DIRECT TESTIMONY - STEPHEN H. HOWELL

I. Introduction and Scope of Testimony

My name is Stephen H. Howell. I am Executive Vice President, Energy Distribution and General Services, for Consumers Power Company.

I graduated from Princeton University in 1954 with a Bachelor of Science Degree in Engineering. I also attended Massachusetts Institute of Technology on a Sloan Fellowship and received a Masters of Science Degree in Industrial Management in 1966.

After graduation from Princeton, I served two years on active duty in the United States Navy and thereafter worked for five years as an Exploration Geologist for the Ohio Oil Company. In 1961, I joined Consumers Power Company as a Geologist in the Gas Department. I held successive jobs in the Gas Department in underground gas storage, oil and gas exploration, gas production and transmission, and gas distribution, before being named Executive Manager of Gas Engineering and Construction in 1968. In 1970, I was appointed Executive Manager of Electric and Generating Plant Construction. In this capacity, my responsibilities included construction of the Company's new nuclear and non-nuclear electric generation plants and transmission lines. In 1971, I was named Executive Manager of Electric Plant Projects, with responsibility for the engineering, construction and

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project management for all of Consumers Power Company's nuclear and non-nuclear generating plant projects.

In 1972, I was elected Vice President, Electric Plant Projects, with similar responsibilities. In 1978, I was elected Senior Vice President, Projects, Engineering and Construction, with continued responsibility for nuclear and non-nuclear construction activities. In October, 1980, I was elected to my present position, Executive Vice President, Energy Distribution and General Services. In this capacity, I am responsible for gas and electric distribution, including distribution engineering and construction activities, region operations, customer services and general services.

I have held membership in various professional societies related to my work. I was the Founding Chairman of the Edison Electric Institute Construction Committee. I have been a member of the Atomic Industrial Forum's Policy Committee on Nuclear Regulation. I am Chairman of the Atomic Industrial Forum Committee on Design, Construction and Operation and have chaired various subcommittees and work groups of the Atomic Industrial Forum and I am a member of the American Nuclear Society. I am a registered Professional Engineer in the State of Michigan.

My present duties do not include responsibility for the construction of the Midland Project. My involvement with the Midland Project spans the period May 1970 to October 1980. However, I was the officer directly in charge of

all aspects of the Project from July 1972 until J. W. Cook's appointment as the Vice President of Consumers Power Company with direct responsibility for the Midland Project in March 1980. Mr. Cook reported to me in this capacity until October 1980. Accordingly the substance of my testimony will deal with the period ending March 1980. Mr. Cook's testimony will cover the period from March 1980 to the present.

I am testifying today about the commitment of Consumers Power Company's management to construct the Midland Project in a manner so as to comply with all applicable regulatory requirements and so that the plant will operate safely and reliably. My testimony on the subject of this commitment is in response to the ruling of the Atomic Safety and Licensing Board ("ASLB") dated October 24, 1980, which limited the scope of Intervenor Stamiris' contentions on "management attitude" as follows:

> "[W]e are admitting the various contentions which raise the 'managerial attitude' issue. In doing so, however, we note that the contentions are to be understood as limited to the resolution of the soils settlement issues, to the implementation of the QA/QC program with respect to the resolution of such issues, and to factors which could be said to bear upon the Applicant's managerial attitude in resolving such issues."

My testimony on managerial attitude, then, covers the time period beginning in 1978 when the settlement issue arose to March, 1980 when my direct involvement in the resolution of the issue ended.

Any discussion of the commitment of Consumers Power Company management to a responsible Midland construction program must focus not on subjective mental states but on actions taken or planned by corporate management to assure that the Midland Project is built in a manner consistent with protection of the public health and safety. It is these actions I will address. They demonstrate that Consumers Power Company's management has never held back in implementing regulatory requirements once the content and scope of those requirements were known. Indeed, in certain crucial areas, management has encouraged activity by Company and Bechtel personnel to anticipate and take into account new safety-related technical matters even though the NRC has not adopted specific regulatory requirements for such matters.

II. Direct Managment Involvement in Resolution of Soils Settlement Issues.

As the corporate officer most directly concerned with the Midland Project my participation in the resolution of the soils settlement was both immediate and extensive. Other levels of management were also involved in decision-making. As a result of this management participation, the Company would insure that public health and safety would be protected by seeing that significant issues were dealt with promptly and by those with the authority to assure satisfactory resolution.

The unusual settlement of the Diesel Generator Building was discovered in late July 1978 by jobsite engi-

neers performing routine follow-up survey measurements. I was informed of the unanticipated settlement shortly after it was discovered, and was fully informed of all developments after that. The NRC on-site inspector was informed that settlement of the Diesel Generator Building exceeded expected ranges on August 22, 1978.

A few days later, on August 28, 1978, the Company stopped construction activities on the Diesel Generator Building until an initial investigation of the settlement, including a soil boring program was begun. When results of the soil boring program and further survey data were available, I reviewed the matter fully with Mr. Keeley, the Project Manager and with Mr. Marguglio, the Director of Quality Assurance. We agreed that the matter was reportable under the criteria of 10 CFR 50.55(e) and followed our reporting procedures. This information was communicated to the Region III office of the NRC by telephone on September 7, 1978. NRC has been kept fully informed of developments in the continuing investigation of the soils settlement issue, both as it affects the Diesel Generator Building, and for the other structures.

Consumers Power Company fully recognizes and accepts its obligation to promptly and fully apprise the NRC of construction progress at the Midland Project, and of any significant variances from construction specifications. It has fulfilled these obligations with respect to soils placement activities affecting the Diesel Generator Building,

auxiliary building, service water pump structure, and borated water storage tanks. I am aware of no assertions by the NRC Staff that Consumers Power Company has not communicated promptly with the NRC Staff, or that it has attempted to withhold information from NRC.

In addition to the joint efforts of Bechtel and Consumers Power Company to discover the source of the Diesel Generator Building settlement problem, Dr. R. B. Peck and Dr. A. J. Hendron, Jr., (independent soil and foundation consultants of nationally-recognized competence), were retained to assist in the investigation into the nature and causes of the problem. The investigations of Consumers Power Company, Bechtel, and Drs. Peck and Hendron had identified improper fill soils compaction as the probable cause of the Diesel Generator Building settlement. Following consultation with members of the NRC Staff, it was decided to broaden the scope of the investigation to include consideration of whether other project structures might be underlain by improperly compacted soils. As a result of the expanded investigation, which included soil boring, settlement recording, and detailed mapping and monitoring of cracks in concrete structures, it was determined that along with the Diesel Generator Building, the Auxiliary Building, the Service Water Pump Structure, and the Borated Water Storage Tank Foundations were founded, in whole or in part, upon fill material whose properties should be investigated.

The nature of the effects upon the above Category I structures, and proposed remedies, will be described in detail by other witnesses. My purpose is to demonstrate that the investigation into the unusual settlement of the Diesel Generator Building was timely and comprehensive. Once the cause was determined, the scope of the investigation was expanded to all other Category I structures that might have been affected by improper soils compaction. Consumers Power Company management has been, and remains, vitally interested in ensuring that all design and construction problems at the Midland Project are promptly and thoroughly investigated and corrected so that the facility can be completed and licensed to operate in a manner consistent with the protection of the public health and safety. Construction of the Diesel Generator Building was stopped while the soil settlement problem was investigated. Furthermore, work on remedial measures was stopped following the December 6, 1979 Order. This suspension was ordered by me despite the fact that our decision to request a hearing on the Order had the effect of staying its effectiveness, and thus we were not required to suspend this work.

III. Management Involvement in the Quality Assurance Program With Respect to Resolution of the Soils Settlement Issues

An aspect of the resolution of the Midland Project settlement problems which expressly reflects the extent and nature of Consumers Power Company's corporate involvement

and concern is the development and direction of the Company's Quality Assurance Program. The thrust of the Company's commitment is to maintain the best state-of-the-art quality assurance program. The result of this commitment has been the progressive improvement of the program as the Company explores and implements new means to achieve that goal.

The importance of continuing to improve the Company's corporate-wide quality assurance effort (including Midland) was recognized even before the events which led to this hearing. By 1976, I had concluded that the quality assurance function, particularly with respect to major generation plant construction projects like Midland, was becoming of sufficient importance that the Company's quality assurance effort required the direction of an experienced quality assurance professional. Accordingly, I decided to hire Mr. Marguglio as Director of Quality Assurance, after a nation-wide search by an executive search firm. Mr. Marguglio joined the Company in January 1977, and directly reported to me in my capacity as Vice President, Projects, Engineering and Construction. At that time, this Quality Assurance Department had line responsibility at construction projects (including Midland) for establishing quality assurance programs and standards, for devising procedures to assure that the standards were met, and additional responsibilities more fully described by Mr. Marguglio.

Prior to 1978, there had been a number of organizational changes in the Midland Quality Assurance organiza-

tion. In each instance, the change in organization was made in order to increase the effectiveness of the quality assurance organization. Some of these changes were recommended by independent consultants employed by Consumers Power Company to audit the Midland quality assurance program. Others followed suggestions and recommendations by Consumers Power Company personnel. In each instance, I, as senior management representative, actively supported these organizational changes.

In March, 1980, the decision was made to integrate the Bechtel Power Corporation quality assurance responsibilities and personnel at the Project with those of the Consumer Power Company. Preparation for making this change to a single quality assurance organization was immediately begun and in August, 1980, the change was fully implemented. This centralization provides single-point accountability for implementation of the project Quality Assurance Program. Mr. Marguglio will discuss in greater detail the reorganization of the project quality assurance effort.

It is my belief that Consumers Power Company management has taken all reasonable measures to create a quality assurance organization with the high-level executive personnel, technical quality assurance specialists, tools and support needed to identify quality assurance problems, and with all authority to examine, decide among alternatives, and implement measures to correct them.

There are other indications of a positive management attitude with respect to management participation in quality-assurance related activities. One significant measure of my own involvement with Quality Assurance matters during the period from the discovery of the soils settlement problem in August 1978 through the end of 1979 is the amount of time I devoted to meetings on Quality Assurance matters. Not all were specifically related to Midland, but they all involved improvements in the Company's Quality Assurance Program. Over this 74-week period, I attended or presided over 122 meetings primarily devoted to Quality Assurance matters, for an average of over 3-1/2 hours per week in such meetings. Additionally, I attended 108 other meetings or conferences during the same time period in which Quality Assurance may have been discussed, for an additional 5 hours per week on the average. During this entire period, I might add, I was Senior Vice President for Projects, Engineering and Construction with significant other demands on my time (including other issues relating to Midland) in addition to Quality Assurance.

In addition to these meetings, which were noted at the time on my calendar, there were innumerable telephone and other conservations concerning Quality Assurance progress and operations. I required routine reports and information to keep me constantly advised. There are stated requirements in our procedures that I be informed about items reportable under 10 CFR §50.55(e) or Part 21. (See

QAPP 20-1, Howell Exhibit 1). In addition, there are stated requirements that I would receive a written resume of quality assurance activities monthly, and I established a requirement for a quarterly Quality Assurance Management Meeting to discuss progress and any problems and to help resolution of any Quality Assurance items. (See Policy No. 20 - Vol. 1. Quality Assurance Program Manual, Howell Exhibit 2). Furthermore, my instructions were that I would receive a copy of any nonconformance written by Consumers Power Company in the progress of the job. I did receive these documents, read them and where appropriate, discussed the substance of them with cognizant Company and Bechtel personnel.

I also routinely received copies of all audit reports on audits run by Consumers Power Company Quality Assurance personnel. Of course, the inspection reports from the NRC I&E Branch were addressed to me and I read and distributed these reports for action. In addition, all submittals of information concerning the NRC were submitted over my signature and I read and was aware of them. This included submittal of the routine reports of Consumers Power Company nonconformances, Quality Assurance personnel resumes and construction schedules submitted in response to ALAB-106. Where problem areas arose that needed special actions or corrections, I took action or approved recommendations. An example of this can be seen in our commitment to the FSAR review which took place following the diesel generator building settlement and the review or re-review of equipment

qualification. In the latter instance our prompt action made us one of the first in the industry to detect problems in the area and, indeed, to take corrective action.

Yet another demonstration of the management commitment to periodically review the performance of the corporate Quality Assurance program and to consider improvements, is the policy of having competent independent consultants conduct a major audit of the Quality Assurance program biennially. This audit requirement was established by Section 3.2.7 of Quality Assurance Program Policy No. 20 (Howell Exhibit 2). The consultant's report is directed to the appropriate Company officers and is to summarize quality-related problems and nonconformances, describe resolutions, and makes recommendations regarding where and how Quality Assurance policies and procedures might be improved.

The biennial audit was performed in 1976 by Nuclear Audit and Testing Company, and in 1978 and 1980 by Management Analysis Company. The recommendation of the consultants were received by the Company in a timely fashion and all recommendations were resolved. I personally reviewed these recommendations, and participated in their resolution.

IV. Other Factors Which Demonstrate a Positive Management Attitude With Respect to Resolution of Soils Settlement Issues

One key indicator of a positive management attitude is the existence of an organization in which responsible corporate officers and managers are informed of developments

affecting a particular project and actively participate in resulting decisions. The Midland Project Organization has evolved over the years, both in response to internal goals of improved effectiveness and in response to changing regulatory requirements. These changes have increased management involvement in the day to day affairs of the Project. While the organizational changes I am about to describe were not solely and directly caused by the unanticipated soil settlement at the Midland site, I believe that effective resolution of that issue has been facilitiated by these organizational changes.

By the beginning of 1980, I had determined that certain changes in Midland project management were desirable in order to promote the objective of unified direction and control of project activities. This resulted in the formation of a new organization with a significant increase in manpower assigned to the Midland Project, and in the appointment of Mr. Cook as Vice President in charge of the Midland Project Office. The purpose of the change was to make possible more effective supervision of Bechtel's efforts by involving the Company more closely in project design, scheduling and cost control, working in cooperation with Bechtel. This reorganization gives Consumers Power Company management daily participation in the Project and provides a more comprehensive interface with Bechtel's Midland Project organization. The change also integrated into the Project Office the Company's Nuclear Safety Task Force, project

quality assurance activities, and other service functions in order to improve communication and control. This is discussed in greater detail in the testimony of Mr. Cook.

While not directly related to resolution of the soils settlement issues, I would like to describe another organizational change which demonstrates a positive managerial attitude -- the Company's commitment of resources to the investigation of potential safety problems and to anticipating changing regulatory requirements.

In the wake of the Three Mile Island accident in March 1979, the NRC suspended review of operating license applications, including that for Consumers Power Company's Midland Plant which had been docketed and accepted for review in November 1977. In order to consolidate our ongoing safety review efforts and to assure that we would determine and properly take into account the implications of the TMI incident, I directed the formation of the Midland Nuclear Safety Task Force (NSTF) in April 1979.

The NSTF was a multidiscipline group of about a dozen engineers drawn from Engineering, Project Management, Quality Assurance, and operational departments then working on various aspects of the Midland project. The NSTF functioned for approximately one year in concert with Babcock and Wilcox (B&W) personnel specifically assigned to this effort as well as other outside consultants. The NSTF undertook technical evaluations of a variety of safety-related issues and documented the results of these analyses

in formal recommendations to Project management. They were presented to me, I reviewed and approved them. Improvements in plant design resulted from implementation of these recommendations.

