

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

In the Matter of)
) Construction Permit
CONSUMERS POWER COMPANY) Nos. 81 and 82
(MIDLAND PLANT, Units 1 & 2)

ANSWERS OF BECHTEL POWER CORPORATION
AND BECHTEL ASSOCIATES PROFESSIONAL
CORPORATION ("BECHTEL") TO SAGINAW
INTERROGATORIES

Bechtel makes the following answers to the Saginaw Interrogatories served upon Bechtel. It is to be noted that persons who have knowledge of the facts are numerous and thus the names of a representative number of persons are supplied in the interest of expediting the furnishing of these answers. Similarly, the names of those preparing the interrogatory answers include only those who did so to a substantial extent, and excludes those with minimal participation, clericals, etc.

Interrogatory 1: Define the words "compliance with quality assurance regulations" as those words are employed and as you understand them in the Commission's Show Cause order in this proceeding.

Answer: As used in the context of the Order to Show Cause, Bechtel's understanding of the words, "compliance with quality assurance regulations", is the implementation of Bechtel's and Consumers' accepted quality assurance programs in accordance with the requirements of 10 CFR Part 50, Appendix B, including the establishment of necessary quality related procedures, the preparation and retention of documentation evidencing the implementation of the procedures, audits, follow-up of audit reports and management commitment to the quality program.

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Identification of representative persons having knowledge of facts contained in this Answer or participating substantially in the preparation of it:

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W. E. Ferriss	2762 S. State Ann Arbor, Michigan 48104
J. I. Dotson	Tecumseh, Michigan 48104
D. R. Johnson	53 Wildwood Avenue Piedmont, California 94610
M. M. Krout	1225 Astor Drive Ann Arbor, Michigan 48104
P. A. Martinez	3244 Bluett Ann Arbor, Michigan 48105
L. M. Scoville	1600 First Federal Building Detroit, Michigan 48226

Interrogatory 7: Identify in connection with each of Consumers Power Company facilities as set forth in the definitional section each document ever received or reviewed, each meeting you have had (include dates and names of attendees) and each physical structure you have reviewed in connection with your analysis of first compliance with quality assurance regulations and second reasonable assurance of continuation with compliance with quality assurance regulations.

Answer: Bechtel's overall quality assurance program includes quality related activities performed by each of the following groups or departments: Quality Assurance; Quality Control; Engineering; Procurement Inspection; Materials, Fabrication and Quality Control Services; and Construction. As indicated in Bechtel's Objections to the Saginaw Interrogatories, each of these groups

or departments generates a large volume of documents during the course of the implementation and performance of its quality requirements. The total of these documents is estimated to be in excess of one million pieces of paper. A number of Bechtel employees, and Bechtel's counsel, have been reviewing these documents during the last three months in order to identify and collect the relevant documents. As indicated in Bechtel's Objections to Saginaw's Request for an Extension of Time Regarding Motion for Production of Documents, the majority, if not all, of the documents for which identification is sought in Saginaw's Interrogatories will be promptly available for inspection and copying and Bechtel will make them available in lieu of listing each of them. Additionally, in its Answer to Interrogatory 16, Bechtel identifies its various categories of quality related documents. The review of Bechtel's documents has been a monumental task. Accordingly, it is possible that some relevant documents will, by inadvertence, not be offered for inspection, although Bechtel has made and continues to make a good faith effort to produce all relevant documents for which Saginaw requested identification.

Using the term "meeting" in its broadest sense, there have been hundreds and probably thousands of meetings or conversations between two or more persons concerning substantially all quality assurance/quality control matters pertaining to the Midland Project. It is impossible to identify each such meeting. Minutes of such meetings, to the extent they were prepared, will be made available for inspection and copying together with the documents referred to above, and generally include the names of attendees. Meetings or conversations for which minutes may or may not have been prepared include:

some of the reports referred to in the Answer to Interrogatory 12(c); audit planning and audit exit interviews; evaluations of vendors and subcontractors' QA Programs; items referred to in the QA Daily Log; management visits to the site; discussions with various AEC and client representatives; construction, procurement and engineering procedures; quality assurance trends; quality assurance and quality control organization; cadwelding; resumption of construction after demobilization; ALAB-106 procedures; and the implementation activities of each of Bechtel's groups having quality responsibilities which are discussed in the Answer to Interrogatory 10(i).

Bechtel interprets the term "physical structure" to include the structures, systems and components which prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public, upon which design or construction activities have begun. A list of such structures is attached as Exhibit 7-1.

Identification of representative persons having knowledge of the facts contained in this Answer or participating substantially in the preparation of it:

M. M. Krout	1225 Astor Drive Ann Arbor, Michigan 48104
J. L. Hurley	2681 Hawks Avenue Ann Arbor, Michigan 48104
L. M. Scoville	1600 First Federal Building Detroit, Michigan 48226
Persons identified in meeting minutes	

Interrogatory 9: Define the words "reasonable assurance" as those words are used, and as you understand them in the Show Cause order in this proceeding.

Answer: Bechtel's understanding of the term "reasonable assurance" is that under all of the human circumstances and conditions involved in the design, procurement and construction of a nuclear power plant, a reasonable person, aware of applicable requirements and implementing programs and knowledgeable of nuclear design, procurement and construction would believe that it was probable that the various elements of the overall quality assurance program will be implemented as required by 10 CFR Part 50, Appendix B. See Answer to Interrogatory 1 for Identification of Persons.

Interrogatory 10(a): With reference to your "Petition to Intervene" filed in this proceeding state:

- (a) Define and list in as much detail as possible the "broad experience" which you allege in paragraph 1;

Answer: Bechtel entered the nuclear power industry over two decades ago and has participated in the engineering design and/or construction of many major nuclear plants in the United States and abroad. To date, more than a dozen units, on which Bechtel has had such involvement, have been licensed for operation. Nuclear News, a publication of the American Nuclear Society, in its "Buyers Guide Seventy-Four" Issue (mid-February, 1974/Vol. 17/No. 3) published a worldwide list of the commercial nuclear power plants that were operable, under construction, or on order (30 MWe and over) as of December 31, 1973. Bechtel is identified in this list as the architect engineer and/or constructor for 63 plants in four different countries.

Bechtel has experience with nearly all types of reactor design and power concepts, working with major worldwide suppliers of nuclear steam supply systems and turbine generators. This involvement has included the following nuclear systems: pressurized water reactor; boiling water reactor; sodium cooled reactor; sodium graphite reactor; liquid metal fast breeder reactor; high temperature gas cooled reactor; pressurized heavy water reactor; boiling heavy water reactor; advanced gas cooled reactor; and steam generating heavy water reactor. Bechtel has participated in many projects involving advanced technological, design, and production milestones. Some highlights of this activity are:

Construction services for the world's first reactor facility to generate electricity from nuclear fuel.

Engineering, procurement and construction services for the world's first privately financed nuclear power generation facility.

Design and construction of the first large-capacity, privately financed nuclear power plant in the USA.

Comprehensive design and construction services for the first nuclear addition to a conventional steam plant.

Engineering, procurement and construction services for the world's first commercial high temperature gas cooled reactor.

Engineering services for the first nuclear power unit with a pressure suppression containment.

Engineering, procurement and construction of the nation's first 450 MWe class commercial power reactor.

Engineering, procurement and construction services for Asia's largest nuclear power plant when dedicated in 1970.

Development and construction of the first fully prestressed, post-tensioned concrete containment vessel.

Design and construction services for the first nuclear power plant with a field fabricated reactor vessel.

Engineering, procurement and construction management services for the largest fast flux test reactor in the USA.

Identification of representative persons having knowledge of the facts contained in this Answer or participating substantially in the preparation of it:

J. L. Hurley	2681 Hawks Avenue Ann Arbor, Michigan 48104
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Interrogatory 10(b): With reference to your "Petition To Intervene" filed in this proceeding state:

- (b) Describe in detail (and attach a copy) of the relevant portions of your contract with Consumers Power Company setting forth your "direct responsibility" as set forth in paragraph 1;

Answer: Article 2 - "Scope of Work," in Bechtel's contract with Consumers Power Company states in pertinent part, "The scope of the work consists of all engineering, procurement and construction work and services required to construct and complete a two-unit nuclear power plant (hereinafter sometimes called the 'Midland Plant' or the 'Plant') to be located on Consumers Power's Midland site near the City of Midland, Michigan."

Identification of representative persons having knowledge of facts contained in this Answer or participating substantially in the preparation of it:

Not Applicable.

Interrogatory 10(f): With reference to your "Petition To Intervene" filed in this proceeding state:

- (f) Describe in detail each issue adverse to the continuation of Construction Permits Nos. 81 and 82 as you use those terms in paragraph 3 of your petition;

Answer: Any proper issue within the scope of this proceeding and within the purview of the two issues stated in the Order to Show Cause, which is timely raised by the Atomic Safety and Licensing Board, the Regulatory Staff or the Saginaw Intervenors, and approved as a contested issue by the Atomic Safety and Licensing Board.

Identification of representative persons having knowledge of facts contained in this Answer or participating substantially in the preparation of it:

Not Applicable.

Interrogatory 10(g): With reference to your "Petition To Intervene" filed in this proceeding state:

- (g) Describe each fact upon which you base (and to which you make reference in) the last two sentences of the first paragraph of paragraph 4 of your petition;

Answer: See the Order to Show Cause, and attachments thereto, together with the DRO Inspection Reports referred to therein and Bechtel's Answer to Interrogatory 10(b).

Identification of representative persons having knowledge of facts contained in this Answer or participating substantially in the preparation of this Answer:

Not Applicable.

Interrogatory 10(h): With reference to your "Petition To Intervene" filed in this proceeding state:

- (h) Set forth in detail each fact upon which you base the allegations in the second paragraph of paragraph 4 of your petition;

Answer: 1. On March 26, 1973, the Atomic Safety and Licensing Appeal Board (hereinafter the "Appeal Board") entered its "Memorandum and Order" designated "ALAB-106", stating in Paragraph III:

"....We have found nothing which would cause us to overturn the Licensing Board's findings as to the consistency of the QA Program with the requirements of Appendix B. We have reviewed the QA Manuals for both the Applicant and its architect-engineer. Both of these manuals, as presently revised, appear to present a satisfactory overall program to meet the quality assurance criteria of Appendix B." (RAI-73-3 at 184).

2. Despite the Appeal Board's conclusion in ALAB-106 that the Licensee and its architect-engineer had satisfactory QA Programs, the Appeal Board in affirming the issuance of the permits, modified the ASLB decision by imposing four conditions on the Licensee.

3. The Appeal Board expressly indicated that it imposed the four Conditions of ALAB-106 upon the Licensee, not as a "punitive" measure, but to remedy any problem remaining due to the long shut-down in construction and to assure the quality of future construction [RAI-73-9 at p. 637 (ALAB-147)].

4. The principal problem to which the Appeal Board referred in ALAB-106 involved certain alleged nonconformancies in concrete work discovered during inspections by the DRO on September 29-October 1, 1970. The Order to Show Cause states that these inspections "revealed several instances of Licensee's nonconformance with quality assurance program requirements involving concrete work" (Order to Show Cause, p. 2). However, the "Order to Show Cause" improperly relies upon these alleged nonconformances and ignored the resolution of them.

The results of the inspection and resolution of all deficiencies are documented as follows:

(a) Alleged nonconformances as reported in CO Report No. 329 and 330/70-6 (pp. 1-2):

"1. Observation of concrete placement activities at the construction site revealed:

- a. The use of vibrator to move concrete.
- b. A lack of sufficient vibration penetration.
- c. An absence of vibration action at recommended intervals.

The above items are in disagreement with ACI-301, Paragraph 803.d (II-A-1.a).

"2. The site testing laboratory was not taking aggregate gradation and organic tests at the frequencies stated in PSAR (II-A-1.a).

"3. The concrete sample obtained for the slump test at the point of transit truck discharge was not taken in accordance with the sampling instructions in ASTM-C-172 which require a representative sample (II-A-9.a).

"4. The QA and QC inspection personnel present at the concrete pour location did not promptly identify and correct apparent deviations from the ACI-301 Standard regarding consolidation of concrete (II-A-9.b)."

(b) Subsequent to the issuance of CO Report No. 329 and 330/70-6, the DRO noted the following in CO Report No. 329 and 330/71-1:

"1. According to Messrs. N. Paige and B. Peck, corrective action by the applicant to improve the use of vibrators has been taken. Bechtel established a special crew of craft personnel to do the vibrator work. This crew has been trained in the proper use of vibrators.

"2. Regarding the taking of aggregate gradation and organic tests in accordance with the PSAR, Mr. Peck said that Consumers Power has reviewed the frequency of aggregate testing and, where necessary, more frequent tests will be made to comply with the PSAR.

- "3. Mr. Peck stated that they have been taking concrete samples for slump in accordance with ASTM-C-172-54 (Revised 1958) which requires only a single sample of concrete from stationary mixers. ASTM-C-172-68, which is a later edition, requires samples at two intervals during discharge of the middle portion of the batch. This difference in requirements has been brought to the attention of the applicant by telephone and will receive follow-up attention at the time concrete work resumes.
- "4. Regarding the lack of prompt attention on the part of QC inspection staff to identify and correct apparent deviations, the applicant, (according to Peck) has requested that Bechtel upgrade the QC inspection force in the area of concrete placement. In this regard, Peck reported that Bechtel and Consumers Power (CP) have conducted reviews of the ACI-301 standard. Additionally, special inspector training sessions have been conducted for the site inspection force and Bechtel has assigned a full-time engineer to inspect all Q-list pours." (pp. 2-3)

No "Other Significant Items" were noted in that Report. The Report also indicates that the dates of the previous construction inspection were September 29 and 30, 1970 and October 1, 1970, i.e., the dates referred to in CO Report No. 329 and 339/70-6. Thus, it is evident that corrective action was taken in a manner satisfactory to the DRO. However, CO Report No. 329 and 330/71-1 further indicates that all construction was shut down prior to that inspection. The shutdown occurred as a result of certain delays in obtaining Construction Permits and continued until the Appeal Board affirmed the ASLB's granting of the Construction Permit in 1973. Upon resumption of construction, further corrective action was taken to prevent repetition of the four nonconformancies itemized in CO Report No. 329 and 330/70-6, as follows:

Items #1 & #4 - An intensive indoctrination and training program was implemented for personnel involved in placing and inspection of

concrete work. This program was developed and presented by San Francisco Bechtel Home Office Quality Control, the Project Field Engineer and the Project Field Quality Control Engineer, and contained, among other things, detailed instructions in the proper use of vibrators. Detailed inspection plans were developed and implemented. Explicit instructions were given by the Project Quality Assurance Engineer to quality assurance personnel to promptly identify, and to take necessary actions to correct any discrepancies noted during concrete operations.

Item #2 - Pursuant to Field Inspection Manual G-1, (Rev. 8), (July 16, 1973), Bechtel assigned a Quality Control representative to full time monitoring of test lab activities. Project Special Provisions Notice SF/PSP #2, Rev. 0, 7220, established additional requirements for indoctrination and training of Quality Control personnel at the Midland jobsite. (On December 28, 1973, General Technical Notice #4 (SF/GT #4) was issued. SF/GT #4 supersedes SF/PSP #2 and establishes a comprehensive program for the indoctrination, training and certification of quality control personnel.) In addition, the requirements for frequencies of aggregate gradation and organic testing were reemphasized to quality assurance and quality control personnel.

Item #3 - Upon project reactivation, the Bechtel specification governing testing of concrete, Specification 7220-C-8, was superseded by Specification 7220-C-208. The requirements and standards contained in 7220-C-208 were updated to the latest revisions of the industry codes and standards which in the area of concrete sampling was the 1971 revision of ASTM-C-172. That standard requires sampling of fresh concrete "at two or in regularly specified intervals during discharge of the middle portions

of the batch". In lieu of the previously assigned field engineer, Bechtel now has assigned a quality control representative to full-time functional technical direction of test lab activities. Prior to this proper instructions and directions to the field engineer in charge of the test lab resulted in correct sampling techniques as noted in RO Report No. 329 and 330/73-07.

(c) Further, in "Applicant's Report on Quality Assurance Action Being Undertaken to Assure Satisfactory Condition of Work Already Performed and Materials Now on Site", May 25, 1973, filed with the Appeal Board and the DRO pursuant to ALAB-106, the Licensee submitted procedures for inspection, evaluation and remedial action to be undertaken in preparation for resumption of construction after shutdown and summarized the results of the initial inspections under these procedures. Subsequent reports were also filed with the Appeal Board and the parties stating in detail the information required.

