REPORT FOUND THAT BROWN & ROOT APPARENTLY FAILED TO PROPERLY IMPLEMENT THE QA PROGRAM IN THE DESIGN AREA BUT ALSO FAILED TO PROPERLY IMPLEMENT AN OVERALL DESIGN PROCESS CONSISTENT WITH THE NEEDS OF A NUCLEAR POWER PLANT. AS A RESULT VERIFICATION OF DESIGN INFORMATION WAS APPARENTLY NOT PERFORMED IN A TIMELY MANNER, AND REGULATORY COMMITMENTS FOR SAFETY DID NOT APPEAR TO BE FULLY OR PROPERLY IMPLEMENTED TO SATISFY NRC REQUIREMENTS FOR LICENSABILITY.

NRC INSPECTION REPORTS DATING BACK TO 1979 FOUND PROBLEMS AT THE SOUTH TEXAS PLANT SIMILAR TO THOSE IDENTIFIED IN THE QUADREX REPORT. HOWEVER, THE AGENCY'S AUDITS DID NOT SURFACE THE NUMBER OF PROBLEMS SUGGESTED BY THE QUADREX REPORT. THOUGH WE WERE AWARE OF QA PROBLEMS AT SOUTH TEXAS AND HAD CITED THE LICENSEE FOR A BREAKDOWN IN THEIR QA PROGRAM IN APRIL 1980, THE MAGNITUDE OF POTENTIAL PROBLEMS WAS NOT FULLY APPRECIATED UNTIL WE FIRST REVIEWED THE REPORT IN AUGUST OF 1981.

IN LATE SEPTEMBER THE LICENSEE ANNOUNCED THAT BROWN AND ROOT WAS BEING REPLACED BY BECHTEL POWER CORPORATION AS ARCHITECT-ENGINEER. WE INTEND TO CAREFULLY MONITOR HOW BECHTEL INVESTIGATES AND DISPOSES OF THE PROBLEMS SURFACED BY THE QUADREX REPORT.

DIABLO CANYON

AT DIABLO CANYON, THE PACIFIC GAS & ELECTRIC COMPANY (PG&E) PROVIDED INCORRECT INFORMATION TO A EXPERT CONSULTANT, WHO USED THE INFORMATION IN DEVELOPING THE SEISMIC RESPONSE SPECTRA FOR THE DESIGN OF CERTAIN SEISMIC PIPING AND EQUIPMENT RESTRAINTS. OUR INVESTIGATORS HAVE FOUND THAT THERE WAS A LACK OF RIGOR AND FORMALITY IN THE PROCEDURES USED FOR VERIFYING THE ACCURACY OF INFORMATION TRANSFERRED BY PG&E TO ITS CONSULTANTS. THESE PROCEDURES DID NOT COMPLY WITH OUR REQUIREMENTS CALLING FOR VERIFICATION OF DESIGN INFORMATION AT EACH STAGE OF THE PROCESS BY AN INDEPENDENT PERSON QUALIFIED IN THE PERTINENT DISCIPLINES. PROPER QUALITY ASSURANCE CONTROLS WERE NOT EMPLOYED IN TECHNICAL AND PROCUREMENT COMMUNICATIONS WITH SERVICE-TYPE CONTRACTORS. NOR WERE DOCUMENT CONTROLS ADEQUATE TO ASSURE THAT THOSE INVOLVED IN DESIGN HAD READY ACCESS TO THE MOST RECENT INFORMATION AVAILABLE.

BECAUSE OF THE INADEQUACY OF QA CONTROLS OVER DESIGN VERIFICATION, PROCUREMENT AND THE TRANSMITTAL OF DOCUMENTS TO SERVICE CONTRACTORS, THE ACCEPTABILITY OF THE DESIGNS BASED ON THEIR ANALYSES IS NOW IN QUESTION.

AS A RESULT, THE STAFF HAS DECIDED THAT THERE IS SUFFICIENT REASON TO REVIEW THE ENTIRE PROCESS FOR SEISMIC DESIGN; TO REVIEW THE ADEQUACY OF OTHER PLANT DESIGN ASPECTS, PARTICULARLY THOSE THAT WERE BASED ON ENGINEERING INFORMATION DEVELOPED UNDER OTHER SERVICE-TYPE CONTRACTS; AND TO REVIEW THE IMPLEMENTATION OF THE UTILITY QA PROGRAM IN THESE AREAS.