The activity of the NSTF allowed Consumers Power Company in most cases to anticipate new NRC requirements as a result of TMI which had not already been incorporated into the Midland design prior to the accident. In other cases the Company was able to take positions outlining proposed acceptable alternative approaches to NRC requirements. As a result of the investigations of the NSTF, Consumers Power Company was able to anticipate many of the safety-related changes in NRC requirements, and committed to adopt them at Midland in advance of any NRC directive to do.

V. Contentions of Intervenor Stamiris

Certain allegations regarding the commitment of Consumers Power Company management to construct a safe plant arise from contentions of Intervenor Stamiris. These contentions are attached as an Appendix to the ASLB's Prehearing Conference Order in this matter dated October 24, 1980. In this part of my testimony, I will address some of those contentions as they relate to my involvement in the Midland Project.

Regarding contention 1, relating to the adequacy and completeness of our communication with the NRC, I have generally discussed Consumers Power Company management's

dedication to full disclosure to the NRC in other sections of this testimony. Although other witnesses will specifically address the details of that contention, at this time I must reiterate the scope of the Company's commitment to meaningful communications with the NRC. Consumers Power Company is committed to complying with all regulatory requirements in its construction of the Midland Plant so that the project can be completed on schedule, consistent with protection of the public health and safety, and providing a safe and efficient source of energy for our customers. As part of that commitment Consumers Power must fully inform the NRC of all aspects of the Project both in recognition of our obligations to the public and as a matter of enlightened self-interest.

I will now address some of the specific contentions. Contention 1(a) makes reference to language in the December 9, 1979 Order which alleges that the Company's FSAR contained "a material false statement", implying that its alleged existence reflects a "less than complete and candid dedication to providing information." First, the term "material false statement" must be put in context: even if there were a material false statement, that fact by itself in no way indicates a reluctance or a lack of frankness in providing the NRC with information. A "material false statement" is a term of art with legal connotations which derives from language in previous NRC Orders and decisions. In more simple terms, it means that there is an error or

inconsistency in the FSAR which may have influenced the Staff's analysis and approval of the FSAR. It in no way implies that the information was deliberately falsified or withheld.

The NRC has asserted that an error in the FSAR has materially affected its analysis and approval of that FSAR. There is no allegation, however, that the error was made intentionally. In this context such an error can only be categorized as inadvertent. The FSAR itself is a document consisting of some 20 volumes, each 3 to 3-1/2 inches thick, to which in excess of 30 revisions have been made, and which is derived from information which was developed over a period of 10 years. It should be obvious that one error in 20 volumes of technical data compiled over that period of time should not be taken as conclusive proof of a "poor management attitude."

On the contrary, the attitude of the Company toward providing the NRC with complete and correct information is reflected in its response to the discovery of the error. As a result of finding this error in the FSAR, the Company instituted an extensive review of the FSAR for errors of fact which was a job of significant magnitude given the size and derivation of the FSAR. This study required a period in excess of 12 months involving 340 people and at a significant cost of manpower and dollars. Furthermore, in the process of this review and correction, it was determined that the FSAR needed some updating in

terms of editorial work, integration and cleanup, and this project was also instituted. It is still in process and is expected to be essentially completed in June, 1981. It, too, involved a considerable amount of resources, both in dedication of manpower and dollars.

Contention 1(b) asserts that Consumers Power Company failed to provide information resolving the geologic classification of site. The contention confuses an honest difference of opinion among experts with a reluctance to provide information.

It is the position of Consumers Power that the Midland Project site is located in the Michigan Basin, a separate tectonic province, and as such information relating to that province should be used as imput in the seismic aspects of plant design. The NRC believes another classification is proper, the "Central Stable Region", necessitating different design criteria. Under such circumstances, Consumers Power had both an obligation and a right to explain its opposing view. An examination of the discussions between the NRC Staff and the Company attempting to resolve the dispute discloses that all the information the NRC Staff requested about Consumer Power's position was supplied to them. The fact that the "seismic" question remained unresolved derived not from a lack of information but from a disagreement as to what the information provided meant.

Consumers Power's seismic engineers and consultant advised me that the Michigan Basin is a separate tectonic

province. Based on my own review of this conclusion, I concurred in that judgment. This commenced a still ongoing dialogue between the NRC Staff and Consumers Power involving the exchange of information concerning the relative positions. As part of this discussion the NRC Staff submitted questions to the Company about its position as it was articulated in the FSAR. The record shows that Consumers Power has answered these questions promptly and completely. (See Consumers Power's Answers to FSAR Questions, Howell, Exhibit 3). That some of the NRC Staff's questions were "followed up" with more questions only reflects the fact of the disagreement and the efforts to resolve it -- not a reluctance on the part of the Company to provide information. Contrary to the contention, the "failure" to resolve the geologic classification dispute does not derive from a "poor" managerial attitude or inadequate information. It is only an example of the still ongoing process by which such issues are resolved.

I will next address contentions 2(a) and 2(b). The apparent basis of these contentions is that Consumers Power Company management has attempted to rush through the NRC review process, with consequent compromises of public health and safety.

Contention 2(a) asserts that the timing of the Company's submission of the FSAR for NRC Staff review was prompted by improper motives. It makes reference to a statement appearing on pp. 1-2 of Consumers Power Company's response to question 1(b) of the NRC Staff's Secton 50.54(f)

information requests regarding plant fill. The complete statement follows:

> "The Midland FSAR was submitted to the NRC at an earlier point in the project schedule than would have normally occurred in order to provide additional time for the operating license hearings due to the forecasted intervention. Consequently, some of the material required to be included in the FSAR was not available at the time of its initial submittal, or was supplied based upon preliminary design information. As the design and construction continued, the appropriate sections of the FSAR were revised or updated to include the necessary information...."

This contention really alleges no conduct that is in any way improper. I note that 10 CFR 2.101 clearly provides for supplementing or amending filed license applications, including FSARs. Consumers Power Company's decision to file the FSAR when it did was influenced by the expectation of a protracted hearing process associated with anticipated interventions. This decision to file the FSAR at a date earlier than scheduled was reviewed with the NRC Staff. I am attaching a copy of a letter I sent the NRC Staff explaining our proposed schedule changes and submission date of the FSAR. (Howell Exhibit 4). In a return letter, the NRC Staff stated that "The...date...established for the submittal of the FSAR is acceptable." (Howell Exhibit 5). It was deemed desirable to provide the adequate time for technical review of the FSAR by the NRC Staff while still accommodating an anticipated protracted hearing. Revision and supplementation of the FSAR following filing is common-

place. Moreover, if the FSAR was so incomplete as to be unacceptable to the NRC Staff, the application for an operating license would not have been docketed.

Regarding contention 2(d), that continuation of work on the Diesel Generator Building after the discovery of the settlement problem precluded thorough consideration of the "removal and replacement" option, the contention is incorrect both as to its premise and the conclusion.

First, the contention is factually incorrect. No work continued on the Diesel Generator Building until after a complete investigation determined the cause of the settlement and the safety consequences of continuing the work. In August 1978, shortly after the settlement was discovered, we halted construction in order to investigate the origins of the problem. It was only after we found the cause of the settlement -- inadequate compaction -- that we continued work.

Further, the continuance of the work on the Diesel Generator Building was done in accordance with our conclusion that the preloading of the building provided a safe and technically adequate means of remedying the settlement. The concept of preloading involves adding excess weight to the building to force its ultimate settlement by compacting the soils beneath it. Finishing the work on the building could only add to its weight -- and therefore aid the end result of the remedy. This was done in accordance with the recommendations of our experts.

Second, the underlying implication of Stamiris' contention -- that preload was chosen because it was cheap and quick and removal and replacement rejected because it took time and money -- is just plain wrong.

The Company decided to solve the Diesel Generator Building settlement problem through a "preloading" program after first evaluating all the available technical remedies. It was only after determining which of the options presented a viable technical solution to the settlement problem, that other considerations -- the acceptance of the solution by the NRC, its cost and its feasibility in relation to the construction schedule -- were factored in. The Company's position has always been that the technical adequacy of the solution is a prerequisite to the consideration of its financial and time consequences. The choice of the preload remedy instead of precluding a "removal and replacement" plan permitted "removal and replacement" to continue as an alternative in the event that the results of the preload were unsatisfactory..

As our December 1978 report to the NRC Staff discloses, the process by which a remedy for the Diesel Generator Building was chosen started with the hiring of the best expert consultants in the field. Among other tasks assigned, the consultants were to present options for resolving the Diesel Generator Building settlement to Project management. Although 6 alternative plans were developed only 2 were found suitable: (1) the preloading of the

building; and (2) removal and replacement of the building. Upon recommendation by our consultants, the preload solution was chosen. This process was documented in a letter and an interim 10 CFS §50.55(e) report sent to the NRC Staff in early January, some 4 months before the preload was begun. (See Howell Exhibit 6).

The preload provided the most attractive resolution of the unanticipated settlement of the diesel generator building: it was technically feasible, it was capable of solving the settlement problem and because instrumentation could record its results, it was capable of producing physical proof of the results. Thus we would have demonstrable evidence to present the NRC Staff to prove that the soils underneath the diesel generator building were adequately compacted. More importantly, it did not preclude the other option -- removal and replacement -- if in fact the preload failed. Finally, it was somewhat less expensive in time and money than total replacement; and since the solution was technically adequate these considerations were significant.

Thus, after the Company hired the consultants, heard and considered their recommendations, the preload option was chosen and the work on the Diesel Generator Building continued. Contention 2(d) is in error: the work did not preclude consideration of the replacement option because it was commissioned only after all options were considered. Our consultants have concluded that the results of the preload program are in accordance with their predic-

tions of the expected behavior of the Diesel Generator Building. The consultants have concluded that the soil has now been adequately compacted so that excessive future settlements will not occur. Thus, the preload program does not represent any compromise of applicable health and safety criteria, as asserted by contention 2(d).

CONCLUSION

I believe that the actions taken or planned by Consumers Power Company management with respect to the Midland Project demonstrate a positive managerial attitude in that:

1. Top corporate management has been informed of matters affecting the Midland Project and has been involved in resolution of problems relating to the project.
2. The quality assurance organization has been improved, both in terms of programmatic changes, implementation and personnel and its relationship to Bechtel.
3. There has been prompt and effective investigation of the deviations from specification which led to the soil settlement issue.
4. There has been complete and timely communication with the NRC on soils settlement issues.
5. Remedial measures were chosen to comply with all applicable regulatory requirements on the

basis of expert technical recommendations and were not dictated by cost and schedule considerations.

1.0 PURPOSE

To establish the requirements, responsibilities and method: (a) For determining the need to report Nonconformances to the NRC under the requirements of either Title 10 CFR Part 50.55(e) or Part 21; and (b) when reportable, for reporting the Nonconformance.

2.0 SCOPE

The requirements of this Procedure dealing with Part 21 apply to all PE&C activities. The requirements of this Procedure dealing with Part 50.55(e) apply to Projects for which an operating license has not been received (except for the fuel and fuel-related activities of such Projects). Section 4.11 applies to Projects for which an operating license has been received.

3.0 REFERENCE DOCUMENTS

3.1 Quality Assurance Program Policy 20, "Program Reporting" and other basis documents listed in Quality Assurance Program Policy 20.

3.2 Title 10 CFR 50.55(e).

3.3 Title 10 CFR 21, as amended October 19, 1978.

4.0 REQUIREMENTS, RESPONSIBILITIES & METHODS

4.1 Any individual who knows of or suspects the existence of a Nonconformance which may be reportable under Part 21 reports the Nonconformance through the existing Procedure or, if none exists, reports the Nonconformance to the Director of Quality Assurance - Projects, Engineering and Construction.

4.2 The organization responsible for documenting Nonconformances (eg, the Quality Assurance Department or the Project Management Organization):

4.2.1 Prepares the Nonconformance Report as soon as practicable after the detection of the Nonconformance and evaluates each Nonconformance to ascertain its reportability in accordance with the following criteria:

4.2.1.1 A Part 50.55(e) reportable Nonconformance is:

a. One which could have an adverse impact on any of the following throughout the life of the plant:

(1) The ability to maintain the integrity of the reactor coolant pressure boundary.

(2) The ability to shut down the reactor and maintain it in a safe condition.

(3) The ability to prevent or mitigate the consequences of an occurrence which could result in off-site exposures comparable to those referenced in 10 CFR Part 100.11 or in exposures to or releases of licensed material in excess of 500 times the 10 CFR 20 allowable.

b. One which also involves at least one of the following:

(1) A significant breakdown in any portion of the Quality Assurance Program.

(2) A significant departure from the final Design as Approved and released for construction such that the Design does not conform to the Criteria and bases stated in the Safety Analysis Report or Construction Permit.

(3) A significant Nonconformance in the construction of or significant damage to an item which will require extensive evaluation, extensive redesign, or extensive repair to meet the criteria and bases stated in the Safety Analysis Report or Construction Permit, or to otherwise establish the adequacy of the Item to perform its intended safety function.

(4) A significant departure from performance Specifications which will require extensive evaluation, extensive redesign or extensive Repair to establish the adequacy of an Item to meet the Criteria and bases stated in the Safety Analysis Report or Construction Permit, or to otherwise establish the adequacy of the Item to perform its intended safety function.

NOTE: Following are some examples:

(a) After Inspection of the System and during its hydrostatic test, leakage is found in a valve packing. This is neither significant nor unusual and packing Inspection does not provide an absolute assurance of the packing adequacy. The hydrostatic test is intended to discover such leaks. The Nonconformance is nonreportable.

(b) After Inspection and during hydrostatic test, pipe yields. Since the pipe is known to be of the correct material and dimensions, the

yielding is most likely due to a design deficiency which violates the design criteria or bases established in the Safety Analysis Report or Construction Permit. It is unusual for the hydrostatic test to result in such a Design-Related (as contrasted to construction-related) deficiency. The Nonconformance is reportable.

(c) Afte Inspection of an uninstalled pipe and during the process of installing the pipe and preparing it for welding, a craftsperson notices that the pipe does not fit up properly. The wall thickness of the pipe is found to be undersized. Although there was an Inspection ineffectiveness by the primarily responsible Inspection agency, the Nonconformance would have been detected as part of the downstream formal installation and weld fit-up Inspection. The Nonconformance is nonreportable.

(d) The same conditions apply as in "c," above, but this is a repetitive case in a short time span. In this case, a Corrective Action investigation must be initiated immediately. If the investigation indicates a systematic breakdown in the Quality Assurance Program, the Nonconformance is reportable.