(d) Subsequent to the reactivation of concrete placement activities, an unannounced audit was performed, on September 5-7, 1973, at the Midland site (RO Report No. 329 and 330/73-07). The principal inspector, R. A. Rohrbacher, made the following findings:

(1) With reference to the prior problem of CO Report No. 329 and 330/70-6 (September 29-October 1, 1970) regarding the alleged improper use of vibrators during concrete placement:

"During this inspection, activities associated with the use of vibrators during concrete placement were observed. Through discussions with site personnel, review of records, and observation of concrete

placement activities in progress, it was determined that the use of vibrators during concrete placement met applicable requirements (ACI-301). This matter is considered resolved. However, periodic inspection of concrete activities, including use of vibrators, are to be made during subsequent inspections." (RO Report No. 329 and 330/73-07 [September 5-7, 1973] p. 2)

(2) Relative to concrete production and placement:

"The Unit 2 tendon gallery outer wall placement area was inspected prior to concrete placement. It was observed that the formwork was solid, clean, tight, and adequately braced. The rebar was free from loose rust, properly spaced, and adequately held in place. Adequate transporting and handling equipment, vibrators, and crew were on hand prior to placement. Adequate personnel, as well as sampling and test equipment, were available at the placement site, and Bechtel QA, QC, and field engineers were present to observe and inspect operations in progress.

"Through observation of QA and QC activities at the time of concrete placement and from discussion with the QA and QC engineers present, it was determined that these engineers were qualified to monitor and audit concrete activities. A representative of CP stated that CP had reemphasized the need for adequate engineering surveillance and QC coverage by Bechtel during placement of all Class I pours.

"It was observed that concrete handling and vibrator usage were in accordance with applicable requirements. Two vibrator crews were observed at four areas of the pour during placement. Through discussions with site personnel and review of records, it was verified that instruction in the use of vibrators took place on August 27, 1973. Demonstration and practice included use of vibrators in fresh concrete. About 27 attended this Bechtel training session, including ten laborers, three foremen, and fourteen engineers (field, QA, and QC).

"During placement, it was observed that truck transit tickets were received and reviewed upon truck arrival and that sampling and testing was done properly and the results recorded. The inspector observed that the first load of concrete received for this pour was rejected at the placement location, due to improper slump. Methods used to take slump and air entrainment measurements met applicable requirements. It was observed that sampling and testing frequency was more frequent than required at the placement location and that samples were taken in a manner to obtain representative samples. A Bechtel QA engineer, among other engineers, was at the pour location verifying that sampling and testing requirements were met. The inspector did not identify any deviations from applicable requirements during observation of concrete placement activities.

"During observation of batch plant operations, it was noted that the required mix was being batched and that sampling and testing met applicable requirements." (RO Report No. 329 and 330/73-07 [September 5-7, 1973], pp. 10-11).

(3) With reference to the alleged failure in 1970 to take aggregate gradation and organic tests of sand in accordance with applicable requirements:

"Discussions with site personnel during the current inspection, review of records, and observations of batch plant operation provided information to establish that the required frequency of the subject testing was maintained. However, this matter remains open pending further record review and observations during further concrete production." (RO Report No. 329 and 330/73-07 [September 5-7, 1973], p. 3).

(4) With reference to the failure to take slump tests in accordance with sampling instructions, and the failure of inspectors to promptly identify apparent deviations from the ACI-301 Standard regarding consolidation of concrete, RO Report No. 329 and 330/70-6, see the comments of the principal inspector quoted at subparagraph (2) hereof.

5. The Order to Show Cause referred to violations of 10 CFR Part 50, Appendix B, Criteria II and V, involving design engineering inspections on September 10 and 11, 1973, and the DRO's discussion of its findings on September 27, 1973. The Order to Show Cause states:

"Inspections conducted on September 10, 11, and 27, 1973, revealed several additional violations of 10 CFR Part 50, Appendix B, Criteria II and V, involving inadequate record keeping procedures relating to quality assurance and unavailability of certain quality assurance records". (Order to Show Cause, p. 2).

An examination of the specific findings of this Report (RO Report No. 329 and 330/73-08) and the responses of the Licensee discloses:

(a) The DRO report of its inspection of project engineering states:

"[T]he Bechtel Corporation Nuclear Quality Assurance Manual does not include a requirement for retention of records common to activities affecting quality. Furthermore, other quality assurance program documentation dealing with record retention requirements was unavailable during the course of the inspection." (RO Report No. 329 and 330/73-08, p. 2)

It should first be noted that Bechtel's QA group had previously identified this matter and initiated corrective action.

The fundamental document for Bechtel's Quality Assurance Program is Bechtel's Nuclear Quality Assurance Manual (NQAM). Criteria II and XVII of 10 CFR Part 50, Appendix B require that record retention requirements be established but do not specify where record retention requirements are to be found. At the time of the inspection referenced in the aforesaid report, the NQAM did not incorporate record retention requirements. The following

Bechtel standards and procedures then in existence did provide certain record retention requirements for project engineering:

1. Bechtel Engineering Standards, Volume G, "General".
2. Bechtel Internal Procedures Manual, Midland Units 1 & 2.

Moreover, the actual records affecting quality which are required to be maintained pursuant to Criteria II and XVII, have been maintained and are available. Therefore, the deficiency was merely in not having sufficiently specific written procedures for record retention available, not in the non-existence of the records.

However, it was the position of the DRO report that record retention requirements for activities affecting quality should either be contained in the NQAM, or incorporated by reference thereto, since the NQAM is Bechtel's fundamental document relative to quality assurance.

In an inter-office memorandum from the Manager of Engineering, dated November 2, 1973, project personnel were directed to comply with the requirements contained in the Corporate Record Retention Schedule, dated October 30, 1973. Additional controlled copies of Bechtel Engineering Standards, Volume G, were requested for project personnel and the applicable requirements therein were simultaneously emphasized to project supervisory personnel.

As an interim measure, to comply with the DRO position, a project amendment to the NQAM which specifically incorporated record retention requirements for Engineering was issued on December 17, 1973.

During its inspection of January 10 and 11, 1974, DRO reviewed the commitments made by the Licensee to incorporate record retention requirements. In RO Inspection Report No. 329 and 330/74-01, DRO stated:

"A review of records and discussion with the Licensee's representative established that substantive progress had been made in that the proposed revision of the NQAM has been issued for review and comment....

"A review of records and discussion with the Licensee established that an interim procedure for controlling records, common to activities affecting quality, was issued by December 17, 1973. Based on a review of these procedures, associated instructions, and the Bechtel Internal Procedures Manual, it is apparent that proper implementation of the interim procedure will assure that all such records will be controlled and retained in a manner consistent with 10 CFR Part 50, Appendix B, Criteria II and XVII requirements." (pp. 7-8)

Finally, Bechtel's NQAM was amended February 11, 1974, to specifically incorporate requirements for retention of records common to activities affecting quality for all project records.

(b) RO Report No. 329 and 330/73-08 alleges with respect to project engineering, that, contrary to the requirements of 10 CFR Part 50, Appendix B, Criterion V, Bechtel's Internal Procedure Manual for Midland Units No. 1 and 2, Section 7.5, which requires that the current revision of each drawing be maintained in the stick files, was not being implemented because some stick files were not current. The DRO Report acknowledged that Bechtel QA had previously noted this matter and prescribed corrective action.

On September 18, 1973, measures were taken by Quality Engineering to review all project engineering stick files. All stick files have been updated in accordance with the Midland Drawing Control Log.

As a further corrective measure, Section 7.5 of the Midland Internal Procedures Manual was revised to read in part: "It is the responsibility of each group to update and maintain its own stick file". The Project Engineer directed that all supervisory personnel require that this procedure be performed on a regular basis.

Finally, the Project Quality Engineer and his staff have been and are performing a monthly surveillance of the project record print file and the discipline stick files to assure adherence to the latest Midland Drawing Control Register.

In RO Inspection Report 329 and 330/74-01 the Region III inspector stated:

"A review of records (procedures and instructions) and discussion with the Licensee's representatives confirmed that all of the above commitments were presently in force at the . . . Ann Arbor Engineering Office, and were being properly implemented." (pp. 8-9)

(c) RO Report No. 329 and 330/73-08 alleged, with respect to Project Engineering, that contrary to Criterion V, 10 CFR Part 50, Appendix B, which states, in relevant part:

"Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances..."

the following procedures were not available for review by the inspector at the time of the inspection:

(1) Procedures to prescribe control of interface activities between design groups; and

(2) Procedures to prescribe control, issuance, and changes to the Bechtel Corporation Internal Procedures Manual for Midland Units No. 1 and No. 2.

The Report acknowledged that Bechtel QA had previously noted and prescribed corrective action in regard to all of these deficiencies (pp. 10-13). In response to the allegations, a review has indicated:

Item 1. Requirements regarding design office interface activities are now provided in the NQAM, Section II, Procedure No. 9. At the time of the inspection detailed interface requirements for Project Engineering personnel were contained in the Divisional Engineering Standards (Volume G), Sections 1.3 and G-200, and in the individual Discipline Engineering Standards. The requirements contained in those documents to the extent that they related to interface activities between design discipline groups were incorporated by reference in Engineering Department Instruction ("EDI") 3.55.1, issued December 17, 1973. Subsequently, EDI 3.55.1 was superseded by Engineering Department Project Instructions ("EDPI") 4.25.1.

Item 2. The Bechtel Internal Procedures Manual for Midland Units 1 & 2, Revision #1 now has control serial numbers. Distribution is controlled by a formal control list for assignments of the Manual showing applicable serial numbers and assignments of the manual by recipients name. A revision block with date and approvals has also been provided. The Internal

Procedures Manual was revised and reissued in accordance with these controls on October 19, 1973. All superseded Manuals have been withdrawn from use. The Project Quality Engineer and his staff have performed and will continue to perform periodic surveillance and spot checks to insure that only Internal Procedures Manuals with the latest revisions are in use.

With reference to Items 1 and 2 above, the Region III inspector stated in RO Inspection Report 329 and 330/74-01, at p. 10:

"Project amendment for Job No. 7220 (design interface) dated December 17, 1973, Section II, was reviewed. Engineering Department Instruction No. 3.55.1 (Design Interface Control, Revision 0) was issued on December 17, 1973, and becomes mandatory on February 15, 1974. The interim amendment provides documentation of the current interface control procedures. The Internal Procedures Manual, issued to a Bechtel employee, was observed to have a document control number and had been assigned according to procedures. A document showing the assignment of all manuals was reviewed. Documented evidence showing the distribution and retrieval of all superseded internal procedures manuals was reviewed."

(d) 10 CFR Part 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."

RO Report No. 329 and 330/73-08 alleged, with respect to Project Engineering, that although "the Bechtel Corporation Nuclear Quality Assurance Manual (NQAM), Section III, Procedure No. 4, specified the use of Exhibits 3.6A.1, 3.6A.2, and 3.6A.3 for vendor control," Quality Assurance

Specifications No. 7220 G-20, No. 7220 G-21, and No. 7220 G-22 were being used to accomplish this activity despite the absence of an approved change to the NQAM authorizing the use of these specifications.

Once again, Bechtel Quality Assurance had previously identified this discrepancy and directed that corrective action undertaken.

As discussed with the DRO, action to amend the NQAM had been taken by Bechtel prior to the DRO's inspection, approval of the use of Specifications No. 7220-G-20, 21 and 22 had been granted by Quality Assurance Management and the mechanics for change of the NQAM had been set in motion (RO Report No. 329 and 330/73-08, p. 13). To preclude repetition of the discrepancy, the NQAM was amended on December 15, 1973, to provide Midland Project Engineering with the flexibility to respond to evolving QA requirements via specification changes with proper Quality Assurance approval and without requiring changes to the NQAM.

In RO Inspection Report 050-329 and 330/74-01, p. 10, the AEC Inspector confirmed that the above corrective action had been completed.

6. With respect to the inspections conducted on November 6-8, 1973, the Order to Show Cause alleges deficiencies associated with Cadweld splicing of concrete reinforcing bars.

A. Specifically, RO Inspection Report 329 and 330/73-10 alleged that the procedures for installation and inspection of splices were inadequate

because they did not provide adequate instructions for performing Cadweld splicing nor for inspection of completed splices, and because instructions and procedures were not being implemented to assure that Cadweld preheating requirements were properly accomplished.

On November 6, 1973, the effective specification for Cadweld splices was Bechtel Spec. No. 7220-C-231, Rev. 2. Paragraph 10.0 thereof, and all subparagraphs thereto, referred to "Mechanical Splices of Reinforcing Bars". These paragraphs dealt with the entire Cadweld process and referred to such specifications as the qualifications of the splicing crew, the care and handling of splicing kits and equipment, preparation for splicing, and inspection. In addition to this specification, the Bulletin of the manufacturer, ERICO Products, Inc., was available to each operator. The Bulletin contains 36 pages of detailed instructions, including pictures, to facilitate the completion of a successful splice. The "ERICO Manual" contained referenced inspection criteria. Finally, a QC inspection plan had been prepared and issued for use and a check list was prepared by the field engineers. Therefore, there were instructions and forms for installation and inspection of splices, as required by Criteria V of Appendix B.

On November 9, 1973 Bechtel Spec. No. 7220-C-231 was amended to clarify Para. 10.11.5 (relating to the measuring of "voids"). Specifically, the intent of the general formula for measuring voids was clarified and an example of a more precise method for measuring the void area was added. ERICO Products, Inc., concurred in this revision by letter dated November 21, 1973.

On December 5, 1973, QC Procedure No. C-231-1 (Rev. 6), "Inspection of Cadweld Mechanical Splicing of Concrete Reinforcing Steel" was issued for use by inspectors, and "Cadweld Rebar Splicing Instructions for the Operator" was issued as a work procedure for operators.

The Cadweld operators and inspectors were thoroughly re-trained, qualified and tested regarding the procedures to be utilized prior to resumption of work, as detailed hereinafter. ERICO Bulletin states:

Generally, the Cadweld Rebar Splice is a mechanical means (not a weldment) of butt splicing deformed bars that produces a joint with basically the same mechanical properties as those of an unspliced bar. Two reinforcing bars are joined at the ends within a splice sleeve. After the rebars are cleaned and properly located within the sleeve, filler metal is melted in an apparatus adjacent to the splice sleeve. Filler metal flows through a guide tube and invades the space between the reinforcing bars and the internal surface of the splice sleeve, thereby interlocking the bar deformations and the annular grooves of the splice sleeve.

The apparatus is then disassembled, the asbestos packing removed, and the splice visually inspected for excessive "void" area, porosity, centering, blow-out and slag. A void area measurement is used to determine the approximate area, in square inches, of unfilled space at the end of the sleeve following a Cadweld splice. The void area is the area not filled by filler metal after allowance of a 3/16 inch normal void area about the bar perimeter which was filled by the asbestos packing.

ERICO designed the Cadweld sleeve conservatively. It has advised that for the size of bar in question (#18), splices with six (6) square inches of void area per end have successfully met tensile test standards. Nevertheless, Bechtel has specified that if the void area is equal to or less than 3 square inches for a single end of a splice sleeve, the splice is satisfactory.

B. DRO allegation i.c. is that inspections of completed splices were being performed by personnel lacking knowledge of applicable inspection-acceptance criteria and/or by personnel using inspection-acceptance methods, which could lead to the acceptance of finished Cadwelds which did not meet acceptance criteria relative to established Cadweld void limits (RO Inspection Report No. 329 and 330/73-10, p. 3).

During the November 6-8, 1973, inspection DRO alleged that at least one Cadweld rebar splice had a void measurement exceeding the allowable 3.0 square inches. DRO Inspector determined the area of the void by multiplying the width of the void at its widest point by the depth of the void at its deepest point after allowance of the 3/16 inch void area about the bar perimeter. A review of the matter was immediately undertaken. As a result of the review, it was concluded that the method as interpreted by the DRO, set forth in the ERICO Manual, was quite conservative. It was decided that a more precise method which more realistically approximated the actual void area may be employed as the measurement method for such void areas. That method is the "Profile Method" and consists of sectionalizing the void area to produce a measurement which will more closely approximate the

actual void area. Bechtel Specification 7220-C-231, Section 10.11.5, was accordingly revised (Rev. 3, November 9, 1973) to reflect this decision. ERICO agreed that this method was satisfactory. Utilizing this method, on November 10-11, 1973, a complete reinspection was made by field engineering of all the completed Cadweld splices in Unit 2. Results indicate that out of the 320 splices rechecked for Containment Unit #2, there were 8 splices preliminarily found to have void areas in excess of the maximum allowable.