IN LOOKING AT THE MARBLE HILL, MIDLAND, ZIMMER, SOUTH TEXAS, AND DIABLO CANYON PROBLEMS, QUESTIONS HAVE BEEN RAISED AS TO WHY THE LICENSEE'S QUALITY ASSURANCE PROGRAM AND THE NRC INSPECTION PROGRAM HAD NOT IDENTIFIED THE PROBLEMS SOONER. CLEARLY, IN EACH CASE, THERE WAS AN OVERRELIANCE BY THE UTILITY ON ITS CONTRACTORS FOR MAINTAINING A THOROUGH QUALITY ASSURANCE PROGRAM. THE UTILITY'S OWN QA STAFF WAS TOO SMALL TO MAINTAIN SUFFICIENT SURVEILLANCE OVER THE WORK OF CONTRACTORS. IN TWO OF THE CASES WE SAW INSTANCES WHERE THE CONSTRUCTION MANAGEMENT DOMINATED OR CONTROLLED THE QUALITY ASSURANCE PROGRAM AND PERSONNEL. AND, IN EACH OF THE CASES WHERE PROBLEMS HAD BEEN IDENTIFIED, THE CORRECTIVE ACTION TAKEN WAS NOT SUFFICIENTLY BROAD. TOO FREQUENTLY, THE RESPONSE WAS ONE OF TREATING THE SYMPTOM, RATHER THAN FINDING THE BASIC CAUSE AND CORRECTING IT.

IN ANALYZING THE IDENTIFIED PROBLEMS AREAS, ONE CAN COME UP WITH A LIST OF IMMEDIATE CAUSES -- SUCH AS UNQUALIFIED WORKERS OR QC INSPECTORS, FALSIFIED RECORDS, INTIMIDATION OF QUALITY

CONTROL INSPECTORS, LACK OF AUTHORITY, LACK OF COMMUNICATION, INADEQUATE STAFFING LEVELS, INADEQUATE CORRECTIVE ACTION SYSTEMS, LACK OF SUPERVISION, POOR TO NONEXISTENT PROCEDURES, POOR DESIGN AND CHANGE CONTROL, DESIGN ERRORS, INADEQUATE ANALYSES, POOR QUALITY COMPONENTS, AND SO ON. MOST OF THESE CAN BE TRACED TO FAILURE OF QUALITY ASSURANCE DUE TO INEFFECTIVE MANAGEMENT CONTROL OF THE QA PROGRAM. THERE ARE A MYRIAD OF EXCUSES AND REASONS WHY MANAGEMENT FAILS. SOME ARE EXPLICIT FAILURES OF PERFORMANCE OR LACK OF ATTENTION. OTHER FAILURES ARISING FROM POOR ATTITUDES AND PERCEPTIONS ARE DIFFICULT TO IDENTIFY. THE NRC CANNOT TOLERATE THESE DEFECTS BECAUSE OF THEIR POTENTIAL IMPACT IN TERMS OF PUBLIC RISK. IT IS SURPRISING THAT SOME LICENSEES ARE INSUFFICIENTLY CONCERNED ABOUT QUALITY ASSURANCE NOT ONLY BECAUSE OF THE SAFETY IMPLICATIONS BUT ALSO BECAUSE OF THE IMMENSE COST OF MISTAKES AND OF THE RESULTING DELAY IN CONSTRUCTION.

GIVEN THESE INSTANCES OF BREAKDOWNS IN MANAGEMENT CONTROL OF CONSTRUCTION QUALITY AND THE COMMISSION'S DISSATISFACTION, THE ISSUE IS "WHAT ARE WE DOING ABOUT IT?"