4.2.1.2 A Part 21 reportable Nonconformance is a "safety-related Nonconformance" for an Item which has been "conditionally accepted" by CP Co. The following are examples:

a. If an Item is being Source Inspected or Receiving Inspected by CP Co and is found to be nonconforming and, therefore, is not accepted by CP Co, there is no responsibility for CP Co to report the Nonconformance under Part 21. However, if the Nonconformance is undetected by CP Co's Source or Receiving Inspection and if the Item is "conditionally accepted" by CP Co, the Nonconformance becomes reportable under Part 21 when and if it is later detected.

b. An exception to the example given in (a) applies to items of a commercial grade (eg, bearings, relays or bar stock) that:

(1) Are not subject to Design or Specification requirements which are unique to facilities or activities licensed by the NRC, and

(2) Are used in applications other than facilities or activities licensed by the NRC, and

(3) Are ordered from the Manufacturer or Supplier on the basis of a Specification set forth in the Manufacturer's published product description (eg, a catalog). Even though such a commercial grade Item may be (conditionally accepted) by CP Co, the subsequent discovery of a Nonconformance does not necessitate CP Co's reporting under Part 21 unless the commercial grade Item was "dedicated" for use as a "basic Component" as defined in Part 21. In other words, if the Item has a multiple application, one of which is safety-related and one of which is not, and if the Item is specifically procured and stocked for the non-Safety-Related application, any Nonconformance detected after CP Co's "conditional acceptance" is not reportable. On the other hand, if this commercial grade Item is specifically procured and stocked for Safety-Related application or if it is stocked in common, subsequent detection of the Nonconformance renders the condition reportable by CP Co under Part 21.

c. When a Turnover Unit is turned over by the Principal Supplier to CP Co for Checkout, Preoperational and Hot Functional Testing, the physical Characteristics of the Turnover Unit are considered to be "conditionally accepted" by CP Co whereas the functional Characteristics are considered not to be accepted by CP Co. Therefore, Checkout, Preoperational and Hot Functional Testing is equivalent to Source and Receipt Inspection and Testing, and any functional failure which occurs during Checkout, Preoperational and Hot Functional Testing is not reportable by CP Co under Part 21.

In any case similar to those given in (a), (b) or (c), above, the Principal Supplier must be notified so that he may consider his reportability of the case under Part 21.

4.2.1.3 It is the intent of CP Co to utilize Part 50.55(e) reporting in any case in lieu of Part 21 reporting, because the former satisfies the requirements of the latter.

4.2.2 Provides a written indication on the Nonconformance Report as to whether or not the Nonconformance is reportable in accordance with the criteria above. Obtains whatever assistance may be necessary to arrive at the judgment as to reportability.

4.2.3 Provides a signature on the Nonconformance Report attesting to the satisfactory completion of the steps given in Paragraphs 4.1.1 and 4.1.2, above.

4.2.4 If a Nonconformance is deemed to be NRC reportable under either the requirements of Part 50.55(e) or Part 21, notifies the QA Director or, in his absence, the acting QA Director, as soon as possible after the Nonconformance is discovered and deemed reportable, but not later than specified in the following tables:

4.2.4.1 For Part 50.55(e) reporting:

Time That Nonconformance Is Discovered	Time by Which To Notify the QA Director
0701 - 1200 Hours	Before 1630 Hours of the Same Calendar Day
1201 - 2400 Hours	Before 0800 Hours of the Next Calendar Day
0001 - 0700 Hours	Before 1200 Hours of the Same Calendar Day

For reporting under Part 50.55(e), in determining the reporting time limitation to NRC, the clock starts at the time that a nonconformance is officially designated as such by the organization having primary responsibility for such a designation (eg, the QA Department or the Project Management Organization).

If, on the basis of information available at the time the Nonconformance Report is prepared, the Nonconformance is deemed to be nonreportable and if, thereafter, additional information is acquired to indicate that the Nonconformance is reportable, revises the Nonconformance Report per Paragraphs 4.1.2 and 4.1.3, above, and notifies the QA Director (or acting QA Director) as soon as possible.

4.2.4.2 For Part 21 reporting:

Time That Nonconformance Is Deemed Reportable	Time by Which To Notify the QA Director
0701 - 1200 Hours	Before 1630 Hours of the Next Calendar Day
1201 - 2400 Hours	Before 0800 Hours of the Day After the Next Calendar Day
0001 - 0700 Hours	Before 1200 Hours of the Next Calendar Day

For reporting under Part 21, in determining the reporting time limitation to NRC, the clock starts at the time that the Nonconformance is deemed reportable by the organization which documented the Nonconformance. It does not necessarily start at the time the Nonconformance Report is originated.

4.2.4.3 The notification to the QA Director includes a description of the condition and a statement as to when the Nonconformance was discovered and when it was determined to be reportable.

4.3 The QA Department:

4.3.1 Assures that Part 50.55(e) and 21 requirements are included in Preliminary Bid Packages to be issued by CP Co.

4.3.2 Requires that the Principal Supplier, in complying with the 10 CFR 50.55(e) reporting requirements, notify CP Co QA.

4.3.3 Requires that the Principal Supplier, in complying with the 10 CFR 21 reporting requirements, notify CP Co QA and NRC contemporaneously. Also requires that, when the Principal Supplier is not in a position to judge the reportability for himself, he request assistance from CP Co.

4.3.4 Requires that the Principal Supplier pass on the reportability requirements to subtier Suppliers, including the requirements that subtier Suppliers notify CP Co QA and NRC simultaneously.

4.4 The Project Management Organization coordinates with the QA Director on any news release relating to the Nonconformance such as to assure that the notification to NRC precedes the issuance of the news release. This applies to any subsequent news release relating to the Nonconformance as well as to the initial news release relating to the Nonconformance.

4.5 The QA Director:

4.5.1 Makes the final decision whether to report any Nonconformance to the NRC and whether the report will be made under Part 50.55(e) or Part 21. No such report is made without the QA Director's (or acting QA Director's) approval.

4.5.2 Notifies the appropriate organization when a Nonconformance, previously thought to be reportable, is deemed not reportable, and in such a case, maintains a record of the decision process and the basis for the decision.

4.5.3 Assures that the NRC is notified of each reportable Nonconformance as soon as practicable. Assures that the notification is "labeled" as a 10 CFR 50.55(e) Report. Assures that the notification is given within

24 calendar hours of the time that the clock starts as noted under Paragraph 4.2.4. The notification is given orally, but a written record of the notification is prepared and filed. Advises the Senior Vice President, PE&C, that the notification has been given.

4.5.4 Assures that the NRC is notified, as soon as practicable, and prior to 30 calendar days of the time that the Nonconformance was originally detected, when additional information is obtained such as to render the Nonconformance nonreportable after it had already been reported. Such notification to NRC prior to the 30 calendar day limit obviates the necessity for the preparation and transmittal of the 30-Day Report required per 4.5.5 and 4.6.3, below.

4.5.5 Assures the preparation of the 30-Day Report, interim or final, in accordance with the following criteria and submits the Report to the Senior Vice President, PE&C. The Report includes:

a. A description of the Nonconformance.

b. An analysis of the safety implications when the Item is not to be Reworked to conform to meet the criteria and bases stated in the Safety Analysis Report or Construction Permit. (When the Item is Reworked to its original drawing and Specification requirements, the analysis of the safety implications is not required to be part of the 30-Day Report.)

c. The Correction Actions taken and their corresponding effective dates.

d. Sufficient additional information as may be necessary to permit an independent evaluation by NRC.

If the report cannot reflect the final conditions with regard to "a" through "d," above, an Interim Report is submitted followed by additional Interim Reports as may be necessary to keep NRC abreast of significant developments until such time as the Final Report is available.

4.6 Relative to 10 CFR 21 reporting requirements, the QA Director:

4.6.1 Notifies the Senior Vice President, PE&C, of any reportable Nonconformance which has not been reported under 10 CFR 50.55(e), recognizing that 10 CFR 50.55(e) reporting obviates the necessity for 10 CFR 21 reporting.

4.6.2 Assures that the NRC is notified of each Part 21 reportable Nonconformance as soon as practicable. Assures that the notification is "labeled" as a 10 CFR 21 Report. Assures that the notification is given within 48 calendar hours of the time that the clock starts as

noted under Paragraph 4.2.4.2. Notification is given orally, but a written record of the notification is prepared and filed. Notifies the Senior Vice President, PE&C, that the notification was given.

4.6.3 Prepares the 5-Day Report (similar to 10 CFR 50.55(e) 30-Day Report) in accordance with the requirements of Paragraph 4.5.5, above.

4.7 The Project Management Organization:

4.7.1 During Checkout, Preoperational and Hot Functional Tests, provides the elements of information required by Paragraph 4.5.5, "a" through "d."

4.7.2 Assures the posting of the following documents in a conspicuous place on any premises where activities subject to this procedure are conducted: 10 CFR Part 21; Section 206 of the Energy Reorganization Act of 1974; and this QAPP. If posting these Documents is not practicable, assures the posting of Section 206 and a notice which describes the regulations and this QAPP, including the name of the QA Director to whom reports may be made. The "premises where activities subject to this Procedure are conducted" are: The fourth floor of the south wing of 1945 W Parnall Road, Jackson, Michigan; the second floor of 1955 W Parnall Road, Jackson, Michigan; and at such places at the Midland Site as may be designated by the Midland Project Manager.

4.8 All organizations involved in the reportable Nonconformance perform such analyses and take such Corrective Action as is requested and required for the adequate and timely issuance of the written report(s) to NRC per Paragraph 4.5.5, above.

4.9 The Senior Vice President, PE&C:

4.9.1 Relative to Part 50.55(e) reporting requirements, issues a written report, as specified in Paragraph 4.5.5, to NRC within 30 days of the day on which the Nonconformance was originally detected and deemed reportable

4.9.2 Relative to Part 21 reporting requirements, issues a written report, similar to that specified in Paragraph 4.5.5, to NRC within 5 days of the day on which the nonconformance was originally detected and deemed reportable.

4.10 Prior to receipt of an operating license, the Director of QA-PE&C is notified by Nuclear Operations personnel of any Nonconformances detected by Nuclear Operations personnel and thought to be reportable under either Part 50.55(e) or Part 21.

4.11 After the receipt of an operating license, the organization responsible for originating the Nonconformance Report form is also responsible for transmitting a copy of the Nonconformance Report to the General Manager or

Plant Superintendent, Nuclear Operations who, in turn, is responsible for performing in accordance with the requirements of the applicable parts of Title 10 of the Code of Federal Regulations and the Plant Technical Specifications.

Senior Vice President, 11/20/79
Projects, Engineering & Construction

Vice President, Nuclear Operations 11/15/79

Executive Director,
Environmental & Project Services 11/9/79

Executive Manager,
Engineering & Construction -
Transmission & Plant Modifications 11/15/79

Manager, Project
Management Organization 11/14/79

Director, Quality Assurance -
Projects, Engineering & Construction 11/9/79

Reviewed by:

Director, Quality Assurance -
Nuclear Operations 11/15/79

Consumers Power

QUALITY ASSURANCE PROGRAM POLICY

PROGRAM REPORTING

POLICY NO 20
PAGE 1 OF 6
REVISION 9
DATE 3/18/80

1.0 GENERAL

Reports of nonconforming conditions, departures from normal operations, special nuclear material status and transfers, changes in facilities and procedures, and nuclear plant status are prepared by Consumers Power Company and submitted to the NRC and to the responsible departments according to the requirements set forth in Title 10 Code of Federal Regulations, applicable ANSI Standards, Regulatory Guides and the Plant Technical Specifications. Consumers Power Company requires suppliers: (a) to report potentially significant nonconformances to Consumers Power Company for determination of 10 CFR 50.55(e) reportability to the NRC; and (b) to comply with 10 CFR 21.

2.0 BASIS DOCUMENTS

a. NRC 10 CFR 19, "Notices, Instructions and Reports to Workers; Inspections"
b. NRC 10 CFR 20, "Standards for Protection Against Radiation"
c. NRC 10 CFR 21, "Reporting of Defects and Noncompliance"
d. NRC 10 CFR 50, Appendix B, Criterion 16, "Corrective Action"
e. NRC 10 CFR 50.55, "Conditions of Construction Permits", Paragraph (e)
f. NRC 10 CFR 59, "Authorization of Changes, Tests and Experiments"
g. NRC 10 CFR 70.52, "Reports of Accidental Criticality or Loss of Special Nuclear Material"
h. NRC 10 CFR 70.53, "Material Status Reports"
i. NRC 10 CFR 70.54, "Nuclear Material Transfer Reports"
j. NRC Regulatory Guide No. 1.16, "Reporting of Operating Information"
k. ANSI N18.7, Section 4, "Review and Audit"
l. Plant Technical Specifications
m. ANSI N45.2, Criterion 17, "Corrective Action"

3.0 POLICY

3.1 REPORTING DURING THE DESIGN AND CONSTRUCTION PHASE FOR NEW FACILITIES, MAJOR MODIFICATIONS AND THE PALISADES SCRP

3.1.1 REPORTS BY ENVIRONMENTAL SERVICES, QUALITY ASSURANCE & TESTING

Environmental Services, Quality Assurance and Testing prepares and issues a monthly status report to the Senior Vice President - Projects, Engineering & Construction. Quality Assurance Audit & Administration performs audits of the Quality Assurance Program and reports the results of the audits to the Director, Environmental Services, Quality Assurance & Testing; to the

to the Vice President - Midland Project (for Midland Project related activities), to the Executive Manager - Transmission, Plant Modifications and Project Services (for related activities) and to other members of management who have either functional or line responsibilities, or both, for the audited area or activity. These reports summarize quality-related problems and nonconformances and describe the status of their resolution.

The Director - Environmental Services, Quality Assurance & Testing conducts biannual status meetings with the officer in charge and with the heads of departments involved in implementing the Quality Assurance Program.

Each biennium, a major audit of the Quality Assurance Program is conducted and reported to the Senior Vice President - Projects, Engineering & Construction.

The Senior Vice President - Projects, Engineering & Construction is responsible for transmitting pertinent quality-related problems and nonconformances to the President and Chief Executive Officer.

3.1.2 REPORTS BY MIDLAND PROJECT QUALITY ASSURANCE

Midland Project Quality Assurance prepares and issues a monthly status report to the Vice President - Midland Project who in turn issues a monthly status report to the Senior Vice President - Projects, Engineering & Construction. Results of audits performed by Midland Project Quality Assurance are reported to the Vice President - Midland Project, Director - Environmental Services, Quality Assurance & Testing and to other members of management who have either functional or line responsibilities for the audited area or activity. These reports summarize quality-related problems and nonconformances and describe the status of their resolution. The Midland Project Quality Assurance Manager conducts quarterly status meetings with the officer in charge, the Midland Project Manager, the Director - Environmental Services, Quality Assurance & Testing, and other personnel as applicable.

3.1.3 REPORTING SIGNIFICANT CONDITIONS TO THE NRC

Significant nonconformances are recorded on nonconformance reports and are controlled in accordance with Quality Assurance Program Policies No 15, "Control of Nonconforming Items" and No 16, "Corrective Action." Each such nonconformance

occurring during the design and construction of the Midland Project is promptly reviewed by the Midland Project Quality Assurance Department or, when occurring during preoperational testing, by Midland Project Testing to determine its reportability to the NRC under the requirements of 10 CFR 50.55(e) and 10 CFR 21. Each nonconformance report originated during the design and construction of a major modification, to an existing operating plant, or the Palisades SCRP is transmitted to the Plant Manager/Superintendent for review and evaluation as the NRC reportability in accordance with the requirements given in Paragraph 3.2.2 of this Policy.

As applicable, nonconformances which are reportable under 10 CFR 50.55(e) are orally reported to the NRC by Midland Project Quality Assurance within 24 hours after their occurrence. Each such oral report is followed within 30 days by a written report to the NRC from the officer in charge. Also, as applicable, nonconformances which are reportable under 10 CFR 21 are orally reported to the NRC by Midland Project Quality Assurance within 2 days after their evaluation. Each such oral report is followed within 5 days by a written report to the NRC from the officer in charge.