Subsequently, a second complete reexamination of all splices was performed by QC personnel using the Profile Method. As a result of this reexamination, which commenced on November 14, 1973, the QC engineers found that 2 of the 8 splices previously found to be unacceptable by field engineering were acceptable, but added to the remaining six, three additional possible unacceptable splices due to excessive void area. The result was 9 possible unacceptable splices due to excessive void areas. These 9 void areas were then presented to the field engineering staff for evaluation. The measurements from the field were plotted and a planimeter was utilized to calculate the exact area within the plotted figure. The results of the planimeter tests indicated that none of the nine splice ends previously believed to have excess void areas, had a void area exceeding the prescribed limit of 3.0 square inches.

Two Cadwelds were rejected for high porosity. These two Cadwelds were cut out and subjected to pull tests to determine their strength. Both rejected Cadwelds exceeded the minimum strength requirements.

The problem concerning void area measurement stemmed from the simplistic example originally used in the specification, the installation procedure, and in the manufacturer's directions. The intent of all methods used in the inspections was to approximate the actual void area. The specifications have been clarified by an example which reiterates the initial formula used and provides a more precise method which considers both shallow and deep voids by sectionalizing. The planimeter may be used to more precisely approximate the actual void area. While the proper measurement technique was in question, it should be emphasized that all interpretations were conservative as verified by more precise measuring methods used in evaluating the sleeve ends in question.

Although the inspectors had received training prior to the inspection of cadwelding, to assure adequate reinspection of the splices and to intensify the training of inspectors, reinstruction and retraining sessions were held on the mornings of November 9 and 13, 1973, and the afternoons of November 13 and 19, 1973. The inspector's prior training had included examination of Bechtel Specification 7220-C-231, the ERICO Bulletin, and a prepared field checklist for inspection.

C. RO Report No. 329 and 330/73-10, p. 19, states that the requirements of the PSAR and Bechtel Specifications, while establishing Cadwelding qualification requirements, do not specify the conditions which would disqualify a Cadwelder, nor establish the requirements for requalification of disqualified Cadwelders.

In response, paragraph 10.8.2 was added to Specification 7220-C-231, on November 14, 1973, to provide:

"If the tensile test failures accumulated from all splicing crews exceed the rate of one for each 15 consecutive test samples, or if splices are consistently failing to pass visual inspection, or if there is a question of a crew's ability, the splicing work shall be reviewed and evaluated to determine corrective action."

It is also provided that if a member of a splicing crew has not used a specific splice position for a period of three months, that member shall be requalified in accordance with the provisions of Specification 7220-C-231, 10.8.

D. The DRO found that packing material and slag in one sleeve obscured proper visual examination of the splice (RO Report 329 and 330/73-10, p. 10). The presence of asbestos packing does not necessarily mean that an inspection was not undertaken since small amounts of asbestos may "float" between the sleeve and rebar. However, if all packing and slag is not removed, proper inspection is precluded. Therefore, removal of all packing was and is a requirement of inspection.

To preclude recurrence of this item, operators and QC Engineers were reinstructed in the importance of removing packing and slag to allow for proper visual inspection of the filler metal. Additionally, new procedural instructions were issued which require that:

(1) the operator is responsible for removal of the packing;

(2) the quality control engineer is responsible for inspection, final acceptance and verification of the quality of the splice.

E. Another allegation made in the DRO Report was that the procedure for documenting required quality parameters was inadequate with respect to the cleaning of the rebar ends before a splice is completed.

As part of the training program, operators and inspectors are taught to clean the rebar ends. However, documentation of the cleaning of rebar ends was previously not required under QC-CS, the Cadweld inspection and test report form. Instead, an in-process check was used to verify that cleaning was performed, even though failure to completely clean each rebar end does not necessarily preclude an acceptable Cadweld splice. Cleaning is used to prevent "blowouts" and porosity, which would be visible at the completion of the Cadweld and would require that the Cadweld be rejected.

Visual inspection and verification of rebar cleanliness is now a specific requirement of the new "Cadweld Inspection and Test Report", QC Cadweld Form. Column 16 requires the QC Engineer to "visually inspect for evidence of cleanliness to confirm the bar ends were properly cleaned in the splice sleeve" and provides a space to document his acceptance. The new QC Cadweld Form was issued for use on November 29, 1973. On April 2, 1974, this form was revised to require quality control signatures for all activities covered thereby.

It is noteworthy that the new "Cadweld Inspection and Test Report," used to support the Master Inspection Plan C-231-1 (Cadweld), is an effort to simplify the reporting and documentation of the various inspections regarding the entire Cadweld splicing procedure. On a single sheet of paper, the QC Engineer can note all proper inspection results regarding the particular splice.

The installation and inspection of cadwelds were the subject of MCAR #2 dated December 11, 1973. As part of the close out of this report Project Engineering analyzed the deficiencies and concluded that there were no safety implications.

F. The alleged deficiencies regarding inadequate material control stem from two alleged incidents. First, a splicing sleeve was found unwrapped; and, second, miscellaneous materials were discovered atop a box in the storage trailer.

10 CFR Part 50, Appendix B, Criterion XIII does not require a "procedure" for storage of Cadweld materials, but merely requires that "measures" be established. Specification C-231, which was in use and available at the time of the November 6-8, 1973 DRO Inspection, instructed that splice kits be stored in a clean, dry, temperature-controlled area. Accordingly, measures were in existence and available at that time.

Regarding the unwrapped sleeve, procedures were implemented to more adequately insure proper storage. As a practical matter, all sleeves had been inspected prior to use as specified in QC Procedure C-231, Section 10.9.3, which prevents a dirty, wet or corroded sleeve from being used.

Regarding the materials atop a box, there is no requirement that access to the Cadweld material storage facilities be controlled, although only operators and inspectors were instructed to utilize the area. However, steps have been taken to insure the proper separate storage of all materials used on the jobsite and to keep other foreign materials away from stored materials.

G. On November 9, 1973, a Nonconformance Report with respect to the Cadwelding problem was issued by Consumers. This NCR required the stoppage of all Cadwelding and concrete pours involving Cadwelds until the list of problem areas were resolved. No such concrete work was scheduled until February 1, 1974, so that there would have been no problem in examining all Cadwelds in Unit 2 and correcting any deficiencies even if neither stop order had been issued. Subsequently, as set forth hereinabove, each of the problem areas listed in the NCR was resolved and Consumers lifted its stop work order on December 6, 1973.

In this connection, it is important to note that Bechtel's Quality Assurance Engineer identified a problem with Cadwelding inspection prior to the November 6-8, 1973, inspection. The matter was not determined to be serious at the time because of the long time available for reinspection before concrete pours were scheduled to begin.

H. All alleged "violations" have been resolved by the Licensee and its engineer-constructor in a manner acceptable to the DRO. It was stated in RO Inspection Report 339 and 330/74-03, at p. 2, that:

"It has been determined that appropriate corrective action has been taken by the Licensee to apparent violations identified in RO Inspection Reports No. 050-329/73-08 and No. 050-330/73-08, No. 050-329/73-10 and No. 050-330/73-10, No. 050-329/74-01 and No. 050-330/74-01."

An examination of the DRO Reports clearly shows the corrective activity taken on the items identified by DRO and the commitment to proper implementation of quality assurance requirements. The engineering and

constructing of nuclear power plants requires the efforts of hundreds, if not thousands, of people, each of whom brings to the job a different skill, background and personality. Laborers, craftsmen, engineers, managers, specialists, clericals, draftsmen and all of the other skilled groups of people necessary to perform the required work are brought together as an ever changing team depending upon the work requirements at any given time.

It would be unrealistic to approach an examination of the effectiveness of a quality assurance program, without an initial understanding of the fact that such people and the new relationships and interrelationships created between them gives rise to errors and conflicts.

Bechtel has recognized this fact for many years. Through education and training programs Bechtel has tried to keep such problems to a minimum. In addition, Bechtel has exerted ever increasing efforts to promulgate systems, procedures and programs as part of its quality assurance program, which, in turn, is designed to minimize adverse consequences of a human failure.

Rather than being insensitive to quality assurance requirements, Bechtel has been in the forefront of the development and implementation of quality requirements such as ANSI N45.2, as evidenced by Bechtel personnel participating as members and chairmen of committees for ASME, ASTM and ANSI codes and standards development with full support and encouragement from Bechtel management.

In this connection, it is to be again emphasized that interpretation of nuclear quality requirements are ever changing and continually

evolving. Such evolution has not stopped with the promulgation of Appendix B to 10 CFR Part 50. That document, not unlike the Constitution, is extremely broad and is susceptible to new interpretations as new situations and new technology are encountered. Thus, proper implementation of Quality Assurance is extremely important and the subject of continued upgrading and development by both the Licensee and its engineer-constructor.

Bechtel has viable Quality Assurance and Quality Control organizations which are continually acting to create new procedures, techniques and forms to satisfy the evolving interpretations of the requirements of 10 CFR Part 50, Appendix B. While human error cannot always be prevented, the QA and QC organizations have at all times attempted to identify all possible sources of error, whether intentional, random or systematic. The DRO allegations and the resolution of them by the Licensee and its engineer-constructor evidence an attempt to develop a systematic approach of avoiding possible further problem areas. The discussions occurring among the Licensee, its engineer-constructor and the DRO at various exit interviews demonstrate a willingness to discuss problem areas and work toward the best solution. The fact that the DRO finds areas of concern is evidence that the DRO is performing its statutory function, just as the Quality Assurance and Quality Control organizations of the Licensee and its engineer-constructor are performing their functions when they discover problem areas.

Identification of representative persons having knowledge of facts contained in this Answer or participating substantially in the preparation of it:

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Interrogatory 10(i): With reference to your "Petition To Intervene" filed in this proceeding state:

- (i) State each fact upon which you base the allegations in the third paragraph of paragraph 4 of your petition including without limitation an identification of the various Bechtel quality-assurance, quality-control programs, how they have been implemented in accordance with evolving AEC codes and identification of such codes, regulations and interpretations to which you refer, and definition of "reasonable assurance" (including all facts which support such a definition) as you use those terms in your petition;

Answer: For Bechtel's understanding of "reasonable assurance", see Answer to Interrogatory 9. Bechtel's quality assurance and quality control programs, sometimes referred to in the singular as "quality assurance program", for engineering, construction and procurement of the Midland facility are contained in the following: the Midland PSAR, Nuclear Quality Assurance Manual (NQAM),

Field Inspection Manual (FIM) and Quality Control Notices Manual (QCNM), Procurement Inspection Department Manual (PIDM), Bechtel Quality Control Manual - ASME III (BQCM-ASME III), and quality related portions of Project Procedures Manual (PPM), Internal Procedures Manual (IPM), Engineering Department Procedures Manual (EDPM), Procurement Procedures Manual (Ann Arbor), and various Bechtel approved Suppliers Quality Assurance Manuals. The NQAM has previously been supplied to the Intervenors. The supplementary manuals will shortly be available for inspection and/or copying.

The following are the evolving AEC regulations, codes and some of the interpretations thereof to which Bechtel's quality assurance program responds:

10 CFR Part 50, Appendix B

ALAB-147 and 152

ANSI N45.2

With respect to the above, it should also be pointed out that Bechtel has responded to the interpretations of various regulations and codes as handed down by Region III inspectors despite the fact that the General Accounting Office (B-164105) recognized that the Appendix B criteria are subject to considerable subjective interpretations:

"We analyzed the 18 criteria (set forth in title 10, part 50, appendix B of the Code of Federal Regulations, effective July, 1970) and found that 21 terms, in our opinion, are subject to considerable subjective interpretation.

* * *

"We believe that AEC, to insure that all matters considered necessary to AEC management will be covered by inspectors, needs to provide its inspectors with (1) more guidance on what constitutes an effective and working quality assurance program and (2) a well-defined, minimum scope of inspection.

"Without more thorough guidance to inspectors, it appears, likely that decisions about the acceptability of licensees' quality assurance programs and the depth of inspections necessary to make such decisions will be made more on the basis of individual judgment than on the basis of established criteria.

As changes in interpretations of AEC regulations become known they are assessed to determine the necessity for amending the appropriate manuals, specifications, procedures, etc. If it is determined that a new interpretation or code requires that Bechtel's quality assurance program be amended in order to be responsive to that interpretation or code, implementing procedures are undertaken to revise or amend the NQAM.

Since the Midland project began, the NQAM has been revised or amended on sixteen (16) different occasions either to incorporate evolving codes, regulations or interpretations as part of Bechtel's quality assurance program, or as a result of Bechtel's continuing effort to revise and upgrade its quality assurance program:

DATES/CHANGES	REASON FOR CHANGE
A. <u>Project Amendments:</u>	
1. July 15, 1973 Section III, No. 4 Section III, No. 5 Section III, No. 6	Response to the AEC's position/ interpretation of "documentation at the site" requirements of Criterion VII, Appendix B.
2. December 15, 1973 Section III, No. 4 Section III, No. 5 Section III, No. 6 Section III, No. 7	Response to RO Inspection Report No. 050-329 and 330/73-08 finding that conflicts existed in Bechtel's vendor QA Program requirements.

3. January 15, 1974
 - Section II, No. 2
 - Section II, No. 3
 - Section II, No. 4
 - Section II, No. 5
 - Section II, No. 6
 - Section II, No. 7
 - Section II, No. 8
 - Section II, No. 9

Response to RO Inspection Report No. 050-329 and 330/73-08 finding that there were no procedures available for record retention or design interface control.

4. January 31, 1974
 - Section I, No. 1
 - Section IV, No. 1
 - Section IV, No. 4
 - Section IV, No. 5
 - Section V, No. 7
 - Section V, No. 14

Response to ALABs 147 and 152. Additionally, ANSI N45.2.9 was adopted.

5. March 11, 1974
 - Section I, No. 1
 - Section I, No. 4
 - Section I, No. 5

Response to a corporate directive ordering that QA and QC be separated from project management.

B. Revisions:

1. February 15, 1970
 - Exhibit 10
2. March 3, 1972
 - Section I, No. 10 (Rev. 1)
3. July 12, 1972
4. October 1, 1972
 - Section V, No. 6

This Exhibit to the 1969 NQAM outlined general vendor requirements.

Added Procurement Inspection Department to the quality assurance program.

At reactivation of the Midland facilities, the 1972 version of the NQAM was in effect. The new format (1972 1/2 NQAM) provided for greater ease of referral and facilitates additions, deletions or revisions.

Incorporated training and indoctrination provisions of engineering and field personnel.

5. December 1, 1972
 - Section I, No. 11
 - Section II, No. 6
 - Section III, No. 8
 - Section III, No. 11
 - Section IV, No. 4
 - Section V, No. 10

Clarified the duties and responsibilities of M&FQCS. Revised Management Corrective Action to respond to new requirements regarding notification to the Client as to the AEC; documentation required.

6. January 5, 1973
 - Introduction
 - Section I, No. 11
 - Section III, No. 8
 - Section IV, No. 4
 - Section V, No. 10
 - Bulletin 16

Qualified the relationship between the BQCM-ASME III and the NQAM. Clarified the M&FQCS relationship with QA Management Audits.

7. February 15, 1973
 - Section II, No. 7
 - Section III, No. 1
 - Section III, No. 2
 - Section IV, No. 6
 - Section V, No. 5
 - Section V, No. 6
 - Section V, No. 7
 - Section V, No. 8
 - Section V, No. 9
 - Section V, No. 11
 - Section VI, No. 6

Corrected minor changes from previous revisions.

8. July 15, 1973
 - Section V, No. 1 (Rev. 1)
 - Section V, No. 2 (Rev. 0)
 - Section V, No. 3 (Rev. 0)
 - Section V, No. 4 (Rev. 1)

Reorganization. Added clarification of the amendment process and QA group responsibilities.

9. September 11, 1973
 - Bulletin 18
 - Appendix C

Clarification of the use of all forms.

10. November 30, 1973
 - Section V, No. 11 (Rev. 2)
 - Section V, No. 12 (Rev. 0)

Gave stop work authority to engineering and procurement. Introduced communication control as a new procedure applicable to all functional groups.

11. March 1, 1974
 - Section II, No. 2
 - Section II, No. 3
 - Section II, No. 4

Incorporated the Midland Project Amendments approved on January 15, 1974.

11. March 1, 1974 Con.
Section II, No. 5
Section II, No. 6
Section II, No. 7
Section II, No. 8
Section II, No. 9

12. April 12, 1974
Figures
Appendix A
Bulletin 20

Clarification of the PQAE's
function in regard to QA
Activity Reports.