WITHOUT DOUBT, THERE HAVE BEEN SHORTCOMINGS IN THE NRC INSPECTION PROGRAM AT CONSTRUCTION SITES. THERE HAVE BEEN CASES WHERE WE HAVE FAILED TO SEE THE BREADTH OR DEPTH OF A PROBLEM. WE IDENTIFIED SPECIFIC VIOLATIONS OF REQUIREMENTS WITHOUT REQUIRING THE CORRECTION OF THE BASIC CAUSE OF THE PROBLEM. ADDITIONALLY,

WE MAY HAVE SPENT TOO LITTLE TIME WITH QUALITY CONTROL INSPECTORS AND CONTRUCTION WORKERS TO GET THEIR VIEWS ON THE IMPLEMENTATION OF QUALITY ASSURANCE ACTIVITIES AT THE SITE. HOWEVER, WE ARE TAKING STEPS TO ASSURE ATTENTION TO CONSTRUCTION QA INCLUDING DESIGNATION OF RESIDENT INSPECTORS AT ALL CONTRUCTION SITES.

THE COMMISSION HAS MADE OR IS CONSIDERING A NUMBER OF CHANGES OF ITS INSPECTION AND ENFORCEMENT PROGRAM TO INCREASE THE EMPHASIS ON IMPLEMENTATION OF QA PROGRAMS. LET ME ADDRESS SIX SPECIFIC ACTIVITIES:

1. AS INDICATED ABOVE, NRC RESIDENT INSPECTORS HAVE BEEN OR WILL BE STATIONED AT ALL CONSTRUCTION SITES WHERE ACTIVE CONSTRUCTION IS PRESENTLY UNDER WAY AND THE PROJECT IS AT LEAST 15 PERCENT COMPLETE. BASED ON OUR EXPERIENCE WITH THE RESIDENT INSPECTION PROGRAM TO DATE, WE BELIEVE RESIDENT INSPECTORS ENHANCE THE NRC'S ABILITY TO MONITOR QUALITY ASSURANCE ACTIVITIES AND IDENTIFY THE SYMPTOMS OF BREAKDOWN IN MANAGEMENT CONTROL.

2. THERE HAS BEEN A TOUGHENING OF THE NRC'S ENFORCEMENT POSTURE OVER THE PAST COUPLE OF YEARS AND THE NRC'S REVISED ENFORCEMENT POLICY HAS PLACED EMPHASIS ON DEALING WITH POOR REGULATORY PERFORMANCE IN THE CONSTRUCTION AREAS.

3. WE HAVE COMPLETED A TRIAL PROGRAM OF TEAM INSPECTIONS WHEREBY SEVERAL NRC INSPECTORS GO TO A CONSTRUCTION SITE FOR TWO TO THREE WEEKS TO DO A BROAD, INTENSIVE INSPECTION OF THE QUALITY ASSURANCE PROGRAM FOR ONGOING WORK. THIS APPROACH ENABLES NRC TO GAIN A TOTAL PROJECT PERSPECTIVE TO A GREATER EXTENT THAN PAST PRACTICE. THE ADVANTAGE OF THIS DETAILED "SNAPSHOT" IS AN ENHANCED ABILITY TO EVALUATE MANAGEMENT EFFECTIVENESS. THE USE OF SUCH INSPECTION TEAMS IS EXTREMELY LIMITED BY THE AVAILABILITY OF INSPECTORS AND FUNDS FOR THIS PURPOSE. WITH ADDITIONAL RESOURCES, WE COULD SEND INSPECTION TEAMS TO EACH CONSTRUCTION SITE TO DO MORE COMPREHENSIVE INSPECTIONS

4. THE NRC CONSTRUCTION INSPECTION PROGRAM IS UNDER REVISION TO ACCOMPLISH SEVERAL OBJECTIVES. WE ARE RECASTING INSPECTION PROCEDURES TO DELETE INSPECTION ACTIVITIES OF LESSER IMPORTANCE AND TO REDUCE DUPLICATION OF EFFORT BY RESIDENT AND REGIONAL-BASED SPECIALIST INSPECTORS. IN SITUATIONS WHERE INSPECTOR RESOURCES LIMITATIONS PRECLUDE COMPLETING THE ENTIRE INSPECTION PROGRAM, WE ARE ORDERING OUR PRIORITIES SO THAT THE MOST IMPORTANT INSPECTIONS WILL BE COMPLETED.