3.1.4 SUPPLIER RESPONSIBILITIES

Consumers Power Company requires suppliers to report each potentially significant nonconformance to the responsible Quality Assurance organization and to the organization having project management responsibility. Each such nonconformance is reviewed and evaluated for reportability to the NRC in accordance with the process described in Paragraph 3.1.3, above. In addition, Consumers Power Company requires suppliers to comply with 10 CFR 21 for all procurements issued by Consumers Power Company after January 6, 1978, in accordance with the provisions delineated in 10 CFR 21.

3.2 REPORTING DURING THE OPERATIONS PHASE

3.2.1 QUALITY PROGRAM STATUS REPORTS

The Director, Quality Assurance - Nuclear Operations, prepares and issues a monthly status report to the Vice President - Nuclear Operations, and

he to the Executive Vice President - Energy Supply. The report summarizes quality-related problems and nonconformances, describes the status of resolution, and makes recommendations for required actions. In addition, the Quality Assurance - Nuclear Operations Department conducts quarterly status meetings with the Vice President - Nuclear Operations and the Consumers Power departments involved in implementing the Quality Assurance Program for Operations.

3.2.2 EVENT REPORTING

Reportable events occurring at the plant site as defined by the Technical Specifications, violations of or events defined as reportable in Title 10 Code of Federal Regulations, undesirable trends in performance or a radioactive release beyond specified limits are documented by the Supervisor of the area or activity involved. The condition or event is reviewed by the Plant Manager/Superintendent or his designated representative to assure that actions taken are in compliance with the Technical Specifications and Title 10 Code of Federal Regulations. Documentation of the event and actions taken are provided by the Plant Manager/Superintendent. He reports promptly to the Vice President - Nuclear Operations and to the NRC as required by the Technical Specifications or Title 10 Code of Federal Regulations. Appropriate corrective action is taken according to Policy 16, "Corrective Action." Resolution of these events, including corrective action, is reported to the Vice President - Nuclear Operations and the NRC as required by the Technical Specifications and Title 10 Code of Federal Regulations.

3.2.3 REPORTING CHANGES IN FACILITIES OR PROCEDURES, TESTS AND EXPERIMENTS -

Safety-related changes to plant facilities or procedures during operations; i.e., plant modifications and the conduct of tests and experiments not covered by the Plant Safety Analysis Report, are reviewed by appropriate Management, Plant Review Committee (PRC) and the Safety and Audit Review Board (SARB) for safety implications according to the requirements set forth in 10 CFR 50.59 and the Technical Specifications. Results of these reviews are documented by the Plant Staff. The Plant Manager/Superintendent directs the preparation of a report describing the changes, tests and experiments and a summary of the evaluation of each case. Changes to the facility or procedures, as described in the FSAR, along with summaries of the safety evaluations are reported at least annually to the NRC or upon request.

3.2.4 SPECIAL NUCLEAR MATERIAL (SNM) STATUS

The Plant Manager/Superintendent directs the preparation of NRC Form 742, in accordance with Plant Procedures and 10 CFR 70.53. This report identifies the SNM material received, produced, possessed, transferred, consumed, disposed of or lost and is filed in accordance with 10 CFR 70.53.

NRC Form 741 is the principal document supporting the transaction of receiving SNM by Consumers Power or shipping SNM by Consumers Power. The Plant Manager/Superintendent directs the preparation of Form 741 and, as the responsible Consumers Power Official, signs the form, both upon receipt and shipment off-site of SNM. Copies of the form are distributed, according to Plant Procedures and the requirements of 10 CFR 70.54.

3.2.5 ANNUAL OPERATING REPORTS, ENVIRONMENTAL MONITORING REPORTS AND SPECIAL REPORTS

Annual Operating Reports, Environmental Monitoring Reports and Special Reports are prepared according to the requirements of the Technical Specifications by the Plant or General Office Staff as directed by the Nuclear Licensing Administrator. These reports are approved by him for submittal to the NRC.

3.2.6 SUPPLIER RESPONSIBILITIES

Consumers Power Company requires suppliers of safety-related items and services during the operations phase to comply with 10 CFR 21.

3.2.7 REPORTING OF AUDITS OF CORPORATE QUALITY ASSURANCE PROGRAM

Every two years, a major audit of the Consumers Power Corporate Quality Assurance Program is conducted and reported to the Vice President - Nuclear Operations and Executive Vice President - Energy Supply. The report summarizes quality-related problems and nonconformances, describes resolutions, and makes recommendations of where Quality Assurance Program Policies or Procedures might be improved. It is the responsibility of the Executive Vice President - Energy Supply to evaluate and approve recommendations therefrom and to inform the President and Chief Executive Officer of Pertinent audit results.

CONSUMERS POWER

QUALITY ASSURANCE PROGRAM POLICY

PROGRAM REPORTING

POLICY NO 20
PAGE 6 OF 6
REVISION 10
DATE 9/26/80

Approved by:

Senior Vice President
Projects, Engineering
& Construction
9-26-80

Executive Vice President
Energy Supply

Vice President
Midland Project
9/23/80

Vice President
Nuclear Operations

Question 361.4 (2.5)

You conclude that the Michigan basin fits the Appendix A to 10 CFR Part 100 description of a tectonic province. Yet the basin is characterized by the same geologic structural features and has essentially the same geologic and tectonic history as the remainder of the Central Stable Region (Cardley, 1962).

a. The Precambrian basement complex in the Michigan basin does not appear to be unique with respect to the surrounding region.

b. The Precambrian crustal features, the Keweenawan rift zone (see Hinze and others, 1975, on the Mid-Michigan gravity anomaly associated with the Keeweenawan rift zone), and Grenville Front transect the boundary of the basin. 12

c. The subsidence and deposition in the basin occurred concurrently with subsidence, arching, and doming in other parts of the Central Stable Region during the Paleozoic.

Please provide information demonstrating the distinct characteristics of the Michigan basin which distinguish it from the Central Stable Region. Include geophysical and remote sensing data which may reflect structural characteristics of the Basin and adjoining portions of the Central Stable Region.

Response

Subsection 2.5.1.1.3.1 has been revised in response to this question. 14 30

Question 362.9 (2.5.4)

The response to Request 362.4 is insufficient. Table 2.5-14A shows the structural settlement measurements available to date. Provide the reasons for the lack of survey data at Benchmark Numbers A-3 and 4; C-2, 3, 4, 5, 6, and 7; and T-2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15. In Subsection 2.5.4.13.1 of the FSAR, reference is made to Figure 2.5-78. The figure number is in error and should be corrected. 14

Response

Table 2.5-14A has been revised to include the settlement measurements for the subject benchmark numbers.

Subsection 2.5.4.13.1 has been revised to reference the correct figure.

Settlement benchmarks have been installed and monitored at selected locations on the major plant structures. Benchmark locations are shown in Figure 2.5-48A. Benchmark elevation measurements are presented in Table 2.5-14A. 18

Measured settlements were not measured from the start of construction. Available settlement measurements are presented graphically in Figures 2.5-89 through 2.5-91 for the reactor, auxiliary, and turbine buildings. Building load intensities estimated from actual material quantities used in construction are also shown in Figures 2.5-89 through 2.5-91.

Subsurface conditions for various Seismic Category I structures on fill are under investigation. The maximum predicted settlements will be recomputed based on this investigation. A comparison of the observed settlement and the maximum predicted settlement will be provided by amendment. 20 26

Question 361.7 (2.5)

You have not responded fully to Question 361.5. Provide a comparative quantitative analysis of the seismicity within 200 miles of the site and other similar sized areas in the Central Stable Region. The purpose of this analysis is to permit a more detailed evaluation of your contention that the Michigan Basin should be considered separate from the Central Stable Region. 18

Response

As stated in the response to Question 361.5, it is our opinion that the Michigan Basin is an area that, for the purpose of evaluating the safe shutdown earthquake at the Midland site in the context of 10 CFR 100 Appendix A and Regulatory Guide 1.70, is sufficiently distinctive in both its geologic and seismic characteristics to justify its acceptance as a convenient and realistic tectonic or seismotectonic province separate from the Central Stable Region as a whole. The historical seismicity is certainly consistent with subdividing the Central Stable Region into smaller tectonic provinces. Several zones of clearly distinguishable, relatively high seismic activity occur within the Central Stable Region in terms of both numbers of events and size of the maximum historical event. However, no such zones occur within the Michigan Basin tectonic province. It has experienced only a few scattered small events in historic time, and none have had an intensity greater than VI. (The Modified Mercalli Intensity Scale has been used to measure the intensities of seismic events referred to throughout this response.) 24

To quantify these observations, a statistical test has been performed using earthquake activity rates in several subareas of the Central Stable Region. In this analysis, the Michigan Basin is compared to similar size subareas within the Central Stable Region. In this context, the Central Stable Region of the eastern United States is as outlined and described by King.[1] This region is shown in Q&R Figure 2.5-3. Although other slightly different characterizations of the precise boundaries of the Central Stable Region exist,[2,3] the outline shown in Q&R Figure 2.5-3 is conservative for the purposes of this analysis.

All historic earthquakes within this region of intensity greater than or equal to V were tabulated. The principal data sources used in this tabulation were Coffman and von Hake,[4] Docekal,[5] and Nuttli.[6] The total data set thus derived, after all obvious aftershocks are removed, consists of 174 earthquakes, with the earliest noted event occurring in 1776. Because the earthquake detection and recording process has not been uniform during the approximate 200 year interval from the first recorded event to the present (as may be readily seen by plotting a histogram of the number of events per decade for this data set), an

alternative and more uniform subset was also considered. This subset contains the 141 earthquakes of the original data set that occurred after 1900.

A total of five nonoverlapping subareas within the Central Stable Region were selected for initial analysis. These are shown in Q&R Figure 2.5-3. Subarea A of this group is the 100,000 square mile Michigan Basin as shown in FSAR Figure 2.5-6. Subareas B through E are approximately 180 mile radius circles centered near Middleport, Ohio; Springfield, Illinois; Omaha, Nebraska; and Cherokee, Oklahoma. The subarea centered near Middleport, Ohio, was selected to include the cluster of historic activity in the Anna, Ohio area, while Subarea C, centered near Springfield, Illinois, was chosen to encompass the large historic earthquake sequence north of the Mississippi embayment. Subareas D and E were selected with no particular attempt to include or exclude pockets of seismic events.

For the complete earthquake data set, 4, 25, 42, 13, and 19 earthquakes of intensities greater than or equal to V occur in Subareas A through E, respectively. For the truncated, post-1900 data set, the equivalent numbers are 2, 21, 32, 8, and 19.

24

The statistical test performed using these subarea earthquake activity rates is as follows: If the Central Stable Region is assumed to be homogeneous in terms of its seismic characteristics, and if the historic earthquake record affords a reasonable estimate of the earthquake recurrence properties of the region as a whole, what are the probabilities of observing the above numbers of earthquakes in each subarea for the time intervals of the two data sets?

Assume, as is generally done, that earthquakes occur as Poisson arrivals. The Poisson process has been found to adequately describe the occurrence of large events when aftershocks are disregarded, and the assumption of this process has been used in previous analyses of eastern United States earthquakes.[7] Under this assumption, the probability of observing "n" earthquakes in "τ" years given an activity rate "ν" is:

$$P\ (n \text{ in } \tau/\nu) = \frac{e^{-\nu\tau}\ (\nu\tau)^n}{n!}$$

Under the conditions of the statistical test proposed above, a reasonable estimate of the activity rate is provided by the historical earthquake data. Considering first the complete data set,

ν = 174 events/200 years/1,300,000 square miles

where the area shown is that of the Central Stable Region. For a subarea of 100,000 square miles, the equivalent activity rate becomes:

$$\nu_{subarea} = 13.38 \text{ events/200 years/100,000 square miles}$$

Thus, for any subarea with data collection over a 200 year period, $\nu_T = 13.38$. For a Poisson distribution, this value is both the mean and variance. Therefore, the first integer numbers of earthquakes to fall outside the mean ± 1 standard deviation range are 9 on the low side and 18 on the high side of the mean. Numbers for events outside the mean ± 2 standard deviations are 6 on the low side and 21 on the high side of the mean.

Performing a similar analysis in the case of the truncated data set,

$$\nu_{subarea} = 10.85 \text{ events/76 years/100,000 square miles}$$

With data collected over a 76 year period, $\nu_T = 10.85$. The integer numbers of earthquakes falling outside the mean ± 1 and ± 2 standard deviations in this case are 7 and 15, and 4 and 18, respectively. 24

The integer ranges may be compared to the observed number of earthquakes in the various subareas. For the complete data set, only Subarea D falls within the mean ± 1 standard deviation limits, and Subareas D and E fall within the mean ± 2 standard deviation limits. For the truncated data set, only Subarea D falls within either the mean ± 1 or mean ± 2 standard deviation limits.

The Michigan Basin contains far fewer events and the subarea including the Anna, Ohio, activity contains far more events than would be expected from random fluctuation of a statistically homogeneous process under both data set calculations. In particular, the probability of four or less earthquakes occurring within the Michigan Basin in a 200 year period under the assumption of the above analysis is just under 0.003, while the similar probability of two or less events in a 76 year period using post-1900 data only is 0.0014.

It is our opinion that this analysis supports our previous conclusion that historic earthquake data is consistent with subdivision of the Central Stable Region into smaller tectonic provinces. Along with a number of previous and independent studies, [8,9,10,11,12,13] it shows that significant differences

in seismic hazards within the Central Stable Region exist, and that the area around the Midland site is among the areas within the Central Stable Region characterized by the lowest hazard levels.

Although the separation of Subarea B (containing the Anna, Ohio, activity) and the Michigan Basin is already clearly implied by the above analysis, a more direct consideration of the historical seismicity of the Central Stable Region suggests even more strongly that the area immediately around Anna, Ohio, should be separated both from the Central Stable Region as a whole, and from the Michigan Basin in particular, for the purposes of specifying proper seismic design parameters applicable in the near future. This has been done in all the studies referenced in the previous paragraph.

Consider, for example, the recent characterization of the Anna, Ohio, seismic source zone appearing in Nuttli and Herrman.[13] With the geography of this source zone so characterized, it has an area of about 14,000 square miles and has been the site of 12 earthquakes since 1875 with intensities of V or more. Four of these events were of epicentral intensity VII, and one was an epicentral intensity of VII to VIII. Body-wave magnitudes of 5.3 are assigned to these five earthquakes in the Nuttli and Herrmann study.[13] 24

A very distinctive feature of the Anna, Ohio, source zone seismicity is this preponderance earthquakes that have intensities of VII or greater. Of the 20 earthquakes in this intensity range within the Central Stable Region, five have occurred very near Anna, Ohio. This represents 1/4 of the earthquakes in this intensity range within approximately 1/90 of the total area. This source zone is also distinctive because 12 earthquakes with intensities of V or greater have occurred in this zone. Under the assumptions of the probability analysis above, the random occurrence of 12 or more events in such a small area is over seven standard deviations from the expected number of approximately two. This concentration of earthquake activity is equalled within the Central Stable Region, as shown in Q&R Figure 2.5-3, only in the Ozark uplift and Wabash Valley outliers of the New Madrid seismic zone.