When formally approved by the ASME Council, ASME Boiler and Pressure Vessel Code ("ASME Code") revisions are published semi-annually as Summer and Winter addenda for the purposes of incorporating ASME Code cases and clarifying or revising the Code rules or interpretations thereto. The revisions may be implemented at any time after the date of issuance and become mandatory six months after the date of issuance except for components and/or installations contracted for prior to the end of the six month period.

Mandatory Code requirements are implemented in the BQCM-ASME III in accordance with the procedures detailed in Section 1. There is no requirement that the BQCM-ASME III be revised to adopt the ASME Code revisions since the Manual, as written, provides for the implementation of evolving ASME Code requirements. Amendments to the BQCM-ASME III for the Midland job have been submitted to the authorized inspection agency for review and approval prior to implementation. The amendments when adopted will alter the quality control verification responsibilities according to the dictates of ALAB-147 (RAI-73-9, p. 636).

The various groups or departments implement the changes to the NQAM or BQCM-ASME III by, first, amending or revising the supplementary manuals

to coordinate with the changes to the NQAM or BQCM-ASME III, and, second, by implementing any procedures or other necessary actions required to effectuate those changes. The following are summaries of the activities of the various functional groups at Midland. These summaries deal, in a general way, with the implementation of quality related requirements which are set forth in greater detail in the respective manuals, procedures, etc.

SUMMARY OF THE QUALITY ASSURANCE
ACTIVITIES FOR THE MIDLAND PLANT

The Midland Quality Assurance Program is coordinated by the Project Quality Assurance Engineer (PQAE), who was assigned to the project by and receives technical and administrative direction from the Divisional QA Manager through a QA Supervisor. The PQAE's functions include: reviewing project plans and schedules for quality related activities to assure the timely and effective implementation of the Quality Assurance Program for the project; providing surveillance of the project Quality Assurance program and coordination of the Quality Assurance program interfaces between Engineering, Procurement, and Construction; monitoring and auditing to determine conformance to the the QA Supervisor and the Project Manager informed of the status and adequacy of Quality Assurance program implementation; identifying problem areas, recommending corrective action; coordinating and verifying implementation of corrective actions; and assuring that there is established and maintained effective systems for controlled storage and retrieval of quality documentation.

The PQAE is currently assisted by five field and office Quality Assurance Engineers who insure that the QA program is properly being implemented. QA has

"stop work" authority which cannot be countermanded. Project QA is charged with the responsibility of preparing periodic reports to the Division QA Manager and to the Project Manager evaluating the status and adequacy of the project quality assurance program. In addition, QA prepares activity reports, discrepancy reports (QADR's), Audit Findings (QAF's) and Management Corrective Action Reports (MCAR's) when required.

SUMMARY OF QUALITY CONTROL ACTIVITIES
FOR THE MIDLAND PROJECT

The Chief Field Quality Control Engineer ("CFQCE") supervises the Quality Control Program. He is responsible for training and administrative and technical direction of the Project Field Quality Control Engineer ("PFQCE") and the Quality Control Engineers at the jobsite. Administrative responsibility is exercised through and upon the recommendations of the Ann Arbor Quality Control Supervisor and the Project Field Quality Control Engineer. The CFQCE provides technical direction through Master Inspection Plans. The Ann Arbor Quality Control Supervisor coordinates quality control activities with engineering and construction personnel, and provides technical support to and monitors the performance of the Project Field Quality Control Engineer. The Project Field Quality Control Engineer is responsible for supervision of the Quality Control Program at the Midland jobsite to assure that the work falling under the scope of the program is properly inspected and documented. The Project Field Quality Control Engineer has authority to stop work being performed by Bechtel and jobsite contractors. This authority, communicated through the Project Superintendent, requires immediate stoppage of work operations and other construction activities determined to be improperly controlled or otherwise

in nonconformance with quality requirements of the applicable design specifications, drawings and other program criteria, or if a designated quality control inspection, examination or test operation is bypassed to the point where the work is no longer capable of being properly inspected. Stop work orders issued by the PFQCE cannot be countermanded by the Project Superintendent. Superimposed upon the stop work authority of Bechtel Quality Control are stop work authorities exercised by Bechtel Quality Assurance and Consumers Power Company. Surveillance over in-process work operations is performed by Quality Control Engineers to verify that construction and installation activities are performed in accordance with specified quality requirements. They are also responsible for performance of the inspections and tests required for quality verification of construction and installation activities. These in-process surveillance and verification inspections are pre-determined and identified on Master Inspection Plans prepared by home office Quality Control Engineers and approved by the Chief Field Quality Control Engineer. Examples of in-process surveillance and verification inspections are:

- A) Visual inspections of structural steel, rotating equipment, pressure vessels, tanks, heat exchanges, heating, ventilating and air conditioning equipment, raceways, conduits, cables and associated electrical equipment.
- B) Liquid penetrant, or magnetic particle of welds or structural steel and vacuum box testing of liner plate welds, and other associated material or components.

- C) Calibration control of measuring and testing equipment.
- D) Monitoring of field design document control measures.

The Project Field Quality Control Engineer supervises the quality verification function. He reviews inspection reports, processes non-conformances, coordinates training and supervises Quality Control Engineers performing receiving and in-process inspection assignments, monitors testing laboratories, provides surveillance of subcontractor quality control programs, reviews field purchase orders for Q-List items, and is responsible for the maintenance of the field quality control files. The PFQCE receives technical and administrative direction from the CFQCE.

Quality Control Engineers and Technicians carry out inspection assignments in accordance with procedures and directions as developed by the Project Field Quality Control Engineer and in accordance with the Field Inspection Manuals. The number of Quality Control Engineers and Technicians assigned to the site depends on the work load and nature of the work. Currently there are 25 Quality Control Engineers and Technicians who have responsibilities for the Midland Project. This will increase substantially during peak construction periods.

SUMMARY OF THE PROCUREMENT INSPECTION
DEPARTMENTS ACTIVITIES FOR THE MIDLAND PLANT

The Procurement Inspection Department plays an active role in the acquisition and manufacture of material and components for the Midland facility. Procurement Inspection Department activities include either pre-bid or pre-award supplier surveys to evaluate a potential supplier's manufacturing,

quality control and quality assurance capabilities; both pre- and post-award meetings with potential suppliers to assist in clarifying Bechtel's position regarding enforcement of specifications, codes, and Bechtel's vendor quality assurance program requirements; pre-fabrication meetings to determine the witness and hold points for in-process inspection and testing; in-process surveillance inspection to assure the quality of material and equipment being manufactured; post-award supplier quality program audits to evaluate the supplier's implementation of its Bechtel approved quality control and quality assurance programs. Finally, materials requiring shop inspection receive a pre-shipment in-shop inspection and documentation review prior to release for shipment to the jobsite

SUMMARY OF ENGINEERING QUALITY ACTIVITIES FOR THE MIDLAND PLANT

Quality related activities of engineering are the responsibility of the Engineering Department. Technical verification of design work is the responsibility of the Project Engineering team, the Chief Engineers and their technical staffs.

The Engineering Department has established and maintains a Quality Engineering function to define Quality practices, coordinate and insure the establishment of quality requirements in engineering documents, and coordinate the design verification program.

Quality Engineers, reporting to the Project Engineer, are assigned to the Midland Project, in accordance with project work load. One Quality Engineer is designated as the Project Quality Engineer (PQE) and is responsible

for day-to-day supervision of the Project Quality Engineering Group which currently consists of approximately 6 quality engineers.

The Project Quality Engineer is responsible for coordination of project Quality Engineering functions. With the assistance of Quality Engineers the PQE directs the planning, organization, and implementation of the Project Quality Engineering Program, including assistance and guidelines in the evaluation of vendor quality assurance programs. Each principle discipline on the project is assigned one engineer who is responsible for coordinating Project Quality Engineering functions within his discipline.

The quality engineers advise and assist the technical discipline on quality matters, monitor project engineering operations for conformance to standards and procedures, and assure that the Project Engineer is aware of the implementation of the overall quality program.

SUMMARY OF CONSTRUCTION QUALITY ACTIVITIES FOR THE MIDLAND PLANT

The use of plans, drawings and specifications to erect and install materials and equipment into a nuclear power plant is the prime function of the Midland Construction Team. The erection and installation of items to the specified requirements is the quality aspect of construction.

Construction involvement with quality begins with site preparation and terminates with the acceptance of the facilities and structures by the Client. Field quality control measures continue in force through receiving, handling, storage, installation, inspection/test and final turn-over to the Client.

The Project Superintendent is responsible for all construction activities at the jobsite for which Bechtel is contractually obligated including field engineering and field procurement. While the Project Superintendent is responsible for the overall quality of the work, he is not responsible for the quality control function. The Project Superintendent is assisted by the Project Field Engineer, the Field Superintendent and a staff of Superintendents.

The Project Field Engineer assists the Project Superintendent with engineering decisions which do not affect basic design, recommends action to the Project Engineer on engineering problems where basic design is affected and reviews all reports of nonconformances.

SUMMARY OF THE MATERIALS, FABRICATION
AND QUALITY CONTROL SERVICES DEPARTMENT
ACTIVITIES FOR THE MIDLAND PLANT

Materials, Fabrication and Quality Control Services Department (MF&QCS) supports engineering and construction activities by providing specialized services consisting of engineers and technicians experienced in metallurgy, corrosion control, metal fabrication techniques, and welding and nondestructive examination. Through the supervision of the MF&QCS Manager the following areas of support have been provided to the Midland facility: consulting services on the properties of materials, material selection and corrosion investigation; preparation of periodic "Materials and Fabrication Guidelines" which provide technical guidance and suggestions for avoiding problems in materials selection, welding, fabrication and quality control; review of welding, fabrication, nondestructive examination and Codes and

Standards portion of project specifications for specific components to insure up-to-date technical content; review of technical portions of bid packages prior to release to bidders and assistance to Engineering and/or Procurement in the evaluation of supplier's bids; consulting services to Engineering on welding, weld design, fabrication, metallurgical, structural, nondestructive examination, heat treating and pressure testing; preparation, revision and maintenance of the Bechtel Quality Control Manuals for ASME Components by coordinating the Manual content, including preparation of amendments for specific requirements of the project; organization of plant site audits for ASME components and welding in coordination with Quality Assurance and/or Engineering; assigning metallurgical, welding and NDE personnel to assist Procurement Inspection Department in conducting supplier audits; and review of field welding and nondestructive examination procedures submitted by Bechtel subcontractors.

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J. L. Southard	1456 Keuhule Ann Arbor, Michigan 48103
P. A. Martinez	3244 Bluett Ann Arbor, Michigan 48105
T. C. Valenzano	4411 Swede Road Midland, Michigan 48640
R. C. Sommerfield	6039 Ann Arbor Road Saline, Michigan 48176
L. M. Scoville	1600 First Federal Building Detroit, Michigan 48226

Interrogatory 11: List each decision which you have taken or failed to take in connection with quality-assurance and quality-control at the Midland facility which action, or failure to act, was based in any part upon the expenditure of funds. This Interrogatory is intended to solicit your answer as to what role the cost of providing quality-assurance and quality-control play in the quality-assurance and quality-control activities you recommend or implement.

Answer: Cost is a minor consideration in virtually every decision recommended or implemented by Bechtel in connection with providing Quality Assurance and Quality Control activities for the Midland Plant. However, even to the extent that cost is a consideration, the primary and overriding consideration is the relationship between cost, need for and efficient use and availability of adequately qualified personnel and procedures. In this sense, cost has not been a factor in the staffing and training of Quality Assurance and Quality Control personnel. Nor has cost been a factor in implementing the Quality Assurance and Quality Control programs and activities. Bechtel's policy is to assure that potential solutions or options adequately provide for the implementation of Quality Assurance and Quality Control, with a choice then being made from such solutions or options which takes economic impact into consideration. To the best of our knowledge, there has been no instance where Bechtel made a decision or recommendation regarding the staffing and/or training

of the Quality Assurance and Quality Control groups and the implementation of their activities for Midland which resulted in a degradation of Quality Assurance and Quality Control activities through efforts to minimize costs. Accordingly, it is impossible to list each instance where cost was a factor in connection with staffing and training of the Quality Assurance and Quality Control groups for the Midland Plant and the implementation of their activities.

In this connection, however, it is to be re-emphasized that decisions as to staffing and training of the Quality Assurance and Quality Control groups for Midland as well as the implementation of their activities are supervised and coordinated by the Quality Assurance and Quality Control Managers and Supervisors, respectively, through the Project Quality Assurance Engineer and the Project Field Quality Control Engineer, who do not have responsibility for project costs and schedules and are properly independent of those who do.

Examples of decisions which have been made and may have resulted in increased costs:

- (a) Revisions of the nuclear quality assurance manual, including project revisions pending changes in the basic manual;
- (b) Revisions of the Field Inspection Manual and project special provisions within the Quality Control Notices Manual;
- (c) Increasing of the project QA staff to 2 man-years above the estimate;
- (d) Increasing the project quality control staff to its current level;

- (e) Increasing the number of Bechtel QA management units for the Midland Project;
- (f) The formulation and implementation of various procedures;
- (g) Providing a quality assurance supervisor and a quality control supervisor for Bechtel's Ann Arbor office;
- (h) Providing for the certification of quality control engineers.

Identification of representative persons having knowledge of facts contained in the Answer or participating substantially in the preparation of it:

W. S. Gibbons, Jr.	189 Warwick Avenue San Leandro, California 94577
S. A. Bernsen	27987 Via Ventana Los Alton Hills, California 94022
W. E. Ferriss	2762 S. State Ann Arbor, Michigan 48104
J. I. Dotson	Tecumseh, Michigan
M. M. Krout	1225 Astor Drive Ann Arbor, Michigan 48104
D. R. Johnson	53 Wildwood Avenue Piedmont, California 94610
Z. G. Tucker	1424 Astor Drive Ann Arbor, Michigan 48104
J. P. Connolly	3313 Birchfield Drive Midland, Michigan 48640
W. F. Holub	712 Peninsula Court Ann Arbor, Michigan 48105
L. M. Scoville, Jr.	1600 First Federal Building Detroit, Michigan 48226

Interrogatories 12(b) and 12(c): With respect to each of the nuclear facilities as to which you have been a contractor or subcontractor, state:

- (a) List each Quality Assurance/Quality Control violation which has occurred at each site and include whether the violation was reported to AEC officials.
- (c) List each Quality Assurance/Quality Control incident which was not reported to AEC or which was not considered a violation but as to which discussion was had whether it was a violation.

Answer: The attached list (Exhibits 12(b) and (c)-1) identifies all issued Management Corrective Action Reports, Nonconformance Reports, Quality Audit Finding Reports, and Quality Assurance Discrepancy Reports. Of them only one, MCAR-2, was identified as reportable pursuant to 10 CFR Part 50.55e.

While "discussions" may or may not have taken place in any given instance, all Bechtel generated Management Corrective Action Reports, Nonconformance Reports and Quality Audit Finding Reports which identify nonconformances or conditions adverse to quality are reviewed for reportability pursuant to 10 CFR Part 50.55e prior to or concurrent with their transmittal to Consumers Power Company. Bechtel provides a recommendation as to reportability to Consumers Power Company, and does not make a direct report of reportable items to the AEC.

Identification of representative persons having knowledge of facts contained in the Answer or participating substantially in the preparation of it:

W. S. Gibbons, Jr. 189 Warwick Avenue
San Leandro, California 94577

W. E. Ferriss 2762 S. State
Ann Arbor, Michigan 48104

J. I. Dotson	Tecumseh, Michigan
W. F. Holub	712 Peninsula Court Ann Arbor, Michigan 48105
J. Milandin	9 Fleetwood Court Orlando, California 94563
J. P. Connolly	3313 Birchfield Road Midland, Michigan 48604
P. A. Martinez	3244 Bluett Ann Arbor, Michigan 48105
L. M. Scoville, Jr.	1600 First Federal Building Detroit, Michigan 48226

Additional persons with knowledge of the facts are identified on the reports themselves which will be made available for inspection and copying.

Interrogatory 14(a): With respect to your Midland facility quality-assurance state:

- (a) Do you agree with the allegations set forth in the Show Cause order and the referenced documents? If not, state each allegation with which you do not agree and explain why:

Answer: No. See answer to Interrogatory 10(h).

Interrogatory 14(b): With respect to the Midland facility quality-assurance state:

- (b) As a result of the Show Cause order, have you recommended or taken any action to change your role or Consumers' role at the Midland facility? If not, state why not, and if yes, explain such changes in implementations and recommendations in detail.