5. FORMALIZED PERFORMANCE APPRAISALS OF LICENSEE REGULATORY PERFORMANCE ARE BEING CONDUCTED ANNUALLY BY THE NRC (SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE PROGRAM). THE APPRAISALS, WHICH REVIEW THE COLLECTIVE NRC EXPERIENCE WITH EACH POWER REACTOR, BRING THE BROAD ISSUES OF PERFORMANCE EFFECTIVENESS TO THE ATTENTION OF SENIOR LICENSEE OFFICIALS.

6. WE ARE NOW USING OUR OWN MOBILE LABORATORY FOR NONDESTRUCTIVE EXAMINATION (NDE) AT CONSTRUCTION SITES. THIS NDE VAN HAS MULTIPLE CAPABILITIES THAT INCLUDE RADIOGRAPH DEVELOPMENT, METALLURGICAL ANALYSIS, AND HARDNESS, ULTRASONIC, DYE PENETRANT AND MAGNETIC PARTICLE TESTING. THE EXAMINATIONS THAT WE PERFORM ARE INTENDED TO CONFIRM QUALITY BASED ON A SELECTIVE SAMPLING APPROACH.

THE COMMISSION IS CONTINUING TO REVIEW ITS RESPONSIBILITIES IN THE NUCLEAR QA AREA IN ORDER TO DEVELOP IMPROVEMENTS IN DEFINING REQUIREMENTS, REVIEWING LICENSEE QA PROGRAMS, AND INSPECTION PRACTICES WHERE THEY ARE CALLED FOR.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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FOR IMMEDIATE RELEASE

Remarks by
Nunzio J. Palladino, Chairman
U. S. Nuclear Regulatory Commission
at the
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San Francisco, California
December 1, 1981

NUCLEAR REGULATORY REFORM

Good morning, Ladies and Gentlemen. I am pleased to speak to you today about nuclear regulatory reform.

I want to talk about regulatory reform as it involves both the Nuclear Regulatory Commission and the nuclear industry. I will discuss actions we have taken and plan to take so that nuclear regulation can work to the net benefit of the Nation. I will be talking about some of the major issues we, and you, have to deal with at this point in time.

Before I address specific actions and issues, however, I want to make a point of fundamental and critical importance.

Regulatory reform is not--I repeat, is not--reform of the regulatory authority only. It involves industry as well. Regulatory reform cuts both ways. It has to if it is going to succeed. When we in regulation have done everything we can to expedite our processes, remove needless regulatory burdens, and widen our perspective to account for all the effects of our decisions, only half the battle, or less than half, will be won. The rest involves you.

If the nuclear industry does not do its part, no amount of regulatory reform will save it from the consequences of its own failures to achieve the quality of construction and plant operations it must have for its own well-being and for the safety of the public it serves.

Based on quality assurance failures that have recently come to light, I am not convinced that all of the industry has been doing its part.

Safety From Quality Assurance

Some utilities fall short of protecting their own best interests and meeting the high standards expected for nuclear power. Unfortunately, the poor performers are the ones who impact most adversely on the safety and credibility of the industry. Their deficiencies in quality assurance are inexcusable.

There have been lapses of many kinds--in design analyses resulting in built-in design errors; in poor construction practices; in falsified documents; in harassment of quality control personnel; and in inadequate training of reactor operators.

Finding problems may imply good inspection, but not necessarily good quality. Quality cannot be inspected into a plant. It must be built into the plant. All of you, I am sure, would say that you know this, but the practices at some plants do not confirm that the importance of this principle is always well understood. These practices must change if true regulatory reform is to take place.

Reform must be a joint undertaking by both the regulators and those being regulated. Certainly, we in regulation can do our job better than before, and we are trying to do that. But regulation alone cannot assure good plants; industry plays the major role. We, as regulators can only prevent inadequate plants from being built or from operating, and we will not shy away from doing that. Whatever changes reform will bring, the paramount mission of the NRC remains the protection of the health and safety of the public. It is your mission to build the plants well and operate them properly so nuclear power can be provided safely.

Let me now turn to:

Specific Regulatory Actions and Issues

In a talk earlier this year, I identified five themes that require implementation if regulatory reform is to be achieved. To these, based on my foregoing comments, I have added a sixth. It is these six themes that I want to discuss with you and report on now. In all six areas, action is already under way, but in each area more must be done.