In these ways (occurrence of large events which have an intensity of V or greater, additional relative concentration of events which have an intensity of VII or greater), the area around Anna, Ohio, is in marked contrast to the Central Stable Region as a whole and in striking contrast to the Michigan Basin.

When this data on historical seismicity is considered along with the facts that the Michigan Basin is geologically distinguishable from the remainder of the Central Stable Region and that the Michigan Basin is characterized by a consistency of the structural features within it, it is our opinion that this is an

adequate basis for considering the Michigan Basin to be a tectonic province as defined in 10 CFR 100 Appendix A.

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(2) A.J. Eardley, Structural Geology of North America, Harper & Brothers, New York, 1951

(3) P.B. King, The Evolution of North America, Princeton University Press, Princeton, New Jersey, 1959

(4) J.L. Coffman and C.A. von Hake, (ed), Earthquake History of the United States, Publication 41-1, Revised Edition, U.S. Department of Commerce, 1973

(5) J. Docekal, Earthquakes of the Stable Interior, With Emphasis on the Midcontinent, University of Nebraska (Ph.D. Thesis), 1970

(6) O.W. Nuttli, Magnitude Recurrence Relation for Central Mississippi Valley Earthquakes, Bull. Seismo. Soc. Am. 64, 1974

(7) R.K. McGuire, Effects of Uncertainty in Seismicity on Estimates of Seismic Hazard for the East Coast of the United States, Bull. Seismo. Soc. Am. 67, 1977

(8) S.T. Algermissen, Seismic Risk Studies in the United States Proceedings of the Fourth Work Conference on Earthquake Engineering, Santiago, Chile, 1969

(9) O.W. Nuttli, Design Earthquakes for the Central United States, Miscellaneous Paper S-73-1, Report 1 (1973), U.S. Army Engineer Waterways Experiment Station

(10) J.B. Hadley and J.F. Devine, Seismotectonic Map of the Eastern United States, Publication MF-620 (1974), U.S. Geological Survey

(11) S.T. Algermissen and D.M. Perkins, A Probabilistic Estimate of Maximum Acceleration in Rock in the Contiguous United States, Open File Report 76-416 (1976), U.S. Geological Survey

(12) N.C. Donovan, B.A. Bolt, and R.V. Whitman, Development of Expectancy Maps and Risk Analysis, Preprint 2805 (1976),

American Society of Civil Engineers Annual Convention, Philadelphia, Pennsylvania

[13] O.W. Nuttli and R.B. Hermann, Credible Earthquakes for the Central United States, Miscellaneous Paper S-73-1, Report 12 (1978), U.S. Army Engineer Waterways Experiment Station

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JLBacon

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File Ops - Midland - Licensing Schedule

1-5-76

Stephen H. Howell
Vice President

Consumers Power Company

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201

February 3, 1976
Howe-18-76

Director of Nuclear Reactor Regulation
Attention: Mr Roger Boyd, Director
Division of Project Management
U S Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND PROJECT
DOCKET NUMBERS 50-329, 50-330
FINAL SAFETY ANALYSIS REPORT
FILE: 0505.8 SERIAL: 2118

During the January 13, 1976 meeting with the staff on Final Safety Analysis Report content and schedule, we discussed the attached preliminary Operating License schedule which indicates submittal of the Midland Units 1 & 2 FSAR in June 1977. We would appreciate your confirmation that the basic schedule as shown is acceptable. The submittal date of June 1977 is preliminary at this time pending a detailed review of the preparation schedule which will be completed within 60 days of your response.

SHH

BCC: RCYoungdahl, P-26-135A
GSKeeley, P-14-412
RLCastleberry, Bechtel
CEMahaney, B&W
JLBacon, M-1095A
TCCooke, Midland
RRRenfrow, Isham, Lincoln & Beale

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HOWELL EXHIBIT 4

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

RCD

Docket Nos. 50-329
50-330

February 26, 1976

Consumers Power Company
ATTN: Mr. Stephen H. Howell
Vice President
212 West Michigan Avenue
Jackson, Michigan 49201

Gentlemen:

Your proposed schedule for the Operating License review for Midland Units 1 and 2, forwarded with your letter of February 3, 1976, has been noted. The tentative date of June 1, 1977, established for submittal of the FSAR is acceptable.

We recognize that the schedule is preliminary in nature and you are requested to keep us advised of the actual submittal date as it becomes more fir...

Sincerely,

Roger S. Boyd, Director
Division of Project Management
Office of Nuclear Reactor Regulation

cc: See next page

MAR ... 1976
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HOWELL EXHIBIT 5

Consumers Power Company

Stephen H. Howell
Senior Vice President

General Offices: 1945 West Parnall Road, Jackson, Michigan 49201 • (517) 788-0453

January 5, 1979
Howe-1-79

Mr J G Keppler, Regional Director
Office of Inspection and Enforcement
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND NUCLEAR PLANT -
UNIT NO 1, DOCKET NO 50-329
UNIT NO 2, DOCKET NO 50-330
SETTLEMENT OF DIESEL GENERATOR FOUNDATIONS AND BUILDING

Reference: S H Howell letters to J G Keppler; Midland Nuclear Plant; Unit No 1, Docket No 50-329; Unit No 2, Docket No 50-330; Settlement of Diesel Generator Foundations and Building;

a) Serial Howe-183-78; dated September 29, 1978
b) Serial Howe-230-78; dated November 7, 1978
c) Serial Howe-267-78; dated December 21, 1978

This letter, as were the referenced letters, is an interim 50.55(e) report on the settlement of the diesel generator foundations and building.

Enclosure 1 provides the status of the actions being taken to resolve the problem.

Enclosure 2 provides some typographical corrections and clarification to Enclosure 1.

Another report, either interim or final, will be sent on or before February 23, 1979.

Enclosure 1: MCAR 24, Settlement of the Diesel Generator Foundations and Building, Interim Report #3, dated December 27, 1978

Enclosure 2: Errata and Clarification for MCAR 24, Interim Report #3

CC: Director, Office of Inspection & Enforcement
Att: Mr John G Davis, Acting Director, USNRC (15)

Director, Office of Management
Information and Program Control, USNRC (1)

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HOWELL EXHIBIT 6

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48106

SUBJECT: MCAR #24 (Issued 9/7/78)
Settlement of the diesel generator foundations and building

INTERIM REPORT #3

DATE: December 27, 1978

PROJECT: Consumers Power Company
Midland Plant Units 1 & 2
Bechtel Job 7220

Introduction

This report is submitted to advise of the interim status of the project's actions relating to the settlement of the diesel generator foundations and building as described in MCAR #24 and NCR 1482.

Description of Deficiency

The general foundation and building settlements (taken December 6, 1978) are shown in Figures 1 through 4 (attached).

Background Information

The Category I structures on the plant site are shown in Figure 5 (attached). Figure 5A indicates the plant structures which are Category II.

The plant fill was placed from 1975 to 1977. Seismic Category I structures placed on the plant fill include the diesel generator building, the underground diesel oil tanks, borated water storage tanks and basin, a portion of the service water pump structure, service water valve pits and the associated piping for each of the above systems. The arrangement of the diesel generator building is shown in Figure 6 (attached).

The settlement of Category I structures observed to date are as follows:

1) Reactor buildings - varies from 1/4 to 5/8 inch
2) Auxiliary building - approximately 3/8 inch
3) Service water pump structure - varies from 0 to 1/4 inch
4) Service water valve pits - approximately 1/4 inch
5) Borated water storage tanks - approximately 1/4 inch
6) Diesel generator building - 3-3/4 inches maximum
7) Diesel generator pedestal - 4-1/4 inches maximum

It is apparant that the structures on original soil show no settlement problem. These settlement values are consistent with the values in FSAR Figure 2.5-14A.

Soil Exploration

After the excessive settlement of the diesel generator building was observed, subsurface studies were conducted in the main plant area by Bechtel to provide information to be used for determining any required remedial measures. There are 29 borings, 14 dutch cone penetrations, and 1 test pit which were made in the diesel generator building. Boring, dutch cone penetration, and the test pit locations in the plant area are shown in Figure 7. Figure 8 shows the locations of those in the diesel generator building area.

Split spoon, Shelby tube, and Osterberg tube samples were taken from the borings and sent to the Goldberg-Zoino-Dunnicliff & Associates laboratory for testing. Bag samples were taken from the test pit. An undisturbed sample was taken from the pit in the diesel generator building. In-place density test was made in the test pit by Goldberg-Zoino-Dunnicliff & Associates.

Laboratory tests made to date have been concentrated on samples taken from the diesel generator building area with some tests made in other areas of the plant. Laboratory tests performed include:

a. Soil classification tests (e.g., Atterberg limits and gradation analyses)

b. Shear strength property tests consisting of torvane strength, unconfined compression strength, and unconsolidated undraine triaxial strength tests, along with unit weight and moisture content

c. Tests made to evaluate consolidation properties of the fill by conducting one-dimensional consolidation tests, specific gravity tests, and tests to evaluate the effects of saturation

d. Mineralogy tests made to evaluate the swelling potential of the fill material including cation exchange capacity and x-ray diffraction tests

e. Compaction tests to evaluate the percent compaction of fill materials

Results from these tests are being evaluated.

Corrective Action

The following alternative plans have been considered by project engineering:

1) No corrective action required

2) Modify the present strip foundations for the walls to a continuous mat foundation for the entire building.

3) Preload and consolidate the soil under the building.

4) Combine Items 2 and 3 above.

5) Underpin the building to transmit loads directly to the original soil layer.

6) Remove and replace the building and fill material.

Dr. R. Peck of Albuquerque, New Mexico, and Dr. A. Hendron, Jr. of the University of Illinois have been retained by Bechtel as soil consultants. Mr. John Dunnicliff of Goldberg-Zoino-Dunnicliff & Associates has been retained as our instrumentation consultant. Dr. Woods of the University of Michigan has been retained to interpret the results of the dutch cone penetration data. These evaluations are under way and will be addressed in subsequent reports.

Our soil consultants have indicated the fill is settling under its own weight. They advise us that there are only two suitable options at this time:

1) Remove and replace the building and fill material

2) Preload and consolidate the soil under the building

Of these corrective action plans, Dr. Peck and Dr. Hendron have recommended preloading and consolidating the soil under the building. This will allow the settlement of the building and underground utilities to take place before plant operation.

Modification of the foundation and underpinning the building were dismissed as possible solutions because the residual settlement of the utilities during the operation of the plant would not be minimized.

The preload option was selected because of the soil consultants' (Dr. Peck and Dr. Hendron) recommendations for corrective action. In order to maximize the preload and minimize the schedule impact, construction of the diesel generator building is being continued.

The exact amount of preload and the consolidation duration are difficult to determine. To assist in the determination of the necessary amount and duration of the preload, a system of instrumentation is being placed to record the soil movement and the pore water pressure during preload. The instrumentation consists of piezometers, settlement platforms, and Borros anchors at selected locations and elevations within and around the diesel generator building. Control instrumentation was installed in the area not affected by the preload. The additional settlement cannot be accurately predicted at this time.

Activities Completed Since Previous Report

The following activities were completed since the last interim report dated November 3, 1978:

1) Isolating Duct banks

The extent of the contact between the structure and the duct banks was explored. It was determined that the duct banks were restraining the diesel generator building from settling independently. Hence, it was decided to free the building from the duct bank restraint.

The structure and utilities were closely monitored during the release of this restraint. No distress to date has been noted in the utilities due to the settlement.

There were gaps in the order of 1-1/2 inch between the mud mat and the footings in the northeast area of the building. These gaps were reduced to 3/4 inch or less when the duct banks were isolated from the building. Therefore, there will be no grout placed between the underside of the footing and the mud mat prior to preload.

To ensure the free movement, a minimum of 2 inches of Ethafoam will be placed around the duct bank and the excavated area filled with lean concrete prior to preloading.

DIRECT TESTIMONY - BENJAMIN W. MARGUGLIO

I. Introduction and Scope of Testimony

My name is Benjamin W. Marguglio. My employment as the Director of Quality Assurance for Projects, Engineering and Construction at Consumers Power Company (CP Co) began on January 1, 1977. In that capacity, my responsibility with regard to the Midland Project was to establish and maintain quality assurance policies, procedures and standards -- in essence, to establish and maintain the Quality Assurance Program--and to assure the implementation of the Program. At that time, I was responsible also for directly implementing, on a line organization basis, selected portions of the Program.

In March 1980, I became the Director of Environmental Services, Quality Assurance and Testing and in August 1980 I became Director of Environmental Services and Quality Assurance. In this capacity, my responsibility to the Midland Project is now different from my responsibility previous to March 1980 in that although I continue to have responsibility for the establishment and maintenance of the Quality Assurance Program, I am no longer responsible for directly implementing, on a line organization basis, any portion of the Program other than quality assurance audit and quality assurance programmatic training.

For approximately five years prior to joining CP Co, I was the Director of the Quality Division of EG&G,

Idaho (and its predecessor company, Aerojet Nuclear Company) at the Idaho National Engineering Laboratory. At the time I left, the EG&G, Idaho Quality Division consisted of approximately 125 persons who were involved in the design and construction of a variety of nuclear facilities. As the Quality Division Director, I had responsibility for the Quality Assurance Program definition as well as for the implementation, on a line organization basis, of major portions of the Program. On a part-time basis, I taught quality courses at the graduate schools of both the University of Idaho and, earlier, the University of Dallas. Altogether, I have over 25 years of industrial experience, approximately 21 years of which have been spent in quality assurance-related assignments at various organizational levels and five years of which were spent in a project management assignment.

I am a Fellow of the American Society for Quality Control (ASQC) having been elected to that rank in 1973, and I am certified by ASQC as both a Quality Engineer and a Reliability Engineer. I am also a Registered Professional Quality Engineer in the State of California.

I am the author of a reference book entitled, Quality Systems In The Nuclear Industry and of over a dozen published technical papers.

My Bachelors and Masters Degrees are in statistics and were awarded in 1954 and 1955, respectively, by the City University of New York.

My testimony will be in two parts. The first part will cover the "programmatic" improvements to the Midland Project Quality Assurance Program which were adopted since late 1976 to the present, but which were independent of the corrective actions taken in response to the Diesel Generator Building settlement. By "programmatic" improvements, I mean those improvements which apply to a large portion of the Midland Project Quality Assurance Program or which apply to more than one activity, such as soils placement. The second part of my testimony will cover the Midland Project Quality Assurance Program improvements which were adopted as corrective actions in response to the Diesel Generator Building settlement. This portion of my testimony also responds to Intervenor Stamiris Contentions number 3 and 2(c). Some of these corrective actions were programmatic and some were generic to soils placement activities.

II. Programmatic Improvements to the Midland Project Quality Assurance Program.

The programmatic improvements which I am about to discuss are arranged to correspond to the criteria given in Title 10 of the Code of Federal Regulations, Part 50, Appendix B. These criteria constitute the basic quality assurance requirements for items and activities which are necessary to either prevent a nuclear accident or to mitigate its consequences. At this point, I must emphasize that the classification of these improvements under a particular Appendix B

criterion is a matter of judgment. Some of these improvements might be classified, reasonably, under Appendix B criteria other than the ones I have specified.

The programmatic improvements which I will discuss first relate to Appendix B, Criterion I, "Organization."