Answer: Bechtel has not recommended or taken any action to change its role or Consumers' role at the Midland facility as a result of the Order to Show

Cause. Bechtel has made adjustments and improvements in the implementation of its quality-assurance program both prior to and subsequent to the Order to Show Cause, and has expanded management, supervisory and senior personnel involvement, as indicated by the following:

1. A. P. Yates, Vice-President, Bechtel, sent a letter to S. H. Howell, Vice-President, Consumers Power, dated December 19, 1973, outlining a program for renewed emphasis upon areas of quality assurance/quality control, (Exhibit 14(b)-1).

2. On January 3, 1974, Mr. P. R. Cassidy, Vice-President and Ann Arbor Area Office Manager issued a memorandum to all responsible supervisory personnel for the Midland job, re-emphasizing the importance of QA/QC activities, (Exhibit 14(b)-2).

3. On December 14, 1973, Mr. H. O. Reinsch, Executive Vice-President/General Manager, issued a letter to management personnel involved with the Midland project requiring increased reporting of important quality issues, (Exhibit 14(b)-3).

4. On February 4, 1974, Mr. H. O. Reinsch, Executive Vice-President/General Manager, issued a letter to all management personnel describing the organizational changes in QA/QC to be implemented on Bechtel projects, (Exhibit 14(b)-4).

5. On December 14, 1973, Mr. J. T. Marvin, Manager of Construction, outlined measures to be undertaken to improve QA/QC procedures and attitudes at Midland, (Exhibit 14(b)-5).

6. On December 19, 1973, Mr. J. T. Marvin, Manager of Construction, further defined measures being taken to improve procedures and reemphasized positive attitudes concerning the QA/QC programs at Midland, (Exhibit 14(b)-6).

See Answer to Interrogatory 10(i) for identification of changes to the Bechtel NQAM which refined the implementation of Bechtel's quality assurance program.

In addition to those identified above as senders or addressees of the referenced letters or memoranda, the following are representative persons having knowledge of facts contained in the Answer or participating substantially in the preparation of this Answer:

S. A. Bernsen	1595 Wright Avenue Sunnyvale, California 94087
W. S. Gibbons, Jr.	189 Warwick Avenue San Leandro, California 94577
W. E. Ferriss	2762 S. State Ann Arbor, Michigan 48104
J. I. Dotson	Tecumseh, Michigan
M. M. Krout	1225 Astor Drive Ann Arbor, Michigan 48104
D. R. Johnson	53 Wildwood Avenue Piedmont, California 94610
Z. G. Tucker	1424 Astor Drive Ann Arbor, Michigan 48105
J. P. Connolly	3313 Birchfield Drive Midland, Michigan 48640
W. F. Holub	712 Peninsula Court Ann Arbor, Michigan 48105
P. A. Martinez	3244 Bluett Ann Arbor, Michigan 48105
L. M. Scoville, Jr.	1600 First Federal Building Detroit, Michigan 48226

Interrogatory 16: Describe in detail each classification or category of document (as defined herein) which you maintain in connection with quality-assurance quality-control regarding the Midland site, whether maintained at the Midland site or elsewhere. This Interrogatory is intended to solicit information for a motion to produce and is intended to have you describe documents whether of a formal or informal nature, and whether or not they are documents which are or are not disclosed to someone other than persons in your Company.

Answer: In general, the classifications or categories of documents maintained in connection with Quality Assurance or Quality Control for the Midland Plant are the following:

- (a) Design Criteria - Standards, codes, regulations and/or client requirements used as a basis for the design of the Midland facilities.
- (b) Systems Descriptions - Written summaries describing the specific functions, design and intent and major features of a system. In the context of power plant design, a system is a grouping of components assembled to perform a specific function.
- (c) Specifications - Specific descriptions, requirements and instructions for components, materials, manufacturing and field processes and required supplier analyses involved in the design and/or construction of the Midland Plant.
- (d) Drawings - Visual informations, graphical presentations, or lists of design information into a format of instruction and/or information for the user.
- (e) Design Calculations - A summary of the mathematical or other approaches used to establish a design parameter.

- (f) Purchase Orders and Subcontracts - Commercial agreements entered into with other organizations for the supply of services and/or commodities necessary for construction of the Midland facilities.
- (g) Vendor Quality Assurance Manuals - The quality assurance program supplied by a vendor of Q-listed commodities or services to Bechtel for acceptance. The quality assurance program describes the planned and systematic measures that are used to assure that structures, systems, and components will meet the requirements of the procurement department.
- (h) Vendor Engineering Documents - Procedures, drawings, specifications, prototype qualification test reports, and other similar documents that require project engineering approval prior to fabrication, or prior to use of the design or fabrication process. They also include price lists, and instructional documents for handling, storage, maintenance, etc.
- (i) Vendor Quality Verification Documents - Material test reports, heat treatment charts, welding records, NDE results, performance test reports, etc., which demonstrate or certify conformance to the technical or inspection requirements of the procurement documents.
- (j) Correspondence Files - All project internal and external communications relative to the construction, engineering, and procurement, and quality activities for the Midland facilities. Correspondence files are maintained by the following groups: QA, QC,

Engineering, MF&QCS. Procurement Inspection and Construction.
Meeting minutes are contained in these files.

- (k) SAR Change Notices - Documented records of changes to design commitments proposed and/or adopted in the Midland SAR.
- (l) Construction Documentation - Field and Subcontract Engineer's reports and other forms and documents utilized to record information and data.
- (m) Construction Procedures and Instructions - Documents establishing methods and sequences of performing construction work not necessarily covered by engineering specifications.
- (n) Procurement Inspection Reports, Surveys, and Audit Reports - Documentary evidence of off-site Procurement Inspection Department activities relative to the Midland facilities' commodities.
- (o) Inspection Assignments - Document packages made up for all purchase orders or subcontracts requiring shop inspection. The packages contain copies of the purchase order or subcontract, all applicable specifications, inspection plans, and inspection reports.
- (p) Materials, Fabrication and Quality Control Services Documentation - These documents including supplier review documentation, qualification and training records of NDE personnel, and welding procedure qualification records.
- (q) Quality Control documentation - Those documents that provide visibility for specific quality related activities:

Material Receiving Reports
Vendor Certifications
Receiving Inspection Plans
Field Inspection Plans and Reports
Welding and Non-Destructive Examination Records, Personnel
Qualifications, and Reports
Quality Control Records Logs
Non-Conformance Reports and Logs
Field Inspection Logs
Material Receiving Instructions
Quality Control Procedures
Training and Qualification Records of QC Personnel Field
Quality Verification Drawings

(r) Quality Assurance documentation - Those documents that provide
visibility for specific quality related activities:

Quality Audit Findings
Quality Assurance Discrepancy Reports
Daily Log Sheets
Management Corrective Action Reports
Bi-monthly Activity Reports
Work Plans
Quality Assurance Audit Checklists

- (s) Quality Engineering documentation - Those documents that provide visibility for specific quality related activities:

Bidder Quality Program Manual Evaluation Summary

Supplier QA Checklist

Project Survey Reports

Identification of representative persons having knowledge of facts contained in the Answer or participating substantially in the preparation of it:

J. I. Dotson	Tecumseh, Michigan
J. P. Connolly	3313 Birchfield Drive Midland, Michigan 48640
T. C. Valenzano	4411 Swede Road Midland, Michigan 48640
J. L. Hurley	2681 Hawks Road Ann Arbor, Michigan 48104
J. L. Southard	1456 Kuehule Ann Arbor, Michigan 48103
R. C. Sommerfield	6039 Ann Arbor Road Saline, Michigan 48176
L. M. Scoville, Jr.	1600 First Federal Building Detroit, Michigan 48226

Interrogatory 17: Please list the name and address of each witness whose testimony you intend to offer at the proceeding. Include with your answer a summary of the scope of each witness's testimony. In the event that you do not presently know who your witnesses will be, please list the areas of evidence or testimony which you presently believe you will introduce. If you cannot answer this Interrogatory, please explain in detail why you cannot.

Answer: Bechtel has not determined who its witnesses may be because that determination depends upon the scope of the hearing in this matter, the required specification of issues and the testimony offered by other parties to this proceeding. It is presently believed that areas of evidence offered by Bechtel witnesses will include:

The continuing evolution of Bechtel's overall quality program;
The implementation of Bechtel's quality requirements on the Midland Project by those Bechtel groups responsible therefor, including Engineering; Construction; Quality Control; Procurement Inspection; Materials, Fabrication and Quality Control Services and Quality Assurance;

and Bechtel's commitment to quality requirements.

Identification of representative persons having knowledge of facts contained in the Answer or participating substantially in the preparation of this Answer:

L. M. Scoville, Jr. 1600 First Federal Building
Detroit, Michigan 48226

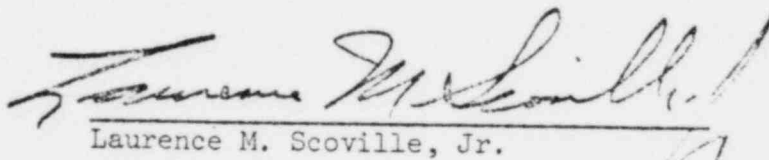
Interrogatory 18: Please list all of the documentary evidence which you presently plan to introduce at the proceeding. If you are not in a position to presently state what documentary evidence you will introduce, please state what categories of documentary evidence you will introduce. If you are not in a position to answer this Interrogatory, please explain why not.

Answer: With the exemption of the Quality Assurance Program Manuals identified in the Answer to Interrogatory 10(i), Bechtel has not determined what documentary evidence it will introduce at the hearing on this matter.

That determination depends upon the scope of the hearing, the required specification of issues and the testimony and documentary evidence offered by other parties to this proceeding. See the Answer to Interrogatory #17 for areas of evidence which Bechtel presently believes it will address.

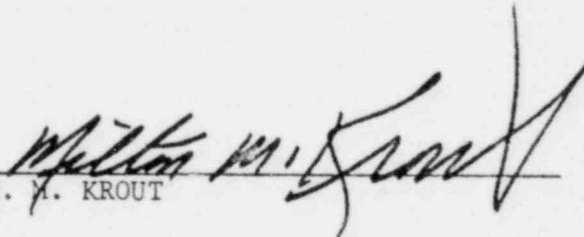
Identification of representative persons having knowledge of facts contained in the Answer or participating substantially in the preparation of it:

L. M. Scoville, Jr. 1600 First Federal Building
Detroit, Michigan 48226

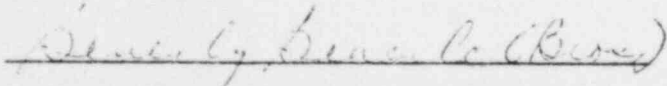

Laurence M. Scoville, Jr.

STATE OF MICHIGAN)
) ss
COUNTY OF WASHTENAW)

M. M. KROUT, being first duly sworn, deposes and says that he is Project Manager for Bechtel Power Corporation with such responsibility for the Consumers Power Company Midland Plant, Units 1 & 2; that he has authority to sign the foregoing Interrogatories on behalf of Bechtel Power Corporation; that he has read the foregoing Answers and subscribed the same; that said Answers were prepared with the assistance and advice of employees of Bechtel Power Corporation and Bechtel Associates Professional Corporation and counsel, upon whose advice he has relied; that said Answers, subject to inadvertent or undiscovered errors, are based on and limited by records and information in existence, presently recollected and thus far discovered in the course of the preparation of these Answers, and that subject to the foregoing limitations, the said Answers are true to the best of his knowledge, information and belief.


M. M. KROUT

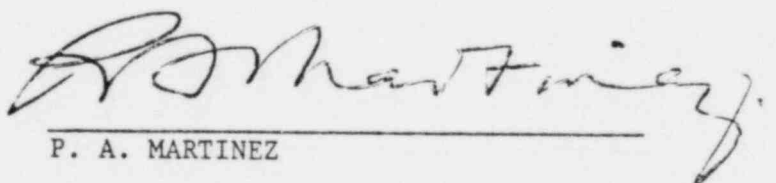
Subscribed and sworn to before me, a Notary Public, in and for said County and State, this 31 day of May A.D., 1974.



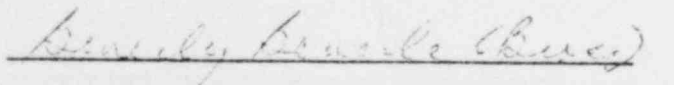
Notary Public, Washtenaw County,
Michigan
My Commission Expires: Nov 10, 1974

STATE OF MICHIGAN)
) ss
COUNTY OF WASHTENAW)

P. A. MARTINEZ, being first duly sworn, deposes and says that he is Project Engineer for Bechtel Associates Professional Corporation with such responsibility for the Consumers Power Company Midland Plant, Units 1 & 2; that he has authority to sign the foregoing Interrogatories on behalf of Bechtel Associates Professional Corporation; that he has read the foregoing Answers and subscribed the same; that said Answers were prepared with the assistance and advice of employees of Bechtel Power Corporation and Bechtel Associates Professional Corporation and counsel, upon whose advice he has relied; that said Answers, subject to inadvertent or undiscovered errors, are based on and limited by records and information in existence, presently recollected and thus far discovered in the course of the preparation of these Answers, and that subject to the foregoing limitations, the said Answers are true to the best of his knowledge, information and belief.


P. A. MARTINEZ

Subscribed and sworn to before me, a Notary Public, in and for said County and State, this 31 day of May, A.D., 1974.


Notary Public, Washtenaw County,
Michigan
My Commission Expires: Nov 19 1974



QUALITY ASSURANCE PROGRAM
 PROJECT SUMMARY Q LIST FORM
 MIDLAND UNITS 1 & 2
 ARCHITECTURAL

Job No. 7220

Page 1 of 1

ITEM REV. NO.	IDENTITY NO.	ITEM/DESCRIPTION	PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	2.1	Reactor Containment Bldg. Coatings				A-15
	2.2	Class I Masonry (Includes ALL Masonry Construction for Areas Containing Class I Equipment)				A-13
	2.3	Flood Control Watertight Doors and Airtight Doors				A-17
	2.4	Control Room Suspended Ceiling				A-19
	2.5	Reactor Containment Bldg. <u>Equipment Coatings</u>	B&W (Partial)			G-3

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△						
△						
3	6/1/70	Revised and reissued by BAPC (Final)	<i>[Signature]</i>	6-1-73	<i>[Signature]</i>	
△	10/29/70					
REV. NO.	DATE	REASON FOR ISSUE	PROJ. ENG.	DATE	CHIEF NUC. ENG.	DATE
			ISSUED BY		APPROVED BY	

QUALITY ASSURANCE PROGRAM
PROJECT SUMMARY Q LIST FORM

MIDLAND UNITS 1 & 2
CIVIL/STRUCTURAL

Job No. 7220

Page 1 of 2

ITEM REV. NO.	IDENTITY NO.	ITEM/DESCRIPTION	PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	1.1	Prestressed & Reinforced Concrete				
	1.11	Reinforcing Steel *				C-39
3	1.111	Cadwelds *				C-255
3	1.12	Concrete *				C-230 C-231
3	1.121	Water Stop *				C-232
	1.13	Post-Tensioning				C-2
	1.131	Corrosion Protection Filler				C-49
3	1.14	Aux. Bldg. Pipe Tunnel*				C-23
	1.2	Containment Structure				
	1.21	Liner Plate				C-50 A
	1.211	1/4" and thickened liner plate				C-50 A
	1.212	Penetration assemblies (including pipe sleeves and wall stiffeners)				C-50 A
	1.213	Leak chase channel system				C-50 A
	1.22	Locks and Hatch Door				C-50 B
3	1.23	Crane Supports				C-50 A
3	1.24	Paints and Coatings (Including equipment coating systems)				C-50A, B
	1.3	Fuel Storage Pool & Fuel Transfer Canal				
	1.31	Fuel Racks (new & spent fuel)				C-41 C-42
	1.32	Stainless Steel Liner Plate				C-43
	1.33	Fuel Pool Gates				C-44
△						
△						
△						
△	1/1/73	Revised and Reissued by BAPC (final)	<i>AR</i>	6-1-73		
△	1/2/73	Revised and reissued by BAPC (Preliminary)	<i>AR</i>			
REV. NO.	DATE	REASON FOR ISSUE	PROJ. ENG.	DATE	CHIEF ENGINEER	DATE
			ISSUED BY		APPROVED BY	

QUALITY ASSURANCE PROGRAM
 PROJECT SUMMARY Q,LIST FORM
 MIDLAND UNITS 1 & 2
 CIVIL/STRUCTURAL

Job No. 7220

Page 2 of 2

ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	1.34	Fuel Transfer Tube				C-46
	1.4	Structural Steel				
3	1.41	Reactor Building Structural Steel				C-37
	1.42	Auxiliary Building Struc. Steel				C-36A C-36B
3	1.43	Emergency Generator Building Structural Steel				C-37
3	1.44	Service Water Pump Structure Structural Steel				C-37
	1.45	Miscellaneous Iron-Embedded * (Sole plates under steam generators and reactor vessels, all embedded steel in reactor building foundations, all anchor bolts and threaded rods.)				C-33
3	1.5	Emergency Reservoir				
3	1.51	Backfill Adjacent to Emergency Reservoir				C-210
3	1.52	Pipeline				#
3	1.53	Service Water Structure Sluice Gates				#
3	1.8	Compacted Backfill *				C-210
	1.9	Field Erected Tanks				
	1.91	Borated Water Storage Tank				C-18

* Seismic Category I portions only.
 # Specifications will be added at later date.