The first theme involves the potential for a near-term reactor licensing logjam and our efforts, within the NRC, to review license applications at an unprecedented pace in the next two years.

Second, is the pressing need to make sense--in terms of establishing priorities and realistic schedules--out of the mass of requirements imposed on the nuclear industry or backlogged in the aftermath of the Three Mile Island accident. We must also make sure that future regulatory requirements are worth doing in terms of safety. A major reorganization within NRC has recently taken place in an effort to meet these needs.

Third, is the matter of streamlining the reactor licensing process for the long term, beginning with the near-term steps we are taking to try to make this possible. I want to take advantage of previous studies and proceed to implement streamlining features already well recognized as potentially effective. I have established an internal NRC task force to take the first steps toward achieving these goals.

Fourth, is the concern I feel about the slow progress in nuclear waste management, and also in the cleanup of Three Mile Island. These are situations which simply must be resolved.

The fifth theme involves the development of tools for more effective management of our regulatory efforts. A key to regulatory reform is that the regulatory body operate along clearly defined lines, guided by specific goals and priorities. My associations with the NRC staff have convinced me that they are thoroughly competent and conscientious. This staff can do the job if there is leadership and clear policy guidance from the top level of management. My personal goal as Chairman of the NRC is to provide that leadership.

Sixth is the role of industry. As I have already stated, the NRC alone cannot carry the burden of regulatory reform. The industry must bear its share of the weight.

Near-Term Peactor Licensing Challenges

Let me turn now to my first-named theme: preventing a possible near-term reactor licensing logjam.

If plants are completed on the dates now projected by their owners, the Commission will be faced with making final decisions on applications for as many as 33 full-power operating licenses by the end of 1983. This would represent, as I said before, an unprecedented rate of licensing activity for the NRC. Even if schedules for some plants slip, as they have a way of doing, the NRC would be faced with a challenging licensing load.

We have taken steps to meet this challenging schedule while at the same time ensuring that each application receives a careful, professional review. The increased pace will not be allowed to force the licensing or hearing staffs into performing cursory reviews.

An area that has proved a very time-consuming phase of the licensing review is emergency preparedness. It is a complex and difficult task for all concerned. It has become a potentially serious source of delay.

Under an arrangement existing since early 1980, the NRC works with the Federal Emergency Management Agency (FEMA) in deciding on the adequacy of emergency preparedness for a nuclear facility. I have met with the Director of FEMA, and our staffs are working together to map out the full dimensions of the problem and find a way to deal with it. Proposals for alleviating potential schedule delays from emergency preparedness are now before the Commission for action.

On the whole, I feel we can deal successfully with the kinds of complications we can now foresee. Our licensing staff has been mobilized for many months to bring down the backlog of impacted plants. So far they have had good success. The Commission also charged the hearing boards to take firm hold of the hearings and keep them moving. I hope this step will also be successful.

We intend to continue to search for innovative solutions when sources of delay can be identified. Nuclear regulation simply cannot become a procedural bottleneck to the Nation's ability to bring new sources of energy on line, especially those ready to come on line in the near future.

Getting Control of Requirements

My second specific theme is the vital business of getting the imposition of new requirements under control.

I have no doubt that nuclear power plants are safer now than they were before the TMI accident. NRC requirements and inspections, as well as industry initiatives, have had a great deal to do with that. But I also believe that our safety priorities have not been made clear, and that our demands on licensee resources have sometimes been excessive and ill-coordinated. The licensees maintain, with some justification I believe, that the sheer volume of new safety requirements constitutes a safety concern in itself.

Last month a major reorganization was implemented within the agency precisely to bring about the needed reform in this area. We have created a Generic Requirements Review Committee to act as a focal point for controlling the issuance of both new requirements and backfitting requirements to be placed on existing nuclear plants. It will also enable us to focus our attention on ways to expedite the processing of backlogged licensing actions, to set priorities among requirements according to their real demonstrable safety significance, and to identify those which can be deferred or dropped entirely.

We intend to sharpen our requirements, reduce them to manageable sets, and establish reasonable timetables for implementation. In return we expect a full and prompt compliance by the licensees. Just as the regulator should avoid unnecessary demands on licensees, so must the licensee avoid a superficial compliance that falls short of the intended increment in safety.