As a result of a national search, I was hired on January 1, 1977, as noted earlier, to direct the Quality Assurance Department for CP Co's Projects, Engineering and Construction -- i.e., for projects in the design and construction phase, the largest of which was and is the Midland Project. I reported then, and still do, to the office of the Vice President-Projects, Engineering and Construction. My predecessor served as the Quality Assurance Director in 1975 and 1976, prior to which time he had extensive operations and maintenance experience whereas my quality assurance background and credentials, as given earlier, are substantially different.

One of my initial actions was to reorganize the CP Co Quality Assurance Department to provide three separate sections applicable to the Midland Project. The first was the Inspection, Examination and Test Verification Section. The activities of this Section were focused at the construction site at Midland. With this reorganization, the Section Head reported directly to me, whereas he had previously reported to an intermediary who, in turn, reported to me. This aspect of the reorganization resulted in my direct involvement with the site quality assurance activities. It

made it easier for the site Quality Assurance Department personnel to escalate their concerns to my level and it made it easier for me to communicate the required quality assurance improvements. It also brought the authority of my office to bear upon the corrective action process.

The second quality assurance section created was the Quality Assurance Engineering Section. Its Section Head again reporting directly to me instead of to the intermediary, resulting in the same benefits as for the Inspection Section. I recruited Walter P. Bird for this position. Mr. Bird had worked for me in this same relative capacity at EG&G, Idaho. We then recruited Robert Southon, to head the Mechanical Group within the Quality Assurance Engineering Section. He, too, had worked in a similar role at EG&G, Idaho. Both Messrs Bird and Southon had prior experience in quality assurance engineering activities which highly correlated to the quality assurance engineering activities needed for the Midland Project. Mr. Bird is a Registered Professional Engineer in Mechanical Engineering, has a Masters Degree in Mechanical Engineering, had almost 15 years of experience at the time, of which at least three years were directly related quality assurance experience at a middle management level. Having worked directly for me in Idaho, I was convinced of his suitability for his role as the Midland Project Quality Assurance Engineering Section Head.

The third quality assurance section created was the Audit Section. The Audit Section Head also reported

directly to me, resulting in the same advantages from the direct reporting relationship as noted in the previously.

My responsibilities as the Director of the CP Co Quality Assurance Department and the responsibilities of the three aforementioned Section Heads within the Department were described in our Quality Assurance Program Policy sent as part of a CP Co Quality Assurance Topical Report dated February 1978; the Topical Report documents the CP Co commitments to NRC requirements. (See Marguglio Exhibit 1).

Other actions that I took resulted in an increase in the technical capabilities of the CP Co Quality Assurance Department personnel as a whole, and in an increase in the number of Department personnel assigned to the Midland Project. Of the nine persons within the Department who were assigned to the Midland Project and who were classified as Executive, Administrative & Professional (EA&P) personnel at the time of my initial employment, five were transferred out of the Department and replaced with others who had higher educational or experience levels directly relating to quality assurance for nuclear design and construction. In addition, by the end of 1977, the number of Quality Assurance Department EA&P-type personnel assigned to the Midland Project had increased to 22, and by the end of 1979, the number had increased still further to 26.

These changes in the Department's organization and its personnel constituency and size enabled us to play a stronger role in preventing defects as well as in detecting and correcting them. I'll discuss the specifics of these preventive functions later in my testimony.

In March 1980, the CP Co Midland Project Office was established to replace the then existing Midland Project Management Organization. The Midland Project Office is headed by a Vice President, assisted by the Project Manager, whereas the former Midland Project Management Organization head was only the Project Manager. Reporting to the Midland Project Office are six department managers who have responsibility for safety and licensing, design production, site operations (construction and pre-operatonal testing), quality assurance, cost and schedule, and administration. The Bechtel Midland Project organization has also been restructured to facilitate the direct interface between the CP Co MPO Departments and the Bechtel Midland Project organizational elements. Attached, as Exhibit 2 to this testimony, is a chart of CP Co MPO and Bechtel Midland Project organizations, showing the various lines of direct communication between the two.

In addition, the number of the CP Co EA&P personnel in the section has grown from 30 at the end of 1976 to the present number of 541.

The establishment of the Midland Project Office with its self-sufficient organizational structure, with its

paralleling of Bechtel's project organizational structure and with its increase in size, resulted in CP Co obtaining quality-related information on a more timely basis, and participating more directly in decisions relating to quality assurance. It strengthened the Midland Project Office control of the project and of the project decisions. These changes provided impetus to the prevention of problems and to the more timely resolution and closure of open items.

Concurrent with the establishing of Midland Project Office in March 1980, was the initial formation of the Midland Project Quality Assurance Department (MPQAD), with Walter R. Bird as its manager. I have already provided a brief description of Mr. Bird's qualifications; he was named MPQAD Manager with my strong endorsement. As I noted earlier in my testimony, at the same time I was appointed Director of Environmental Services, Quality Assurance & Testing.

The responsibilities of the MPQAD Manager were essentially the same as were those of the Director of the Quality Assurance Department, the office I had held, with one exception. Mr. Bird assumed all of my former responsibilities, except that I continued to have the responsibility for the establishment and maintenance of the Quality Assurance Program and for the conduct of quality assurance audit and programmatic training. Thus for quality assurance programmatic matters, Mr. Bird continues to report to me, but for all other matters he reports to the Midland Project Office. As part of my testimony, I have allocated the CP Co

Quality Assurance Topical Report dated March 18, 1980 which outlines the organizational changes I have just described. (See Marguglio Exhibit 3). When compared to Exhibit 1, it demonstrates that the MPQAD has the same responsibilities as were assigned formerly to the CP Co Quality Assurance Department.

In August 1980, the Bechtel Midland Project Quality Assurance organization was integrated into the MPQAD, making the MPQAD only quality assurance organization supporting the Project. Thus, the MPQAD now performs all of the quality assurance functions for the Project which were previously assigned to the Bechtel Midland Project Quality Assurance organization in its former, primary quality assurance role and those assigned to the CP Co, in its overview role. Attached to this testimony as Marguglio Exhibit 4, is a chart of the organization of MPQAD, defining the MPQAD lines of communication.

The organization change places a CP Co employee, Mr. Bird, as the Manager of MPQAD. In addition to the MPQAD Manager, the Site Quality Assurance Superintendent and the Section Heads of Quality Assurance Engineering, Inspection, Administration and Quality Assurance Services, who each report to the MPQAD Manager, are permanent CP Co employees. The MPQAD is currently staffed with 73 persons; 55 persons all permanent CP Co employees or personnel under direct contract to CP Co; 18 are Bechtel employees. In addition to these, the time of 6 more persons in the Audit Section, who report to me, is devoted to the Midland Project Quality

Assurance Program and, or course, my secretary and I are also part of the Program.

The integration and staffing increase provide the MPQAD with a more timely and complete involvement in both preventive and corrective activities. The existence of the singular Quality Assurance entity (MPQAD), as contrasted to the functioning of two separate quality assurance entities (Bechtel's and CP Co's), has had the effect of promoting the interests of the Project as a whole over and above any parochial interests.

That completes my testimony with regard to the programmatic improvements relating to Appendix B, Criterion I, "Organization." I will now describe some programmatic improvements relating to Appendix B, Criterion II, "QA Program."

In November 1976, the Quality Assurance Program was revised to voluntarily commit the Midland Project to the following quality assurance standards and NRC Regulatory Guides which were unavailable at the inception of the Project and, therefore, not committed to in the original Topical Report: ANSI N45.2.1-1972; N45.2.2-1972; N45.2.3-1973; N45.2.4-1972; N45.2.5-1974; N45.2.6-1973; N45.2.8-Draft 3, Rev 4; N45.2.9-1974; N45.2.10-1973; N45.2.11-1974; N45.2.12-Draft 4, Rev 1; N45.2.13-Draft 3, Rev 3; N101.4-1972; and Regulatory Guides 1.28-June 1972; 1.30-August 1972; 1.37-March 1973; 1.38-March 1973; 1.39-March 1973; 1.54-June 1973; 1.55-June 1973; 1.58-August 1973; 1.64-February 1973; 1.74-February 1974; 1.88-August 1974; and 1.94-April 1975.

These standards and Regulatory Guides deal with a variety of quality-related subjects including requirements for the overall Quality Assurance program; requirements for Quality Assurance of design; requirements for Quality Assurance of procurement; requirements for the inspection and test of structural steel, structural concrete, instrumentation, electrical and mechanical equipment, and protective coatings; requirements for cleaning and housekeeping; requirements for packaging, shipping, receiving, storage and handling; requirements for quality assurance records; requirements for the qualification and certification of inspection, examination and test personnel; and requirements for auditing. These standards represent the state of the quality assurance art at this time, since there have not been any major changes to the standards since 1976 with which the Project does not comply.

Bechtel procedures were originated or revised as necessary to accommodate the implementation of these commitments. Examples of Bechtel procedures which were either originated or revised are Manager of Engineering Department (MED) Procedure 2.13, "Project Engineering Team Organization Responsibilities"; Engineering Department Project Instruction (EDPI) 4.55.1, "Project Material Requisitions, Midland Project"; Field Procedure General (FPG) 4.00, "Storage and Storage Maintenance of Equipment and Materials"; FPG 7.000, "Housekeeping and Cleanliness Control During Construction"; and Project Special Provision (PSP) G07.1, "Documentation, Records and Correspondence Control."

In December 1979, the CP Co Quality Assurance Program Procedures (QAPPs) were originated or revised largely in accordance with recommendations which I made to a Management Task Force consisting of the Senior Vice President (my superior, whom I previously noted as the Vice President, but who had since been promoted) of Projects, Engineering & Construction, the Midland Project Manager and other members of the Senior Vice President's staff, besides myself, who had responsibilities for CP Co Midland Project quality-related functions. These QAPPs provided quality assurance requirements, responsibilities and interface procedures -- i.e., procedures describing the interfaces among various departments within Projects, Engineering & Construction.

The following subjects are covered by new or revised QAPPs: quality assurance policies; quality assurance program procedures; identification of safety-related items; quality assurance training; preparation of design documents; control of design changes; design verification; control of design interfaces; processing procurement requisitions to incorporate quality assurance requirements; department procedures relating to quality assurance; control of quality-related documents; evaluation of suppliers for quality considerations; source inspection; identification and control of items; control of special processes; site construction inspection; turnover from Bechtel to CP Co; preoperational testing; control of measurement equipment; handling, storage and shipping controls; control of nonconforming items;

processing NRC Bulletins, Circulars and Information Notices; processing notices from manufacturers; stop work orders; allegations; corrective action; quality records; auditing; quality assurance management meetings; and reporting to NRC.

For example, the QAPP with respect to auditing (QAPP 18-1) was modified to provide far greater specificity regarding such matters as audit schedules, documentation of audit findings and identification of personnel who are to be apprised of audit findings. (See Marguglio Exhibits 5 and 6, the QAPP 18-1 as of February 28, 1977 and January 1, 1980). Similarly, the QAPPs describing management involvement in quality assurance matters has been made more specific. QAPP 19-1 identifies the individuals who must attend quarterly Quality Status Meetings and requires both a written agenda and written meeting minutes to be distributed. QAPP 20-1 describes the method for informing CP Co management about the status of the Qaulity Assurance Program. (See Marguglio Exhibits 7 and, 8 QAPP 19-1 as of January 1, 1980 and 20-1 as of February 28, 1977).

The new or revised QAPPs resulted in the addition of some quality assurance requirements, in the increased specificity of other quality assurance requirements and of the departmental interfaces necessary to implement those requirements. They also resulted in improved flexibility allowing the then existing CP Co Quality Assurance Department to participate in the Midland Project on either a primary or overview basis. Prior to that time, the Quality

Assurance Department's activities were of the overview type only. "Primary" participation means that a particular organization has direct responsibility for performing a quality assurance function while "overview" participation means that no such direct responsibility exists -- rather a review type function is contemplated.

In addition, the relatively high level of Company management participation in the Task Force strengthened the management's already strong quality assurance understanding and attitude.

At approximately the same time as the new and revised CP Co QAPPs were issued, 28 CP Co Quality Assurance Department Procedures (QADSs) were revised and 13 new QADPs were originated. These new and revised QADPs provided numerous technical improvements. For example, inspection plans were required as a prerequisite to the performance of inspection and the contents of the inspection plans were specified. Previously, no such requirements existed. The QADPs incorporated specific checklists for the Quality Assurance Department's performance of design reviews whereas, previously, no such checklists existed. The QADPs incorporated in excess of 100 procurement quality assurance requirements which were to be imposed contractually, as applicable. (The number of such requirements has since risen to approximately 200.) The QADPs introduced detailed nonconformance reporting forms to facilitate the Quality Assurance Department's inspection and overinspection.

Subjects covered in the QADPs included: organization; the preparation of procedures; personnel training; personnel qualification and certification; design review; processing procurement documents; prebid and preaward quality evaluation; inspection planning; source and receiving inspection; construction inspection; maintenance inspection; checkout and preoperational test verification; turnover from Bechtel to CP Co; nonconformance reporting; corrective action; nonconformance and quality action statusing; stop work orders; reporting to the NRC; documentation control; quality records; inspection stamp control; processing manufacturer's notices; responding to NRC inspection reports; personnel safety; review of external documents which could impact the quality assurance program; and trend analysis; among others.

With the advent of the MPQAD, the QADPs were converted into MPQAD Procedures and are in effect today.

In the last quarter of 1979, the Bechtel Midland Project Quality Assurance organization implemented a computerized tracking system to provide increased visibility to and accountability for the open quality-related action items. This system is now being administered by MPQAD. For each action item entered into the system, the output reports identify the organization responsible for the action, the schedule for the completion of the action, the status of the action, and the MPQAD staff member responsible for following

up to assure the completion of the action and the closure of the item.

The number of open quality-related action items as of November 23, 1979, was 237. As of April 11, 1980, this number was reduced to 155, a reduction of 34.6 percent. At that point, the scope of the system was expanded to provide for the tracking of additional items for which the action rested with the Bechtel, Ann Arbor office. The initial effect was to increase the number of open quality-related action items from 155 to 273, an increase of 118 open items. As of the end of April 1981, this number was increased to 461, representing further specificity in the tracking system.

An additional change has been made to this system recently to provide a truncated, prioritized list of actions which warrant special management involvement due to their complexity or importance or due to the status of the actions in comparison to the commitments. This change provides information promptly to Mr. J. Cook, the Vice President responsible for the Midland Project and involves him directly in resolution of significant quality-related issues.

In addition to these improvements, the system for tracking open quality-related action items has enabled management attention to be focused on the most significant actions and on the total number of actions for which each organization is responsible. This resulted in a marked reduction in the number of old, outstanding actions, even though the total number of outstanding actions at the end of

May 1981 has increased from the inception of the system due to the fact that the system was changed to broaden its scope, as noted earlier.

In the last quarter of 1979, another system was implemented to measure the quantity and ages of the open quality nonconformances, as differentiated from the system for tracking open quality-related action items described immediately above. As an example, in November 1979, the number of open quality construction Discrepancy Reports was 1,603 whereas at the end of May 1981, the number was 502, a reduction of 111 or 69 percent.

The system for tracking open quality nonconformances has also facilitated concentrating managerial attention on matters which assisted in achieving the significant reductions noted.