QUALITY ASSURANCE PROGRAM
PROJECT SUMMARY Q LIST FORM

MIDLAND UNIT 1 & 2
CONTROL SYSTEMS

Job No. 7220

Page 1 of 2

ITEM REV. NO.	IDENTITY NO.	ITEM/DESCRIPTION	PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	5.1	Instruments Controllers/Transmitters				J-204
	5.2	Radiation Monitoring Equipment				J-211
	5.3	Level Controllers				J-216
	5.4	Temperature Regulators				J-217
	5.5	Flow Tubes				J-222
	5.6	Orifice Plates				J-223
	5.7	Flow Switches				J-224
	5.8	Sight Flow Glasses				J-225
	5.9	Level Switches				J-226
	5.10	Gage Glasses				J-227
	5.11	Pressure and Temperature Switches				J-228
	5.12	Thermocouples, RTD's and Thermo Wells				J-229
	5.13	Dial Thermometers				J-230
	5.14	Control Valves				J-255
	5.15	Solenoid Valves				J-256
3	5.16	Non-Nuclear Instrumentation Q-listed instruments for all of the categories above are identified in the Instrument Index.	B&W (CS 1048)			M-1.35
Δ						
3	6/1/73	Revised and Reissued by EAPC (Final)	<i>[Signature]</i>	6-1-73		7-15-73
2	11-5-70					
REV. NO.	DATE	REASON FOR ISSUE	PROJ. ENG.	DATE	CHIEF NUC. ENG.	DATE
			ISSUED BY		APPROVED BY	



QUALITY ASSURANCE PROGRAM
PROJECT SUMMARY Q LIST FORM

MIDLAND UNIT 1 & 2

Job No. 7220

Page 2 of 2

CONTROL SYSTEMS

ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
		<u>Equipment</u>				
3	5.17	Main Control Boards (Seismic Category I Only)				J-201
3	5.18	Local Control Panels (Seismic Category I Only)				J-202
3	5.19	Local Instrument Rocks (Seismic Category I Only)				J-203
3	5.20	Nuclear Instrumentation and Reactor Protection Systems	B & W (CS-2-18)			M-1.31
3	5.21	Engineered Safety Features Actuation Systems	*			J-207
		* ECCAS by B & W				M-1.32



QUALITY ASSURANCE PROGRAM
PROJECT SUMMARY Q LIST FORM
MIDLAND UNITS 1 and 2
ELECTRICAL

Job No. 7220

Page 1 of 4

ITEM REV. NO.	IDENTITY NO.	ITEM/DESCRIPTION	PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	3.1	Switchgear, Engr. Safeguards				
3	3.101	4.16kV Swgr. Buses		1A05 & 2A05	E-5 E-6	E-29
3	3.102	4.16kV Swgr. Buses		1A06 & 2A06	E-5 E-6	E-29
	3.11	Station Power Trans., Engr. Safeguards				
	3.111	4160-480V Trans. 750 kVA		1X17 & 2X17	E-11 E-15	E-6
	3.112	4160-480V Trans. 750 kVA		1X18 2X18	E-11 E-15	E-6
3	3.113	4160-480V Trans. 500 kVA		1X15 2X15	E-11 E-15	E-6
	3.12	Load Centers, Engr. Safeguards				
	3.121	480V Load Center Buses		1B17 & 2B17	E-11 E-15	E-6
	3.122	480V Load Center Buses		1B18 & 2B18	E-11 E-15	E-6
3	3.123	480V Load Center Buses		1B15 2B15	E-11 E-15	E-6
	3.13	Motor Control Center Engr., Safeguards				
	3.131	Motor Control Centers		1B23 & 2B23	E-11 E-15	E-7
	3.132	Motor Control Centers		1B24 & 2B24	E-11 E-15	E-7
	3.133	Motor Control Centers		1B25 & 2B25	E-11 E-15	E-7
△						
△						
△						
△	9/1/73	Revised and Reissued (Final)	<i>[Signature]</i>	6-1-73	<i>[Signature]</i>	<i>[Signature]</i>
△	11/3/70					
△	DATE	REASON FOR ISSUE	PROJ. ENG.	DATE	CHIEF MFG. ENGR.	
			ISSUED BY			

QUALITY ASSURANCE PROGRAM
PROJECT SUMMARY Q LIST FORM

MIDLAND UNITS 1 and 2
ELECTRICAL

No. 7220

Page 2 of 4

IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
3.134	Motor Control Centers		1B39 & 2B39	E-11 E-15	E-7
3.2	Switchboards & Panels				
3.241	120V Preferred ac Panels		1Y11 & 2Y11	E-23 E-24	E-15
3.242	120V Preferred ac Panels		1Y12 & 2Y12	E-23 E-24	E-15
3.243	120V Preferred ac Panels		1Y13 & 2Y13	E-23 E-24	E-15
3.244	120V Preferred ac Panels		1Y14 & 2Y14	E-23 E-24	E-15
3.3	Raceways Associated with Ener. Safeguards (Installation)				
3.31	Conduit (installation only)			E-42	Field
3.32	Cable Tray (installation only)			E-42	Field
3.4	Cable Associated with Engr. Safeguards				
3.411	Triax Instrument Cable				E-23
3.412	Coax. Instrument Cable				E-23
3.413	Shielded Instrument Cable				E-23

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ITEM NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	3.414	Thermocouple Extension Wires				E-23
	3.42	600V Control Cable				E-22
	3.43	600V Power Cable				E-22
	3.44	5KV Power Cable				E-21
	3.5	DC Equipment				
3	3.51	125V Station Batteries		OD02A & OD02B	E-20 E-21	E-12
	3.52	Battery Chargers				
	3.521	Battery Chargers		1D12A & 2D12A	E-20 E-21	E-11
	3.522	Battery Chargers		1D12B & 2D12B	E-20 E-21	E-11
	3.53	AC INVERTERS				
	3.531	Inverter Channel #1		OY01A	E-20	E-11
	3.532	Inverter Channel #2		OY01B	E-20	E-11
	3.533	Inverter Channel #3		OY01C	E-21	E-11
	3.534	Inverter Channel #4		OY01D	E-21	E-11
	3.54	DC Buses				
3	3.541	125V dc Bus		1D21 & 2D21	E-20 E-21	E-13
3	3.542	125V dc Bus		1D22 & 2D22	E-20 E-21	E-13
	3.55	125V dc Distribution Panels				
	3.551	125V dc Distr. Panel		1D31 & 2D31	E-20 E-21	E-13
	3.552	125V dc Distr. Panel		1D32 & 2D32	E-20 E-21	E-13
	3.6	Miscellaneous Elect. Equip.				

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REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	3.611	12" Penetrations for Power				E-20
	3.612	12" Penetrations for Control				E-20
	3.613	12" Penetrations for Instrumen- tation				E-20

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ITEM REV. NO.	IDENTITY NO.	ITEM/DESCRIPTION	PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
3	400	Miscellaneous Equipment				
	4001H51	Reactor Building Crane (S)		1 H 51		M-92
	4002H51	Reactor Building Crane (S)		2 H 51		M-92
	4000H52	Auxiliary Building Crane (S)		0 H 52		M-93
3	4001M12 A & B	Hydrogen Recombiners		1M12 A,B		M-169
3	4002M12 A & B	Hydrogen Recombiners		2M12 A,B		M-169
3	4001G10 A & B	Emergency Diesel Generators		1G10 A,B		M-18
3	4002G10 A & B	Emergency Diesel Generators		2G10 A,B		M-18
3	4000W	Fuel Transfer Tube Isolation Valves				DCCL
3		Reactor Building Isolation System (all penetration components not addressed under other systems)				
3	4000W	Reactor Building Isolation Valves				
3	4000Q	Reactor Building Penetration Piping				
3	4000Z	Reactor Building Penetration Flued Heads				
3	4000M	Reactor Building Penetration Supports & Hangers				
	401	Reactor Coolant and Pressure Control System, Unit 1				

Δ						
Δ						
Δ						
Δ						
3	6/1/73	Revised and Reissued by B.A.P.C (Final)	<i>[Signature]</i>	7-7-73	<i>[Signature]</i>	7-8-73
REV. NO.	DATE	REASON FOR ISSUE	PROJ. ENG.	DATE	CHIEF NUC. ENG.	DATE
			ISSUED BY		APPROVED BY	

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	4011751	Reactor Vessel and Head	B&W	1 T 51		M-1.1
3	4011M98	Fuel Assemblies and Neutron Sources	B&W	1 M 98		N/A
3	4011M51A	Control Rod Assemblies	B&W	1 M 51A		M-1.3
3	4011M51B	Axial Power Shaping Rod Assemblies	B&W	1 M 51B		M-1.3
3	4011M51C	Orifice Rod Assemblies	B&W	1 M 51C		M-1.3
3	4011M51D	Lumped Burnable Poison Rod Assemblies	B&W	1 M51D		M-1.3
	4011M52	Control Rod Drive Pressure Tube	B&W	1 M 52		M-1.4
	4011E51 A & B	Steam Generators	B&W	1E51 A,B		M-1.6
3	4011P51 A,B,C,D	Reactor Coolant Pump	B&W	1 P 51 A,B,C,D		M-1.7
3	4011PM51 A,B,C,D	Reactor Coolant Pump Motor Flywheel	B&W	Part of PM51A,B,C,D		M-1.8
	4011T52	Pressurizer	B&W	1 T 52		M-1.10
3	4011Q	Piping**	B&W(Partial)			M-1.9 DCCL
3	4011W	Valves**	B&W(Partial)			M-1.28 M-1.11, DCCL
3	4011M	Supports & Hangers**				M-106
	402	Reactor Coolant and Pressure Control System, Unit 2				
	4022T51	Reactor Vessel and Head	B&W	2 T 51		M-1.1
3	4022M98	Fuel Assemblies and Neutron Sources	B&W	2 M 98		N/A
	4022M51 A	Control Rod Assemblies	B&W	2 M 51 A		M-1.3
3	4022M51B	Axial Power Shaping Rod Assemblies	B&W	2 M 51 B		M-1.3
3	4022M51C	Orifice Rod Assemblies	B&W	2 M 51 C		M-1.3
3	4022M51D	Lumped Burnable Poison Rod Assemblies	B&W	2 M 51 D		M-1.3

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	4022M52	Control Rod Drive Pressure Tube	B&W	2 M 52		M-1.4
	4022E51 A & B	Steam Generators	B&W	2E51 A,B		M-1.6
	4022P51 A,B,C,D	Reactor Coolant Pump	B&W	2 P 51 A,B,C,D		M-1.7,
3		Reactor Coolant Pump Flywheel	B&W			M-1.8
	4022T52	Pressurizer	B&W	2 T 52		M-1.10
3	4022Q	Piping**	B&W (Partial)			M-1.9 DCCL
3	4022W	Valves**	B&W (Partial)			DCCL M-1.27
3	4022N	Supports & Hangers**				M-106
	403	Makeup and Purification System, Unit 1*				
	4031T58	Makeup Tank	B&W	1 T 58		M-1.15
3	4031P58 A,B,C	Makeup Pumps & Motors	B&W	1P58 A,B,C		M-1.16
3	4031E57 A & B	Letdown Heat Exchangers (tube side)	B&W	1E57 A,B		M-1.13
3	4031Q	Piping**				DCCL
3	4031W	Valves**				DCCL
3	4031N	Supports & Hangers**				M-106
3	4031Z	Reactor Building Penetration Flued Heads				M-111
	404	Makeup and Purification System, Unit 2*				
	4042T58	Makeup Tank	B&W	2 T 58		M-1.15
3	4042P58 A,B,C	Makeup Pumps & Motors	B&W	2P58 A,B,C		M-1.16

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
3	4042E57	Letdown Heat Exchangers (tube side)	B&W	2E57 A,B		M-1.13
3	4042Q	Piping**				DCCL
3	4042N	Valves**				DCCL
3	4042M	Supports & Hangers**				M-106
3	4042Z	Reactor Building Penetration Flued Heads				M-111
	406	Reactor Coolant Sample System*				
3	4060Q	Reactor Building Penetration Piping				
3	4060W	Reactor Building Isolation Valves				
3	4060M	Supports & Hangers**				M-106
3	4060Z	Reactor Building Penetration Flued Heads				M-111
	407	Liquid Waste Management System*				
3	4070Q	Reactor Building Penetration Piping				
3	4070W	Reactor Building Isolation Valves				
3	4070M	Supports & Hangers**				M-106
3	4070Z	Reactor Building Penetration Flued Heads				M-110,111
	409	Waste Gas System*				
3	4090T98	Radwaste Gas Surge Tank		O T 98		M-26
	4090T99 A,B,C,D,E,F	Radwaste Gas Decay Tanks		O T 99 A,B,C,D,E,F		M-26

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
3	4090Q	Piping**				DCCL
3	4090W	Valves**				DCCL
3	4090M	Supports & Hangers **				M-106
3	4090Z	Reactor Building Penetration Flued Heads				M-111
	410	Decay Heat Removal and Emergency Core Cooling System, Unit 1				
	4101P60 A & B	Decay Heat Removal Pumps & Motors	B&W	1P60 A,B		M-1.17
	4101E60 A & B	Decay Heat Removal Heat Exchangers	B&W	1E60 A,B		M-1.18
	4101T63 A & B	Core Flooding Tanks	B&W	1T63 A,B		M-1.19
3	4101Q	Piping**				DCCL
3	4101W	Valves**				DCCL
3	4101M	Supports & Hangers **				M-106
3	4101Z	Reactor Building Penetration Flued Heads				M-111
	411	Decay Heat Removal and Emergency Core Cooling System, Unit 2				
	4112P60 A & B	Decay Heat Removal Pumps & Motors	B&W	2P60 A,B		M-1.17
	4112E60 A & B	Decay Heat Removal Heat Exchangers	B&W	2E60 A,B		M-1.18
	4112T63 A & B	Core Flooding Tanks	B&W	2T63 A,B		M-1.19
3	4112Q	Piping**				DCCL
3	4112W	Valves**				DCCL
3	4112M	Supports & Hangers **				M-106
3	4112Z	Reactor Building Penetration Flued Heads				M-111
	412	Reactor Building Spray System, Unit 1				
	4121P64 A & B	Reactor Building Spray Pumps & Motors		1P64 A,B		M-54
	4121T71	Sodium Hydroxide Storage Tank	B&W	1T71		M-1.74
	4121T72	Sodium Thiosulfate Storage Tank	B&W	1T72		M-1.74
	4121P71 A & B	Sodium Hydroxide Injection Pumps & Motors	B&W	1P71 A,B		M-1.74



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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	4121P72 A & B	Sodium Thiosulfate Injection Pumps & Motors	B&W	1P72 A,B	.	M-1.74
3	4121M64 A & B	Reactor Building Spray Nozzles	B&W	1M64 A,B		M-1.74
3	4121Q	Piping**				DCCL
3	4121W	Valves**				DCCL
3	4121M	Supports & Hangers**				M-106
3	4121Z	Reactor Building Penetration Flued Heads				M-111
	413	Reactor Building Spray System, Unit 2				
	4132P64 A & B	Reactor Building Spray Pumps & Motors		2P64 A,B		M-54
	4132T71	Sodium Hydroxide Storage Tank	B&W	2T71		M-1.74
	4132T72	Sodium Thiosulfate Storage Tank	B&W	2T72		M-1.74
	4132P71 A & B	Sodium Hydroxide Injection Pumps & Motors	B&W	2P71 A,B		M-1.74
	4132P72 A & B	Sodium Thiosulfate Injection Pump & Motors	B&W	2P72 A,B		M-1.74
3	4132M64 A & B	Reactor Building Spray Nozzles	B&W	2M64 A,B		M-1.74
3	4132Q	Piping**				DCCL
3	4132W	Valves**				DCCL
3	4132M	Supports & Hangers**				M-106
3	4132Z	Reactor Building Penetration Flued Heads				M-111
	414	Fuel Pool Cooling and Purification System*				
3	4140Q	Reactor Building Penetration Piping				
3	4140W	Reactor Building Isolation Valves				
3	4140M	Supports & Hangers**				M-106
3	4140Z	Reactor Building Penetration Flued Heads				M-111
	416	Component Cooling Water System, Unit 1*				
	4161P73 A & B	Component Cooling Water Pumps & Motors		1P73 A,B		M-52
	4161E73 A & B	Component Cooling Water Heat Exchangers		1E73 A,B		M-51