Streamlining the Licensing Process

I want now to take up my third theme, one which is really a keystone of regulatory reform--streamlining of the licensing process.

It has been quite a while since we as regulators stood back and took a long hard look at the way nuclear power plants are licensed. With that realization, as indicated earlier, we have established a task force at the NRC to explore ways to undertake a basic overhaul of the process. I am not talking here about another study of ways to improve licensing. We have had enough studies. We need action.

Just to give you an indication of the direction of our thinking, let me mention one-step licensing. One-step licensing, when accompanied by standardization and early siting, merits the most serious consideration. It makes good sense to move as many issues as possible forward to the construction permit stage for thorough review before design and construction commitments are made. To make this work, applicants will have to submit essentially final designs at the outset. Standardization by permitting attention to a limited set of designs could facilitate this process.

Without extensive standardization of entire plant systems, one-step licensing may offer no advantages in time saved since applicants in each case would have to submit at the outset designs much closer to completion than they now do. Standardization would also facilitate high quality construction and safe operation of specific plant designs.

We will be giving attention to modifying other aspects of streamlining the process, such as NRC's role in need-for-power determinations, anti-trust considerations, and alternatives to the adjudicatory hearing format. I will not try to elaborate on the various options now. We will give consideration to the whole spectrum, including the certification of designs and sites as well as possible measures to control additional requirements after designs are approved.

Nuclear Waste Disposal and Three Mile Island

For the fourth topic, I want to raise some concerns that lie somewhat outside the specific realm of reactor licensing but are certainly not unrelated to it.

One of these concerns is waste management, especially high-level waste management. The development and demonstration of a high-level waste repository is, of course, a task in the hands of the Department of Energy, or its successor. The NRC has licensing responsibilities for the facility eventually proposed, and we want to be of assistance to DOE in the test and evaluation steps leading to a final repository.

The NRC staff has worked diligently over the past several years, on its own and with DOE officials, to acquire the expertise and establish the procedural and technical requirements from which to make the necessary licensing decisions. We will continue to consult with DOE--moving forward with them in the chosen direction and, if necessary, at an accelerated pace.

I welcome the recent initiatives of the Congress to relieve the uncertainty surrounding the long unresolved spent fuel and waste management questions. This uncertainty undermines the confidence of the general public, the utilities, and financial institutions in the viability of nuclear power.

Next, I hope that the Commission can begin to pick up the pace of its own proceeding to determine, as required by the courts, whether it has confidence that radioactive waste can be disposed of safely and in a timely manner.

It is also important to me--and, I hope, to all of you--to see some real progress soon in developing the means to finance and carry out an expeditious and complete cleanup of Three Mile Island, Unit 2. Conditions persisting on that site since the accident took place can only be regarded as very serious. Most disturbing is the uncertainty about the availability of resources to continue and complete the job of decontamination. Progress has been agonizingly slow thus far. The prospect of its becoming slower still, or even grinding to a halt because of lack of funds is, quite simply, unacceptable. I hope that the recent initiatives of the President, the Edison Electric Institute, and others mark the beginning of a more determined commitment to the cleanup of Three Mile Island.

Tools for Managing Regulatory Efforts

As a fifth subject, I want to discuss certain measures related to activities within the NRC that are going to prove valuable in the setting of priorities among requirements and clarifying the purpose behind them.

One of these is the formulation of an overall safety goal for nuclear operations. The project is an ambitious undertaking, requiring a painstaking examination of the views of a great many individuals and organizations. That takes time, but the benefit to us and to our licensees, as well as to the general public, should be considerable. Given recent progress within NRC in articulating a safety goal, I sense that we can now see the light at the end of the tunnel for this endeavor.

Another factor that I hope can bring new order to regulatory requirements is probabilistic risk assessment. It is a developing area, but one full of potential usefulness

both for weighing risks against one another and for defining achieved safety levels. I believe application of the methodology--for example, in connection with steps we are taking to control requirements--can do a great deal to dispel the murkiness that surrounds so many regulatory decisions.

It is essential that we bring an improved level of logic, discipline and clarity to the identification of risk and the attendant requirements. These tools--the safety goal and probabilistic risk assessment--will, as they develop, help make that possible.