A parallel effort resulted in the reduction of the number of open and outstanding Quality Control Inspection Records (QCIRs). QCIRs describe the construction inspections to be made and provide a record of the status of those inspections. In the fourteen month period ending January 1980, the number of open QCIRs was reduced from over 22,000 to less than 16,000. As of the end of April 1981, the number was 15,128. A part of this reduction was attributable to the shortening of the time span between the completion of the construction activity and the completion of the corresponding inspection activity. To put these numbers in perspective, the total number of closed QCIRs, representing

completed and accepted construction work, was approximately 8,300 as of the end of May 1981.

The CP Co Quality Assurance Department, and its successor, the MPQAD, have been provding an in-line review and approval of the Nonconformance Reports originated by Bechtel and selected site contractors. The purpose of this review and approval is to assure the adequacy of the process by which the Nonconformance Report is dispositioned and closed. The MPQAD assures that the disposition is made by persons who are authorized and designated to do so and that the justification for the disposition is appropriate and documented.

In the same manner, commencing in August 1980, the MPQAD has been providing an in-line review and approval of the disposition and closure process for any requests from Bechtel suppliers to accept nonconforming items as is or on the basis of their repair. Previously, the review and approval of the supplier requests was required of only the Bechtel Engineering and Procurement organizations with an "information only" copy provided after the fact to both the Bechtel and CP Co Quality Assurance organizations.

The MPQAD in-line review and approval of these requests provides both a timely assessment of the dispositioning process and a timely feedback as to a given supplier's ability to achieve the quality-related requirements. MPQAD now has greater involvement and control in the correction of

the root cause of the supplier's problem or of any Bechtel problem which may arise in processing the supplier's request.

Historically, the Bechtel Quality Control organization has been reviewing and approving Purchase Orders (POs) originated at the site. The purpose of this review was primarily to assure that the design and quality criteria previously established by Project Engineering were translated accurately into the POs. In September 1980, the MPQAD replaced the Bechtel Quality Control organization as the reviewer of these field POs. (This responsibility change is consistent with the MPQAD's review and approval of the POs originated at the Bechtel, Ann Arbor Office). The scope and purpose of the MPQAD review and approval is broader than was the scope and purpose of the Bechtel Quality Control review and approval. Thus, MPQAD assures the technical adequacy of the quality assurance requirements, adjusting them as appropriate, to fit current conditions.

That completes my testimony with regard to the programmatic improvements relating to Appendix B, Criterion II, "QA Program." I will now describe some programmatic improvements relating to Appendix B, Criterion III, "Design Control."

In the last quarter of 1977, Walter R. Bird submitted a CP Co Quality Assurance Engineering Section objective which I, in turn, submitted as a CP Co Quality Assurance Department objective to the Vice President - Projects, Engineering & Construction. The objective was to assess, on

a sampling basis, the adequacy of the process by which equipment was being environmentally and seismically qualified and to assess the level of assurance that the equipment qualification results were consistent with the commitments made in the Final Safety Analysis Report (FSAR). The review began in the first quarter of 1978 and resulted in the issuance of three CP Co Nonconformance Reports in late June 1978. On November 13, 1978, CP Co issued a 50.55(e) Report based on the CP Co Quality Assurance Department Nonconformance Reports issued in late June 1978. This 50.55(e) Report alerted the industry to the generic problems relating to equipment environmental and seismic qualification. The CP Co 50.55(e) Report and the associated CP Co corrective action plan preceded, by three months, the NRC Bulletin (79-01) which required actions nearly identical to those which had been planned and begun for the Midland Project, as I will describe below.

In April 1978, the Bechtel San Francisco Power Division issued a quality assurance information flyer which identified three cases for which the qualification test reports approved by Bechtel did not meet the purchase specification and FSAR requirements. As a result of this information, the Bechtel Midland Project organization reviewed seven qualification test reports which had been approved by Bechtel Engineering. The Bechtel Midland Project Quality Assurance organization issued a Quality Action Request in June 1978

and hardware deficiencies were identified in a Bechtel Nonconformance Report issued on October 4, 1978.

The documentation for all equipment requiring environmental and seismic qualification has since been re-reviewed by Bechtel Midland Project Quality Engineering personnel. For each such equipment, the re-review encompassed a comparison of the FSAR requirements, the Institute of Electrical & Electronic Engineers (IEEE) standard requirements and the procurement specification requirements to assure their consistency and adequacy. A comparison was then made between those requirements and the actual test procedures and test reports provided by the equipment suppliers. This equipment qualification documentation re-review was performed using a disciplined system which was documented in accordance with a formal procedure. The re-review was completed in January 1979 and the Bechtel Quality Control organization issued approximately 50 Bechtel Nonconformance Reports against the equipment found to be nonconforming or potentially nonconforming.

Due to the nature of the problems discovered during the qualification documentation re-review and the fact that these problems were generic to the Bechtel Engineering Department, several Bechtel procedural changes were made. These procedural changes better defined the role of the Bechtel Quality Engineer. Manager of Engineering Directive (MED) 4.49-0 was revised to add paragraph 4.3, as follows:

> "The Project Quality Engineer shall review all specifications, attachments and addenda for completeness, inspectability of the commodity, compliance with the quality codes and standards, control of special processes, quality considerations, and qualification test requirements prior to approval by the Project Engineer."

Engineering Department Project Instruction (EDPI) 4.25.1 was revised to add paragraph 4.4, as follows:

> "Test procedures and test results relating to equipment qualification shall be routed to Quality Engineering and Licensing for review (nuclear projects only). All other documents relating to qualification require interface as defined in Table I."

In addition, a Bechtel Power Corporation Design Guide for Environmental Qualification of Safety-Related Equipment was provided for use by Bechtel engineers.

Training relating to qualification testing also was provided to Bechtel engineers. 147 Project personnel have received this training. Included in the training were such topics as testing standards, methods of testing, testing documentation, and interpretation of testing results -- all with emphasis on the problems found during the aforementioned qualification documentation re-review.

This whole re-review experience, along with the procedural changes and training, have produced a significant improvement in the Bechtel Midland Project organization activities relating to qualification tests.

Assurance that the current qualification test requirements are being met is gained from a periodic report

issued by the Bechtel Midland Project organization which provides the statusing and tracking of the open aforementioned Nonconformance Reports and other related action items, as well as from the documented corrective actions. An additional assessment is being accomplished in association with an ongoing activity to provide qualification information requested by the NRC, in a letter from D. F. Ross, Jr. entitled, "Qualification of Safety-Related Electrical Equipment," dated February 21, 1980.

This activity involves the identification of safety-related equipment including, for each equipment, the model manufacturer, location, service description, environmental conditions and applicable qualification report. The assessment involves a re-re-review (a third review) of the qualification report, using a detailed checklist to verify conformance to the requirements given in NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment." This assessment is scheduled for completion by October 1981 and is being performed by Commonwealth Associates, Inc. of Jackson, Michigan, an outside consulting firm, thus providing independence from the prior Bechtel Midland Project qualification documentation re-review process.

In 1977, the CP Co Quality Assurance Engineering Section performed a review of Bechtel field-oriented specifications to determine the adequacy of their specificity, the clarity of their wording, supportive of construction and inspection activities. Forty-nine specifications for fabri-

cation and installation were reviewed. The forty-nine specifications covered the significant work activities not yet completed at the site. This review and the Bechtel Engineering disposition of the CP Co Quality Assurance Engineering comments resulted in the revision to twelve of the forty-nine specifications. These revisions were for tolerance and word changes which improved the clarity and increased specificity.

Also in 1977, the CP Co Quality Assurance Engineering Section and the Bechtel Engineering Department, each independently, reviewed the dimensional tolerances for a portion of the Reactor Building Spray System (RBSS). Forty design documents were reviewed by each organization, including drawings for the RBSS installation which are typical of drawings for other safety-related installations and specifications generic to the installation of all safety-related systems. The results of these reviews confirmed that dimensional tolerances were generally available for the installation of safety-related systems. Revisions were made to seven generic design documents to clarify dimensional tolerances.

The review of the forty-nine field-oriented specifications and of the forty design documents relating to the RBSS provide an increased confidence in the clarity of these documents. And, through the process of resolving the CP Co Quality Assurance Engineering review comments, Bechtel

Engineering personnel increased their awareness of the need for specificity in the preparation of design documents. In 1978, a review was conducted of 91 Bechtel Field Change Requests (FCRs) to assess the sensitivity of Bechtel Field Engineering personnel to the need for tolerances, specificity and clarity in design documentation. If Bechtel Field Engineering personnel were requesting changes to design document (documents originated early in the project prior to the aforementioned specificity reviews), it would be indicative, that the need for tolerances, specificity and clarity was also acknowledged by them. Of the 91 FCRs reviewed by Bechtel, 11 were found to have been originated for these reasons.

Specifications and drawings are now subject to a continuing review by MPQAD in conjunction with the MPQAD overinspections of site construction activities. In addition, revisions to specifications are now subject to MPQAD review and approval prior to their issuance.

That completes my testimony with regard to the programmatic improvements relating to Appendix B, Criterion III, "Design Control." I will now describe some programmatic improvements relating to Appendix B, Criterion VII, "Control of Purchased Material, Equipment and Services."

The system for the evaluation of the degree to which suppliers conform to quality requirements has been changed in two ways. First, we have increased, to a minimum of 10 per year, the number of CP Co Audit and Administration

Section audits of suppliers. Second, the Bechtel Manager of Engineering Directives have been revised to provide for specific inspection points, as necessary, in Bechtel originated procurement documentation as designated by the Bechtel Supplier Quality or the Bechtel Engineering organizations.

In addition, a contract clause was originated and is being implemented through the MPQAD Procedures to provide, that specific inspection points be contractually imposed on suppliers as necessary for CP Co-originated procurement packages for design and construction.

In February 1978, the CP Co Quality Assurance Department engaged Science Applications, Incorporated an independent consultant, to perform an audit of the quality verification documents for the Nuclear Steam Supply System (NSSS) supplied by B&W, Lynchburg. Quality verification documents are documents which are intended to demonstrate that an item meets its design and workmanship requirements. The results of the audit indicated that a complete re-review of this documentation was appropriate, and in conjunction with B&W, the CP Co Quality Assurance Department established and documented the requirements by which to accomplish the re-review. The re-review has been completed by the B&W Quality Assurance organization. The nonconformances have been dispositioned and corrected, as necessary, and the effectiveness of the re-review has been verified through additional audits by the

CP Co Audit and Administration Section and by summary reviews by the MPQAD.

In 1979, at the direction of the CP Co Quality Assurance Department, the Bechtel Quality Control and Bechtel Supplier Quality organizations started a re-review of quality verification documents originated prior to July 1978 by Bechtel suppliers. The re-review is limited to verification documents originated prior to July 1978 because, as of that date, the Bechtel Quality Control and Supplier Quality organizations began making their initial review of these with a much more specific and improved procedure. The purpose of the re-review of the older documents is to provide additional assurance of the quality of the supplied hardware by confirming that the quality verification documents are available, legible and technically acceptable. The re-review is being performed on a systematic sampling basis. When the adequacy of a supplier's quality verification documents cannot be judged, to be wholly acceptable, 100 percent of that supplier's quality verification documents are subjected to the re-review process. All nonconformances are being dispositioned and corrected, as necessary, under the auspices of the joint Bechtel/CP Co MPQAD Material Review Board. At the end of May 1981, the re-review and disposition of the supplier quality verification documents was complete for approximately 2,500 purchase order packages, a completion percentage of approximately 44.

This re-review activity, in conjunction with the improved procedures for the review of supplier quality verification documents and the training of 159 Bechtel Supplier Quality representatives in May and June, 1980 (the Midland Project uses approximately 70 of these representatives for supplier evaluation, source inspection and source surveillance activities), has resulted in a reduction in the number of nonconformances in these documents as received at the site.

In 1980, at the direction of the MPQAD, and based on a suggestion by James Keppler, Director of NRC Region III, the Bechtel Quality Control and Supplier Quality organizations began a re-review of the certain types of Bechtel purchase orders issued prior to July 1980. These include purchase orders issued at the site for bulk items for which there was no Bechtel inspection required during the items' fabrication at the suppliers' facilities (although there may have been Bechtel inspection at the conclusion of the fabrication processes at the suppliers' facilities and although there was receiving inspection in each case). There are approximately 1,700 such field purchase orders being re-reviewed.

Another re-review concerns field purchase orders for which Bechtel in-process inspection at the suppliers' facilities was required. There are approximately 50 such field purchase orders. Finally, a third type re-review involves purchase orders originated at the Bechtel, Ann Arbor Office. These purchase orders had required Bechtel

in-process inspection at the suppliers' facilities and involved a subjective engineering judgment which indicated that the supplier may have had some difficulty in meeting the requirements. There are approximately 50 such purchase orders.

The purpose of this purchase order re-review is to identify any "flags," or "adverse conditions" for which the available documentation does not provide evidence of the adequate disposition or resolution of the condition. The purchase order re-review for "flags" is being accomplished on a disciplined basis by experienced personnel who have been specifically trained to accomplish this task in accordance with a documented procedure. The reason for limiting the re-review of these types of purchase orders to those which were originated prior to July 1978 is because since that time the Bechtel Quality Control and Bechtel Supplier Quality organizations have implemented changes, which I believe to be improvements, in the way in which the purchase order documentation is initially reviewed and the way in which the disposition of any question is initially documented.

As of the end of May 1981, 421 purchase orders, or 23 percent, have been re-reviewed. Although there are some "flags" yet to be resolved, there are no serious hardware concerns as of that time.

Beginning in 1979, selected major procurements were processed through the CP Co Quality Assurance Program, rather than through the Bechtel Quality Assurance Program,

in order to provide CP Co with direct control of the new work represented by these procurements. For the installation of the Nuclear Steam Supply System (NSSS) and for the preservice inspection (PSI), the CP Co Quality Assurance Department was established as the primary organization responsible for performing quality engineering, inspection, examination, test verification and audit. This is in contrast to the responsibility for "overviewing" these activities as they are performed by the Bechtel Quality Engineering, Bechtel Supplier Quality, Bechtel Quality Control and Bechtel Quality Assurance organizations. The NSSS erection is approximately 90 percent complete. The PSI is approximately 75 percent complete. For these activities, both the execution of the Quality Assurance Program and the supplier's performance have been above average based on the relatively low number of nonconformance reports originated and on their relative lack of significance. I anticipate that any additional future site work will also be executed wholly utilizing the CP Co Quality Assurance Program.

That completes my testimony with regard to the programmatic improvements relating to Appendix B, Criterion VII, "Control of Purchased Material, Equipment and Services." I will now describe a programmatic improvement relating to Appendix B, Criterion IX, "Control of Special Processes."

The process control which I am about to describe was implemented to avoid damage to electrical cable, both the wire and its insulation, while it is being pulled through

a run of conduit which contains one or more 90° bends. Based on input from the Bechtel Field Engineering and Bechtel Quality Control organizations as to the actual field conditions, a computer program calculates the expected pull forces that will be required to pull a given cable or group of cables through a given conduit. The program also calculates the maximum allowable pull force that can be used without subjecting the cable or cables to damage. The output of this program is reviewed by Bechtel Quality Control personnel prior to pulling any cable which is categorized as Class 1E. Obviously, cable is not allowed to be pulled if the expected pulling force exceeds the allowable pulling force. This process control has worked effectively as evidenced by the relative absence of MPQAD originated Nonconformance Reports as well as the relative absence of NRC Items of Noncompliance or Unresolved Items in this area.