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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	4161T73 A & B	Component Cooling Water Surge Tanks		1T73 A,B	.	M-26
3	4161Q	Piping**				DCCL
3	4161W	Valves**				DCCL
3	4161M	Supports & Hangers**				M-106
3	4161Z	Reactor Building Penetration Flued Heads				M-111
	417	Component Cooling Water System, Unit 2*				
	4172P73 A & B	Component Cooling Water Pumps & Motors		2P73 A,B		M-52
	4172E73 A & B	Component Cooling Water Heat Exchangers		2E73 A,B		M-51
	4172T73 A & B	Component Cooling Water Surge Tanks		2T73 A,B		M-26
3	4172Q	Piping**				DCCL
3	4172W	Valves**				DCCL
3	4172M	Supports & Hangers**				M-106
3	4172Z	Reactor Building Penetration Flued Heads				M-111
	418	Service Water System Cooling Tower and Pumps*				
	4180P75 A,B,C,D,E	Service Water Pumps & Motors		OP75 A,B,C,D,E		M-75
3	4180F75 A,B,C,D,E	Service Water Strainers		OP75 A,B,C,D,E		M-181
3	4180Q	Piping**				DCCL
3	4180W	Valves**				DCCL
3	4180M	Supports & Hangers**				M-106
3	4180Z	Reactor Building Penetration Flued Heads				M-111
	419	Service Water System Reactor and Auxiliary Buildings and Emergency Diesel Generators*				
3	4190Q	Piping**				DCCL
3	4190W	Valves**				DCCL
3	4190M	Supports & Hangers**				M-106
3	4190Z	Reactor Building Penetration Flued Heads				M-111



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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	421	Reactor Building Penetration Pressurization and Seal Injection Systems, Unit 1 *				
3	4211T41	Pressurized Storage Tank		1T41		
3	4211T42	Penetration Pressurized Air Receiver		1T42		
3	4211Q	Piping **				DCCL
3	4211W	Valves **				DCCL
3	4211M	Supports & Hangers **				M-106
	422	Reactor Building Penetration Pressurization and Seal Injection System, Unit 2*				
3	4222T41	Pressurized Storage Tank		2T41		
3	4222T42	Penetration Pressurized Air Receiver		2T42		
3	4222Q	Piping **				DCCL
3	4222W	Valves **				DCCL
3	4222M	Supports & Hangers * *				M-106
	431	Main Steam and Turbine Steam System, Unit 1 (from Steam Gen. thru R.B. Isolation Valves)*				
3	4311Q	Piping **				DCCL
3	4311W	Valves **				DCCL
3	4311V	Safety Valves	B&W			M-112
3	4311M	Supports & Hangers **				M-106
3	4311Z	Reactor Building Penetration Fluid Heads				M-111

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	432	Main Steam and Turbine Steam System, Unit 2 (From Steam Gen. thru R.B. Isolation Valves)*				
3	4322Q	Piping **				DCCL
3	4322V	Valves ***				DCCL
3	4322W	Safety Valves	B&W			M-1.12
3	4322M	Supports & Hangers * *				M-106
3	4322Z	Reactor Building Penetration Flued Heads				M-111
	433	Auxiliary Steam System, Unit 1 (from Main Steam Headers thru Aux. F.W. Pump Turbines)*				
3	4331Q	Piping **				DCCL
3	4331W	Valves **				DCCL
3	4331M	Supports & Hangers * *				M-106
	434	Auxiliary Steam System, Unit 2 (from Main Steam Headers to Aux. F.W. Pump Turbines)*				
3	4342Q	Piping **				DCCL
3	4342W	Valves **				DCCL
3	4342M	Supports & Hangers * *				M-106
	438	Feedwater and Condensate System Unit 1 (Main F.W. Piping from Steam Gen. to R.B. Isolation Valves, Aux. F.W. Piping & Piping from Service Water Sys. to Aux. F.W. Pump Suction)*				

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	4381P05 A & B	Auxiliary Feedwater Pumps & Drivers, (Turbine and Electrical)		1P05 A,B		M-14
3	4381Q	Piping**				DCCL
3	4381W	Valves**				DCCL
3	4381M	Supports & Hangers**				M-106
3	4381Z	Reactor Building Penetration Flued Heads				M-111
	439	Feedwater and Condensate System Unit 2 (Main F.W. Piping from Steam Gen. to R.B. Isolation Valves, Aux. F.W. Piping & Piping from Service Water Sys. to Aux. F.W. Pump Suction)*				
	4392P05 A & B	Auxiliary Feedwater Pumps & Drivers		2P05 A,B		M-14
3	4392Q	Piping**				DCCL
3	4392W	Valves**				DCCL
3	4392M	Supports & Hangers**				M-106
3	4392Z	Reactor Building Penetration Flued Heads				M-111
	452	Emergency Diesel Fuel Oil System				
3	4521T77 AB	Emergency Diesel Oil Day Tanks		1T77 A,B		M-26
3	4522T77 A,B	Emergency Diesel Oil Day Tanks		2T77 A,B		M-26
3	4521T78 A,B	Emergency Diesel Oil Storage Tanks		1T78 A,B		M-71
3	4522T78 A,B	Emergency Diesel Oil Storage Tanks		2T78 A,B		M-
3	4521P78 A,B	Diesel Oil Transfer Pumps		1P78 A,B		M-24
3	4522P78 A,B	Diesel Oil Transfer Pumps		2P78 A,B		M-24
3	4520Q	Piping**				DCCL
3	4520W	Valves**				DCCL
3	4520M	Supports & Hangers**				M-106

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
	453	Reactor Bldg. Ventilation System*				
	4531VM56 A,B,C,D	Reactor Building Cooling Units		1VM56 A,B,C,D		M-163
	4531V57 A,B,C,D	Reactor Building Cooling Unit Fans		1VV57 A,B,C,D		M-157
	4532VM56 A,B,C,D	Reactor Building Cooling Units		2VM56 A,B,C,D		M-163
	4532VV57 A,B,C,D	Reactor Building Cooling Unit Fans		2VV57 A,B,C,D		M-157
3	4531VV55	Reactor Building Hydrogen Vent Fan		1VV55		M-157
3	4532VV55	Reactor Building Hydrogen Vent Fan		2VV55		M-157
	4531VF60	Reactor Building Hydrogen Vent Pre-Filter		1VF60		M-162
	4532VF60	Reactor Building Hydrogen Vent Pre-Filter		2VF60		M-162
	4531VF61	Reactor Building Hydrogen Vent HEPA Filter		1VF61		M-162
	4532VF61	Reactor Building Hydrogen Vent HEPA Filter		2VF61		M-162
	4531VF62	Reactor Building Hydrogen Vent Charcoal Filter		1VF62		M-162
	4532VF62	Reactor Building Hydrogen Vent Charcoal Filter		2VF62		M-162
3	4531VE51	Reactor Building Hydrogen Vent Heating Coil		1VE51		M-166
3	4532VE51	Reactor Building Hydrogen Vent Heating Coil		2VE51		M-166
3	4531VD	Reactor Building Dampers**				M-151
3	4532VD	Reactor Building Dampers**				M-151
3	4531VD	Reactor Building Ductwork and Supports**				M-151
3	4532VD	Reactor Building Ductwork and Supports**				M-151

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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
3	4531W	Reactor Building Purge Valves**				M-168
	4532W	Reactor Building Purge Valves**				M-168
	454	Auxiliary Building Ventilation System*				
	4540VM01 A & B	Control Room Air Handling Units***		OVM01 A, B		M-160
	4540VV03 A & B	Control Room Supply Fans***		OVV03 A, B		M-159
	4540VF01 A & B	Control Room Supply Pre-Filters***		OVF01 A, B		M-162
3	4540VF02	Control Room Supply Pre-Filters***		OVF02		M-162
	4540VF6 ³	Control Room Supply HEPA Filter***		OVF63		M-162
	4540VF51	Control Room Supply Charcoal Filter***		OVF51		M-162
	4540VM52	Component Cooling Water Pump Room Air Handling Unit		OVM52		M-160
	4541VM52 A & B	Component Cooling Water Pump Room Air Handling Unit		1VM52 A, B		M-160
	4542VM52 A & B	Component Cooling Water Pump Room Air Handling Units		2VM52 A, B		M-160
3	4541VM54 A & B	Auxiliary Feedwater Pump Room Air Handling Units		1VM54 A, B		M-160
3	4542VM54 A & B	Auxiliary Feedwater Pump Room Air Handling Units		2VM54 A, B		M-160
	4541VM55 A & B	Engineered Safeguards Pump Room Air Handling Units		1VM55		M-160
	4542VM55 A & B	Engineered Safeguards Pump Room Air Handling Units		2VM55		M-160
	4540VV53 A,B,C,D	Diesel Generator Room Exhaust Fans		OVV53 A,B,C,D		M-165
	4541V	Battery Room Exhaust Fans				M-165
	4542V	Battery Room Exhaust Fans				M-165



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ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
3	4541VM05 A & B	Switch Gear Room Air Handling Units		1VM05 A, B	.	M-160
3	4542VM05 A & B	Switch Gear Room Air Handling Units		2VM05 A, B		M-160
3	4540VM02	Cable Spreading Room Air Handling Unit		OVM02		M-160
3	4540VM03	Cable Spreading Room Air Handling Unit		OVM03		M-160
3		Service Water Pump Structure Exhaust Fans				M-165
3		Diesel Generator Room Dampers**				M-151
3		Service Water Pump Structure Dampers**				M-151
3		Diesel Generator Room Ductwork & Supports**				M-151
3		Service Water Pump Structure Ductwork & Supports**				M-151
	457	Chilled Water System*				
	4570VPO2 A & B	Auxiliary Building Chilled Water Pumps***		OVP02 A, B		M-154
3	4570VM59 A & B	Auxiliary Building Main Chiller***		OVM59 A, B		M-155
3	4570Q	Piping**				DCCL
3	4570W	Valves**				DCCL
3	4570M	Supports & Hangers**				M-106
3	4570Z	Reactor Building Penetration Flued Heads				M-111
		NOTES:				
3	*	Seismic Class I Portions				
3	**	Actual Q-valves, dampers and lines				

QUALITY ASSURANCE PROGRAM
PROJECT SUMMARY Q LIST FORM

7220

Page 14 of 14

ITEM REV. NO.	IDENTITY NO.		PURCHASER	EQUIP. NO.	DWG. NO.	SPEC. NO.
		(NOTES Con't.)				
3	***	will be indicated on the system P&ID and Piping Class Summary Sheets. Only assured for Control Room Emergency ventilation.				
3	DCCL	Bechtel Design Control Check List. When indicated in "Spec No." column the DCCL should be used in conjunction with the appropriate P&ID to determine which piping or valve specification applies.				
	(S)	Seismic I for Structural Integrity only.				

EXHIBIT 12 (b) and 12 (c) - 1

<u>DOCUMENT CODE</u>	<u>DATE</u>	<u>DOCUMENT CODE</u>	<u>DATE</u>
NCR C-1-1	7-12-73	NCR C-47	1-21-74
C-2	9-7-73	C-48	1-21-74
C-3	9-12-73	C-49	1-21-74
C-4	9-28-73	C-50 (R.1)	1-24-74
C-5	9-28-73	C-51 (R.1)	2-8-74
C-6	10-4-73	C-52	2-8-74
C-7	10-8-73	C-53	1-29-74
C-8	10-8-73	C-54 (R.1)	2-4-74
C-9	10-29-73	C-55	1-28-74
C-10	10-29-73	C-56	2-4-74
C-11	11-8-73	C-57	2-4-74
C-12	11-2-73	C-58	2-13-74
C-13	11-19-73	C-59	2-13-74
C-14	11-16-73	C-60	2-14-74
C-15	11-16-73	C-61	2-14-74
C-16	11-16-73	C-62	2-14-74
C-17	11-21-73	C-63	2-14-74
C-18	11-23-73	C-64	2-18-74
C-19	11-29-73	C-65	2-18-74
C-20	11-29-73	C-66	2-21-74
C-21	11-28-73	C-67	2-21-74
C-22	11-29-73	C-68	2-21-74
C-23	11-30-73	C-69	2-22-74
C-24	11-30-74	C-70	2-22-74
C-25	12-3-73	C-71	3-5-74
C-26	12-5-73	C-72	3-4-74
C-27	12-5-73	C-73	3-6-74
C-28	12-5-73	C-74	3-11-74
C-29	12-12-73	C-75	3-11-74
C-30	12-12-73	C-76	3-14-74
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C-34	12-18-73	C-80	3-20-74
C-35	12-19-73	C-81	3-22-74
C-36	12-31-73	C-82	3-27-74
C-37	12-20-73	C-83	3-28-74
C-38(A)	1-9-74	C-84	4-5-74
C-39	12-18-73	C-85	4-5-74
C-40	1-3-74	C-86	4-11-74
C-41	12-20-73	C-87	4-18-74
C-42	12-20-73	C-88	4-17-74
C-43	1-4-74	C-89	4-24-74
C-44	1-15-74	C-90	4-25-74
C-45	1-19-74	C-91	4-30-74
C-46	1-21-74	C-92	5-8-74
		C-93	5-10-74

<u>DOCUMENT CODE</u>	<u>DATE</u>
MCAR-1	9-11-73
2	12-11-73
3	12-7-73
4	12-10-73
5	2-5-74
6	5-2-74
CNCR-QF-1	11-9-73
QF-2	12-6-73
QF-3	1-16-74
QF-4	1-16-74
QF-5	1-25-74
QF-6	1-23-74
QF-7	2-6-74
QF-8	2-19-74
QF-9	3-5-74
QF-10	3-28-74
QF-11	4-74
QF-12	4-1-74
QAF E-1A 001	5-14-73
002	5-14-74
003	5-14-74
004	5-14-74
005	5-14-74
006	5-14-74
007	5-14-74
008	5-14-74
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011	5-14-74
012	5-14-74
QAF E-1B 001	5-14-74
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003	5-14-74
004	5-14-74
005	5-14-74
006	5-14-74
007	5-14-74
008	5-14-74
009	5-14-74
QAF E-2-1	9-5-73
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8	9-5-73

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11	9-5-73
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13	9-5-73
14	9-5-73
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16	9-5-73
17	9-5-73
18	9-5-73
QAF E-3-1	11-5-73
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5	11-5-73
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7	11-5-73
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9	11-5-73
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12	11-5-73
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4	2-28-74
5	2-28-74
6	2-28-74
7	2-28-74
QAF C-1 001	7-17-73
002	7-17-73
003	7-17-73
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006	7-18-73
007	7-18-73
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009	7-17-73
010	7-17-73
011	7-16-73
012	7-17-73
013	7-17-73
014	7-16-73
015	7-16-73
QAF C-2-1	10-25-73
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5	10-25-73
6	10-25-73
7	10-25-73

<u>DOCUMENT CODE</u>	<u>DATE</u>
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3	1-28-74
QAF C-4-1	2-20-74
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QAF C-5-1	5-1-74
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7	5-1-74

QADR 001	2-5-74
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006	2-25-74
007	3-28-74
008	4-29-74

QADR CA-1	3-18-74
CA-2	3-20-74
CA-3	3-21-74
CA-4	3-21-74
CVN-1	4-9-74
CVN-2	4-10-74
CVN-3	4-11-74
CVN-4	4-15-74
CVN-5	4-30-74
CVN-6	5-2-74

<u>DOCUMENT CODE</u>	<u>DATE</u>
QADR CVN-7	5-2-74
CA-5	5-20-74

<u>DOCUMENT CODE</u>	<u>DATE</u>	<u>DOCUMENT CODE</u>	<u>DATE</u>
NCR 0001	9-14-70	NCR 0045	10-23-70
0002	9-14-70	0046	10-23-70
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0007	9-19-70	0051	10-19-70
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0012	9-28-70	0056	11-25-70
0013	9-29-70	0057	11-25-70
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0025	10-27-70	0069	12-14-70
0026	10-27-70	0070	12-14-70
0027	11-2-70	0071	12-15-70
0028	11-2-70	0072	12-16-70
0029	11-2-70	0073	12-16-70
0030	11-2-70	0074	12-18-70
0031	10-27-70	0075	Not Issued
0032	10-27-70	0076	Not Issued
0033	10-27-70	0077	Not Issued
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0039	11-2-70	0083	12-22-70
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0041	10-24-70	0085	12-22-70
0042	10-28-70		
0043	10-30-70		
0044	10-27-70		

Bechtel Power Corporation

Post Office Box 15000
3801 South Lake Blvd
Ann Arbor, Michigan 48106

H. J. C. ...
H. C. W. ...
R. D. M. ...
K. ...
J. ...
F. ...
J. ...
S. ...

E. W. Peterson
J. C. McKillip
D. R. Johnson

December 19, 1973

APR 20 1973

Mr. Stephen H. Howell
Vice President
Construction Company
212 West Michigan Avenue
Jackson, Michigan 49201

Subject: Midland Units 1 and 2
Quality Assurance/Quality Control

Dear Mr. Howell:

The purpose of this letter is to outline our renewed emphasis upon
attainment of quality assurance/quality control and to assure you that this
emphasis is the management of Bechtel, and that this direction will
be transmitted to all project personnel.