Consistent with the logic we seek in a safety goal and in risk assessment, I believe we must review the priority for the development of a new siting rule. Without belaboring the subject, I think we are proceeding on it in a way that is the reverse of what logic would dictate.

Rather than rushing to develop a new siting rule now, I believe that we ought to first develop a safety goal and also gain a better understanding of the source term. Better understanding of the source term--that is, the types and amounts of radioactivity that might be dispersed in various nuclear accident scenarios--is important because recent preliminary studies suggest that less radioactivity may be dispersed than was once generally believed.

Finally, consistent with the number one priority to make sure that nuclear plants are operated safely, a subject of particular importance is operating experience. I refer specifically to assuring that all concerned learn the lessons that only experience can teach.

We are giving the operating experience of licensed reactor facilities closer surveillance than ever before, and I hope you are doing the same. This scrutiny should help both the NRC and the industry see precursors that signal problems before they become serious. In that way changes to our requirements, as well as to your procedures and equipment, can be focused on areas that have a direct and empirically determined safety payoff.

In addition, what I would like to see develop as a result of our emphasis on operating experience is a pervasive diagnostic skill at every level of plant operations. Plant managers and supervisors, as well as operators, should be able to diagnose and deal with off-normal conditions. The ability to do that with skill and speed is the product of experience. It is an important ingredient for safety.

Industry's Role in Regulatory Reform

My sixth and final topic returns to you. Industry has the key role in the construction and safe operation of nuclear power plants. Public health and safety considerations as well as economic imperatives dictate use of the highest professional standards in building and operating a nuclear plant. When construction or operation falls below the highest standards, the entire industry is hurt.

During my first five months as NRC Chairman, a number of deficiencies at some plants have come to my attention which show a surprising lack of professionalism in the construction and preparation for operation of nuclear facilities. The responsibility for such deficiencies rests squarely on the shoulders of management. Avoidance and correction of such deficiencies in turn can come about only from effective attention of management in all organizations involved--utilities as well as their contractors.

I don't mean to absolve the NRC of its portion of responsibility at all. (In a sense, every deficiency that is identified or that finds its way into a plant or its operation can be viewed as an NRC failure as well as an **industry failure.**)

I intend that NRC examine regulatory policies toward quality assurance. The industry would also do well to examine its managerial policies toward quality assurance (QA). One can ask a number of questions about management attention to QA, but the most important is, does senior management back up the QA staff in a way that lets everyone concerned understand that it means business?

I suggest that, just as all utilities have certified independent financial audits of their fiscal activities, so should they have certified independent performance audits of their QA activities. This may be an activity on which INPO, the Institute for Nuclear Power Operations, can provide help. If utilities don't do these audits themselves, we may have to require them.

American Electric Power Service Corporation
D. C. Cook 1, 2 (50-315, 50-316)

The Cleveland Electric Illuminating Company
Perry 1, 2 (50-440, 50-441)

Commonwealth Edison Company
Braidwood 1, 2 (50-456, 50-457)
Byron 1, 2 (50-454, 50-455)
Dresden 1, 2, 3 (50-10, 50-237, 50-249)
La Salle 1, 2 (50-373, 50-374)
Quad-Cities 1, 2 (50-254, 50-265)
Zion 1, 2 (50-295, 50-304)

Consumers Power Company
Big Rock Point (50-155)
Palisades (50-255)
Midland 1, 2 (50-329, 50-330)

Dairyland Power Corporation
LACBWR (50-409)

The Detroit Edison Company
Fermi 2 (50-341)

Illinois Power Company
Clinton 1, 2 (50-461, 50-462)

Iowa Electric Light and Power Company
Duane Arnold (50-331)

Northern Indiana Public Service Company
Bailly (50-367)

Northern States Power Company
Monticello (50-263)
Prairie Island 1, 2 (50-282, 50-306)

Public Service of Indiana
Marble Hill 1, 2 (50-546, 50-547)

Toledo Edison Company
Davis-Besse 1 (50-346)

Union Electric Company
Callaway 1, 2 (40-483, 50-486)

Wisconsin Electric Power Company
Point Beach 1, 2 (50-266, 50-301)

Wisconsin Public Service Corporation
Kewaunee (50-305)