As a result of visiting the Midland site on Thursday, December 6th,
and also returning to visit the site on Wednesday, and Thursday,
December 13th and 14th, and site visits by Bill Gibbons, Manager of
Midland Quality Assurance; Jim Marvin, Manager of Construction; Don
Johnson, Chief Field Quality Control Engineer, and others; I have
concluded that there are a number of areas on which we must concentrate
our efforts.

This conclusion has also been reviewed with Ed Dalton, Midland Project
Supervisor; Jim Marvin, Manager of Construction; Mike Frost, Midland
Project Engineer; P. L. Casady, Area Manager; and R. L. Allen, Manager
of the Construction Labor Division of Bechtel Power Corporation, and
has been given priority in Bechtel.

The staff has assured that we have taken necessary steps to insure that
our quality assurance procedures and attitudes are that each person
concerned with the project recognizes his responsibility and obligation to
perform these steps in accordance with client and all requirements for the
project.

(1) Quality Assurance Procedures

A detailed program will be instituted to define the quality
requirements for special work processes. This program which
consists of the basic pre-planning of an operation will identify
the required procedures, instructions or work plans, inspection
plans, specifications and drawings required. Further, this
program will assist in identifying deficiencies in
special work processes, as required by the client, and in the

Mr. Stephen H. Howell
General Manager

December 13, 1973
Page Two

10074-03, Appendix 8, such as Field Change Requests (FCRs) and Non-Conformance Reports (NCRs). This process will include a review of all work functions to determine if there are special work processes. A list will be prepared for review by Bechtel Power Company. Appropriate work plans will then be prepared and reviewed with Customer Power Company prior to proceeding with the work.

(4) Change/Exception Responsibility

Previously, some verification inspections were performed by field engineers. For all jobs, quality assurance and verification inspections (for safety related work) will be performed only by quality control engineers. Quality verification inspections evaluate the work process that insures that the work process is constructed in accordance with the applicable plans, documents, specifications, and codes, and included in appropriate documentation.

(3) Insights to Quality Findings

Implement an action program to provide more timely and more complete quality assurance/quality control findings, using a standard procedure for identifying, reporting and resolving nonconformances. Section 34 covering Non-Conformances in the contract is under revision. This revised procedure provides for increased control over the processing of nonconformances and inspection findings by quality control and quality assurance personnel for more timely and complete identification of nonconformances to engineering and quality assurance personnel.

(4) Quality Control Changes

Quality control changes have been made to the quality control program for quality control observations. The Quality Control Program Review Report (see the San Diego quality control program review report) has been added to our Action Report. The Quality Control Engineer has been advised that the Quality Control Report should be submitted to the Quality Control Engineer to support the increased quality control program. The Quality Control Report should be submitted to the Quality Control Engineer to support the increased quality control program. The Quality Control Report should be submitted to the Quality Control Engineer to support the increased quality control program.

(5) Quality Control Program

Implement an action program to provide more timely and more complete quality assurance/quality control findings, using a standard procedure for identifying, reporting and resolving nonconformances.

Mr. Stanley H. Howell
Compressor Buyer Company

June 24, 1964
Page Three

be performed in accordance with a written procedure covering the qualifications, indoctrination, training, testing and certification of quality control personnel to the requirements of ANSI Standard #Z5.2.6 and the ASME Code, Paragraph 1.9B.

(6) Management Attention

Additional management or supervisory personnel attention will be maintained to assure that the corrective actions have been completed. Better personnel will be assigned to the plant and will receive additional training to permit evaluation of their performance on a continuing basis.

This list is not necessarily all inclusive. We expect it will bring to your attention that other areas require increased attention and attention of personnel. We will keep you informed as to our progress in this matter.

Very truly yours,



Alden E. Yule
Vice President

AP/jm

- cc: G. Farley
- W. Snyder
- E. J. Allen
- E. Nelson
- E. Brown
- J. Smith
- P. H. ...

Kemp

Bechtel Power Corporation
Inter-office Memorandum

0460

Date January 3, 1974

From P. R. Cassidy

Of S.F.P.D.

To Ann Arbor Office

To Ann Arbor Office
Staff Meeting Attendees

Subject QA/QC

- Copies to
- R. D. Allen
 - A. P. Yates
 - J. Morowski
 - E. J. O'Connell
 - H. O. Reinsch

It is not possible to sufficiently emphasize the importance of QA/QC in all of our nuclear work.

We have been accused of "foot-dragging" by the AEC and the Client in the case of the Midland Job. Below listed are steps that must be taken so that our QA/QC program is effective.

(1) Provide Immediate Response

It is imperative that an immediate response be made to each and every QA finding. The response may be a complete response or it may be a promise to take corrective measures by a given time. It is very important that we can produce the paper that shows that we have immediately acknowledged the problem and have a program for correcting it.

(2) Seek Help in Responding

The Quality Assurance Department is available and prepared to help any of our people who are not certain as to how to correctly respond to any quality related findings coming from auditing groups (i.e., Bechtel, AEC, Client).

(3) Follow-Up

As a corollary to the above, it is important that each department have a foolproof follow-up system that will insure that corrective measures are taken within the time frame specified.

Proper performance of our QA/QE/QC responsibilities is the most critical subject facing us this year. It is important that this message be transmitted to Bechtel people throughout our projects.

PRC/mh



P. R. Cassidy
P. R. Cassidy

Bechtel Power Corporation

Interoffice Memorandum

R.D.A.

To R. D. Allen ✓
I. R. Caraco
C. D. Statton

Date December 14, 1973

DEC 17 1973

Subject Reporting Important QA/QC
Problems

From H. O. Reinsch

Of Thermal Power Management

Copies to H. F. Brush W. E. Ferriss
R. M. Collins W. S. Gibbons
W. K. Davis R. T. Hamilton
K. O. Taylor Ib Ibsen
J. B. Loth
T. I. McHugh L. E. Stromberg
G. B. Grable J. M. Varela

At 50 Beale Street
11/B-7 Ext. 6204

The growing awareness and rapid dissemination of Quality Program problems detected by AEC and others makes it increasingly important for us to keep Management advised of important issues as soon as they are identified. The following instructions will become a part of TPO Quality Program Policies and should be placed into effect immediately.

Whenever a significant QA/QC problem is detected by AEC, Bechtel Client, or Bechtel personnel concerning Bechtel, Bechtel Subcontractor or Supplier, a brief written report shall be submitted by the Project Manager or his designee to the cognizant Division Manager. Information copies shall be sent to the cognizant Manager of Projects, Department Manager, QA Manager, and the Manager of Quality Assurance-TPO. This report shall describe the problem; how it was discovered and by whom; indicate other documents that may report the problem, such as reports to or by AEC or press releases; and indicate the immediate remedial action underway or planned. A schedule for completing this remedial action and a description of the types for formal reports to be prepared shall be included. The report shall be submitted no later than 24 hours after discovery of the condition.

The Manager of Quality Assurance, Thermal Power Organization, should be advised by telephone as soon as possible whenever the occurrence may have serious adverse affects on relations with the AEC, Public, or Client. When considered necessary, the Project Manager should also advise the cognizant Manager of Projects by telephone.

The Addressee
December 14, 1973
Page 2

Bethel Power Corporation

The Manager of Quality Assurance, Thermal Power Organization,
will be responsible for advising appropriate TPO Management of
these problems as necessary.

HOR:SAB:mm

Henry
H. O. Reinsch

Bechtel Power Corporation

Interoffice Memorandum

To	Distribution	Date	February 4, 1974
Subject	QA/QC Organization	From	H. O. Reinsch
		Of	Thermal Power Management
Copies to		At	50 Beale 11-B/7

Bechtel has consistently required that personnel performing Quality Assurance and Quality Control functions have sufficient authority and independence to carry out these functions and assure a quality job. We have also recognized the need for teamwork and close coordination on projects and for effective use of personnel. In the past few years, a number of organizational relationships have been employed by our Divisions to achieve these goals. While many of these have been effective, including those currently in use, we have determined that a single, uniform approach, unless specifically exempted, must be adopted and incorporated in all work performed by the Power Divisions for projects in the United States.

The key elements of this standard approach are:

1. Quality assurance personnel on projects shall receive administrative supervision¹ and technical direction² through the Division Quality Assurance Manager.
2. Quality Control personnel on projects shall receive administrative supervision and technical direction through the Division Chief Field Quality Control Engineer.
3. The relationship between Project Managers and Project Quality Assurance Engineers shall be defined as Coordination. Project Managers will not direct project Quality Assurance personnel.

¹Administrative supervision includes hiring, assignment, and salary administration.

²Technical direction includes positive mandatory direction prescribing the procedures and practices to be followed.

February 4, 1974

-) 4. The relationship between Project Field Construction Managers (or Project Superintendents) and Project Field Quality Control Engineers shall be defined as Coordination. Project Field Construction Managers will not direct project Field Quality Control personnel.
-) 5. Organization charts will illustrate that the relationship of QA and QC to the Project Managers and Project Construction Managers is different than that for other personnel.

Effective within 30 days, all projects unless specifically exempted by the Division Manager shall meet the requirements of this memo. Projects exempted will be individually reviewed by Division Management and the Manager of Quality Assurance to determine whether some of these requirements should be incorporated.

The Bechtel Topical Report on Quality Assurance will be revised to show these relationships.

HOR:SAB:eb


H. O. Reinsch

Bechtel F-ower Corporation

Inter-office Memorandum

To E. E. Felton Date December 14, 1973

Subject QA/QC - Midland Project 7220 From J.T. Marvin

Of Construction

Copies to A. P. Yates At Ann Arbor
P. R. Cassidy
M. M. Krout

Further to several telephone conversations with you on December 10, 11, 12 and 13 concerning measures we must take to improve our procedures and attitudes concerning QA/QC on the Midland project, listed below are improvements to be made immediately if they are not already made:

1. Provide procedures (instructions or work plans) in addition to the field inspection plans for selected processes. Plans needed will be agreed upon with Consumers Power Company prior to their implementation.
2. Additional emphasis on pre-planning of quality requirements of selected work processes. Pre-planning to identify and prepare the required procedures, instruction, inspection plans, specifications, drawings, etc., to be used in the work operation.
3. Although our inspectors are qualified by construction training programs, past work history and education, certification of these inspectors will be performed.
4. Intensify efforts in the training of field quality control personnel, field engineers and craftsmen.
5. Implement an action program to provide timely and adequate response to Quality Assurance/Quality Control findings.
6. Establish a written reporting system to apprise management of quality operations.
7. Added quality assurance personnel at the project site to assist in the interpretation of the quality assurance requirements.
8. Additional management and supervisory personnel attention until the foregoing items have been accomplished.

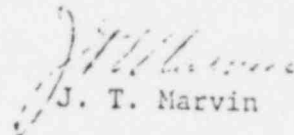
JTM to EEF

-2-

12/14/73

As you know, Construction Methods in Ann Arbor has been working since December 8 on a plan to implement a program which covers Item 2 above. In addition, I have reviewed certain instructions and work plans in San Francisco which may be implemented on selected processes as defined in Item 1. These, of course, as well as other selected items will be implemented at Midland with the concurrence of the client.

On December 19 I will be visiting your project for two specific reasons: (1) to confirm that you and your personnel have a complete understanding of the measures described herein and (2) to review those additional procedures as outlined in this letter that you have or are implementing.


J. T. Marvin

JTM/cg

QA/2

Bechtel Power Corporation

Interoffice Memorandum

To E. E. Fulton

Date December 19, 1973

Subject Job 7270 Midland Project
QA/QC Midland Units 1 & 2

From J. T. Harvin

at Construction

Copies to A. Yates
P. Cassidy
H. Krout

at Ann Arbor

Subsequent to my memorandum to you dated December 14, 1973, concerning measures we are taking to improve procedures and attitudes concerning the QA/QC program on the Midland Project. This memorandum is intended to identify and clarify those items that require special and continuing consideration.

(1) Special Work Processes

A more formalized program will be instituted to define the quality requirements for special work processes. This program which constitutes the basic pre-planning of any operation will identify the required procedures, instructions or work plans, inspection plans, specifications and drawings required. Further, this pre-planning operation will assist in identifying deviations from specified requirements, as required by the eighteen criteria of 10CFR-50, Appendix B, such as Field Change Requests (FCRs) and Non-Conformance Reports (NCRs). This program will include a review of all work functions to determine those that are special work processes. A list will be prepared for review by Consumers Power Company. Appropriate work plans will then be prepared and reviewed with Consumers Power Company prior to proceeding with the work.

(2) Changed Inspection Responsibilities

Previously, some verification inspections were performed by field engineers. Now all jobsite quality acceptance and verification inspections (for safety related work) will be performed only by quality control engineers. Quality verification inspection consists of the work process that insures that the work or process is constructed in accordance with the applicable plans, documents, specifications, and codes, and includes the appropriate documentation.

December 19, 1973

(3) Response to Quality Findings

Implement an action program to provide more timely response to quality assurance/quality control findings, using a revised procedure for identifying, reporting and resolving non-conformances. Section G3 covering Non-Conformances in the Bechtel Field Inspection Manual is under revision. This revised procedure provides for increased control over the processing of non-conformances and inspection findings by quality control and quality assurance personnel and for more timely and action oriented reporting of non-conformances to engineering and quality assurance personnel.

(4) Organizational Changes

Organizational changes have been made to provide additional coverage for quality control operations. A Quality Control Supervisor, responsible for Ann Arbor quality control operations, Z. G. Tucker, has been added to our Ann Arbor Office. The former Project Field Quality Control Engineer has been replaced by J. P. Connolly, who reports directly to Z. G. Tucker. This latter change was required to support the increased quality control inspection responsibilities described in Item 2. These new personnel, along with members of the construction organization, have intensified efforts in field quality training. To insure the adequacy of training, a training sessions coordinator, L. R. Albert, has been assigned in the job site quality control organization.

(5) Inspector Certification

Although our inspectors are qualified by training programs, past work history and education, certification of these inspectors will be performed in accordance with a written procedure covering the qualifications, indoctrination, training, testing and certification of quality control personnel to meet the requirements of ANSI Standard N45.2.6 and the AEC Regulatory Guide 1.50.

On December 20, 1973, I will review the status of progress regarding the above items and work that Construction Methods in Ann Arbor has been doing since December 8, 1973, with regard to item 1, Special Work Processes. This review will be made with all of your key project personnel. I would appreciate your scheduling this review meeting for the afternoon of December 20, 1973.


J. T. Marvin

UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of)
)
CONSUMERS POWER COMPANY) Construction Permit
) Nos. 81 and 82
(Midland Plant, Units 1 and 2))

CERTIFICATE OF SERVICE

I hereby certify that copies of the attached "Answers of Bechtel Power Corporation and Bechtel Associates Professional Corporation ('Bechtel') to Saginaw Interrogatories" dated May 22, 1974 in the above captioned matter have been served on the following in person or by deposit in the United States mail, first-class, or airmail, this 22nd day of May, 1974:

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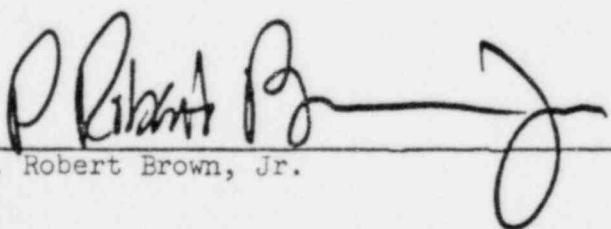
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