Next, my testimony will describe programmatic improvements relating to Appendix B, Criterion X, "Inspection."

MPQAD and Bechtel Quality Control personnel who perform inspection are now certified to requirements which exceed the requirements of the Ameircan National Standards Institute (ANSI) Standard N45.2.6. Certifying inspectors on a discipline-by-discipline basis satisfies the requirements of ANSI N45.2.6. For example, it is acceptable to certify an inspector as a civil inspector or to certify him as an electrical inspector or to certify him as a mechanical

inspector -- civil, electrical and mechanical being among the major disciplines.

However, in 1979, the CP Co Quality Assurance Department (and its successor, the MPQAD) started to certify its inspection personnel to each specific inspection plan that is used on a repetitive basis. For example, within the civil discipline, one who is to perform the inspection of concrete must first be certified to the specific plan for the inspection of concrete; one who is to perform soils inspection must first be certified to the specific plan for the inspection of soils. Such certification is also used for other activities within the civil discipline, such as the installation of anchor bolts, or the installation of tendons for post-tensioning the concrete containment structure. Similarly, in 1980, at the direction of the CP Co Quality Assurance Department, Bechtel began certifying its Quality Control inspection personnel to the individual Bechtel inspection plans which are called Project Quality Control Instructions. The changes that I have just described apply to Bechtel Quality Control and MPQAD personnel who are Level I and II Inspectors in accordance with the ANSI N45.2.6 classification system.

In 1976, the CP Co Quality Assurance Department started to perform overinspection of the placement of reinforcing steel bar and of the placement of other embedments in concrete. An overinspection is an inspection of a characteristic which was previously inspected by the primary

inspection organization--for the most part, that being the Bechtel Quality Control organization, the B&W Quality Control organization, or any one of a number of other site contractor Quality Control organizations. The purpose of the overinspection is to evaluate the appropriateness of the decision made by the primary inspection organization regarding the acceptability or unacceptability of the characteristic. In any case for which the decision was inappropriate, action is taken to prevent recurrence of a similar situation. Obviously, a higher degree of assurance in the quality of the characteristics which are overinspected also results.

In 1978, overinspection was extended to cover other civil work and to cover the mechanical, welding, electrical, and instrumentation and controls work. The overinspection activity implemented in 1978 was changed in three ways. First, overinspection started to be performed in accordance with specific inspection plans, whereas previously this had not been the case. Second, a review for specificity of the applicable Bechtel drawings, specifications, Field Procedures and Quality Control Instructions, was incorporated as part of overinspection. Finally, we began to "front end load" the overinspection -- i.e., to perform overinspection to a greater degree at the inception of a new activity to provide more timely identification of nonconforming conditions and necessary corrective action in both the construction and primary inspection processes.

The MPQAD overinspection of Bechtel Quality Control's civil inspection, mechanical inspection, electrical inspection and welding inspection is accomplished on a sampling basis. The interpretation of on-site radiographs is overinspected on a sampling basis, except for radiographic interpretations for the Nuclear Steam Supply System (NSSS) for which overinspection is on a 100 percent basis. The overinspection of the interpretation of radiographs received from Bechtel suppliers is also accomplished on a sampling basis. Specific, documented sampling plans have been established for these purposes.

As of the end of May 1981, the CP Co Quality Assurance Department and its successor, the MPQAD, has performed 98 civil, 160 mechanical, 152 electrical, 45 welding, 15 NDE and 10 radiographic interpretation overinspections. Each of these overinspections corresponds to a work package which involves numerous characteristics.

Thus, the implementation of overinspection and the implementation of the changes to the way in which the overinspection was accomplished, represent significant improvements to the Quality Assurance Program.

In 1977, the CP Co Quality Assurance Department reviewed 54 Bechtel Project Quality Control Instructions (PQCIs) or inspection plans. The review resulted in revisions to 44 of these PQCIs to provide a specific delineation of the characteristics required to be inspected and to

provide greater specificity as to the method to be used for the inspection of each characteristic.

That concludes my testimony with regard to the programmatic improvements relating to Appendix B, Criterion X, "Inspection." I will now describe some programmatic improvements relating to Appendix B, Criterion XVI, "Corrective Action."

Earlier I provided testimony regarding the statusing, reporting and reduction of open quality action items and open quality indicators. That testimony could just as well been categorized under Criterion XVI, "Corrective Action." Keeping that in mind, I will not repeat that testimony at this point.

An activity referred to as "trend analysis" was started by the Bechtel Quality Assurance organization in 1974. Trend analysis involves categorizing various types of Bechtel originated nonconformance reports by the work, performance area, and by the type of nonconformance reported. By grouping the nonconformance report data into these performance areas and by counting the number of nonconformances which fall into each area and into each nonconformance type during each period, one can determine whether there is an adverse trend or an undesirably high frequency of a nonconformance, regardless of trend.

In 1976, the Bechtel Quality Assurance organization formalized this trend analysis activity in accordance with a documented procedure. In 1977, at the direction of

the CP Co Quality Assurance Departement, the procedure was changed to cover 30 performance areas instead of the few areas previously covered and to distribute copies of the trend analysis reports to both CP CO and Bechtel management personnel. In 1978, at the direction of the CP Co Quality Assurance Department, as suggested by NRC Region III inspectors, the system was changed again to broaden the data base for trend analysis. Previously, a micro approach was being used in that the nonconformance data were categorized into narrow performance areas and nonconformance types. At this point, a macro approach was added whereby the same data also was grouped into larger categories of performance areas and nonconformance types. This permitted the identification of broader trends, which might have been overlooked within the more detailed "micro" classification.

In 1980, another change was made to require the MPQAD Manager to make and document a specific review of each monthly trend analysis report. If the trend data for a given month exceeds specified parameters for a specific performance area, automatically an assessment is made as to whether a Stop Work Order should be issued for that performance area.

The last of my testimony with regard to programmatic improvements relates to Appendix B, Criterion XVIII, "Audits."

In 1980, the Bechtel Quality Assurance Program was changed to require two quality assurance audits to be made per year, instead of one, by Bechtel management. In addition, over the years since 1977, both the Bechtel and CP Co

Quality Assurance organizations increased the emphasis in auditing the technical engineering activities and in determining the adequacy of the policies and procedures, as contrasted to auditing merely to determine the degree to which these policies and procedures are being implemented.

Earlier I testified with regard to audits of supplier facilities. This testimony could just as well have been categorized under this Criterion XVIII, "Auditing." However, keeping that testimony in mind, I will not repeat it at this point.

Both the CP Co "Corporate" audit (made by the Audit & Administration Section) and the MPQAD audit activities were changed to require that auditors and lead auditors be qualified and certified in accordance with the requirements of ANSI Standard N45.2.23, except that the auditors are not required to perform a stipulated number of audits per year in order to maintain their certification status.

In accordance with existing quality assurance procedures, the Management Analysis Co (MAC), an independent consultant, was engaged to perform two special quality assurance audits in September 1978 and September 1980. The findings in the audits and MAC's specific comments have been used to develop some of the improvements in the Quality Assurance Program discussed in my testimony.

In May 1981 MAC finished an extensive "special" assessment of the adequacy of the corrective actions taken by CPCo and Bechtel for terms identified in 10 CFR §50.55(e)

Reports, the quality of supplied hardware at the site and the overall effectiveness of the Midland Quality Assurance Program. The results of this assessment have been submitted to the NRC. In the assessment MAC concluded:

> "the Midland Quality Assurance Program . . . in general . . . meets the NRC requirements and is adequate for the control of quality assurance of safety related hardware."

Further, MAC determined that:

> "the overall assessment of Midland's Quality Assurance Program is that it is somewhat above average for nuclear plants, particularly those for which construction permits had been issued in the same time frame."

This concludes my testimony with regard to the improvements made to the Midland Project Quality Assurance Program.

Recognizing the fact that the Program was approved by the NRC in 1975, recognizing the large number of improvements that have been made to the Program since 1976, recognizing the significance of these improvements, the published NRC conclusions about the Program, and finally, the general state of the quality assurance programs for other projects, I am confident of the Midland Project Quality Assurance Program. I believe it is in compliance with the NRC requirements, that it is adequate for its purpose, and that it is among the best in the industry. In addition, in my opinion, these improvements I have described demonstrated CP Co management's willingness to make large upfront investments for quality assurance, to accept changes in the Quality Assurance Program, to be informed about the state of quality

assurance. They indicate a management willing to make timely decisions on quality assurance matters, to promote quality assurance throughout the organization, and, very importantly, to interact responsibly with the NRC.

III. Midland Project Quality Assurance Program Improvements Adopted As Corrective Actions for the Diesel Generator Building Settlement.

The second part of my testimony deals with other Midland Project Quality Assurance Program improvements or corrective actions in response to the Diesel Generator Building settlement. Some of these corrective actions were programmatic and some were generic to soils placement activities.

On April 24, 1979, CPCo submitted to the NRC Staff a response to their 10 CFR §50.54(f) question 1; subsequently, on November 13, 1979 CP Co responded to 10 CFR §50.54(f) question 23. These responses have been revised periodically to provide additional information. They explicitly detail the additional programmatic improvements not covered in the first part of my testimony. They also provide a description of generic improvements and corrective actions relating to the specific soils placement activities which are the subject of this hearing. In light of their subject matter and since I made the final decisions regarding the content and language of these responses, they will serve as the second part of my testimony dealing with the corrective actions concerning the diesel generator building. (See Marguglio Exhibits 9 and 10).

CP Co continues to meet the commitment made in our responses to these questions and regularly apprises the NRC Staff of their status. I have attached, also as part of my testimony, a copy of the March 1981 Status Report, outlining the current status of these improvements and corrections. (Marguglio Exhibit 11).

Our responses to 10 CFR §50.54(f) questions 1 and 23 directly relate to the allegations put forth by Intervenor Stamiris in her contention 3. Absent from our response to these questions, however, is any discussion of the incidents described in contention (2)(c), relating to an alleged company practice of "substituting" construction materials for other than those specified, on the basis of "commercial" and "expediency" reasons. The contention asserts this adversely affected the soils settlement. I will now take the opportunity to address that contention.

Our responses to the 10 CFR §50.54(f) questions 1 and 23 were directed at those events which possibly related to the Diesel Generator Building settlement; the incidents described in contention (2)(c) in no way relate to soils settlement. In fact the statements in the contention are factually incorrect.

The contention identifies one non-conformance report -- NCR QF 203 -- as its basis. The report, by CP Co's own quality assurance section, was written because it appeared that materials not in compliance with construction specifications were improperly accepted for use on the Project.

After an investigation by the CP Co Quality Assurance Department, however, it was found that the materials in question complied with applicable construction specifications as outlined in the design documents. The non-conformance report was written because the materials did not meet the standards found in the "receiving inspection plan," an internally developed document. In this case, the receiving inspection plan had more stringent requirements for the particular materials than were found in the construction specifications. Thus, the receiving inspection plan was incorrect. There was never any substitution of an unapproved material for an approved one here; only the originally specified and approved materials were used in the first place.

The contention also refers to an event in which lean concrete was placed around electrical duct banks, implying that this, too, somehow threatened safety and caused the settlement. Here, too, the contention is inaccurate. Lean concrete was used to replace the soils material around certain duct banks because of the difficulty in compacting the soils material. Such action was in complete compliance with the applicable construction specification, C-211, "Technical Specification for Structural Backfill". C-211, in effect since 1974, permitted the use of lean concrete in place of soils material. Thus, there was no basis at all for the allegation in contention 2(c) that financial and time schedule pressures forced CP Co to take

certain action in regard to soils materials that compromised health and safety and caused the settlement of the Diesel Generator Building.

1.0 GENERAL

The President of Consumers Power is responsible for the safe and efficient operation of its nuclear power plants. Consumers Power Company retains responsibility for the Quality Assurance Program although it may delegate to its Principal Suppliers, the establishment and implementation of certain portions. Authority to develop and implement the Quality Assurance Program for Nuclear Power Plants is assigned by the President, for design and construction, to the Vice President - Projects, Engineering and Construction; for operations, to the Executive Vice President - Energy Supply; and, for procurement, security services and graphic arts, as requested, to the Executive Vice President - Energy Distribution and General Services.

Responsibility is further assigned by:

a. The Vice President - Projects, Engineering and Construction -

(1) For the development and implementation of the Quality Assurance Program during the design and construction phase of new nuclear plants and during major modifications of existing nuclear plants, to the personnel reporting to him, as follows:

(a) Executive Director - Environmental and Project Services, and reporting to him, to the:

Director - Project Engineering Services Department

Director - Project Construction Services Department;

(b) Executive Manager - Engineering & Construction - Transmission & Plant Modifications, and reporting to him, to the:

Manager - Generating Plant Modifications;

(c) Director - Quality Assurance - Projects, Engineering and Construction;

(d) Project Managers.

b. The Executive Vice President - Energy Supply -

(1) For the development and implementation of the Quality Assurance Program during the operations phase, to personnel reporting to him, as follows:

(a) Vice President - Production & Transmission, and reporting to him, to the:

Manager - Production - Nuclear

Director - Operating Services

* Complete Revision

Manager - Maintenance and Administrative Services
Director - Quality Assurance - Production & Transmission
Director - Nuclear Activities.

(2) For providing quality-related support during design and construction, operation, and modification phases, to personnel reporting to him, as follows:

(a) Executive Manager - Production & Transmission and, reporting to him, to the:

Manager - System Protection and Laboratory Services.

(3) For nuclear fuel procurement and offsite nuclear fuel accountability to the:

(a) Executive Manager of Fuel Supply and, reporting to him, to the:

Director of Nuclear Fuel Supply.

c. The Executive Vice President - Energy Distribution and General Services - For providing quality-related support during design and construction, operation, and modification phases, in the areas of procurement, security services and graphic arts, as requested, and to personnel reporting to him, as follows:

(a) Vice President - General Services and reporting to him, to the:

Manager - Purchasing Material & Transportation Services
Director - Property Protection
Manager - Administrative Services (Graphic Services).

The organization relationship of these positions are shown in Figure 1.

2.0 BASIS DOCUMENTS

a. NRC 10CFR 50, Appendix B, Criterion 1, "Organization"

b. ANSI N45.2, Criterion 3, "Organization"

c. ANSI N18.7

3.0 POLICY

3.1 PROJECTS, ENGINEERING & CONSTRUCTION ORGANIZATIONAL RESPONSIBILITIES DURING THE DESIGN AND CONSTRUCTION PHASE

The Quality Assurance Department - Projects, Engineering & Construction (QA-PE&C) is responsible for setting quality assurance standards for design and construction consistent with CPCo objectives, and for assuring the establishment and implementation of quality policies and procedures to meet these standards. Additional

quality assurance-related activities, as given below, are assigned to QA-PE&C for work performed either by CPCo or by Principal Suppliers, major subcontractors and sub-tier suppliers, or the activities may be delegated to a Principal Supplier's corresponding organization. The decision as to whether or not these activities are to be delegated shall be made with the mutual concurrence of both the PMO and QA-PE&C Departments. Nevertheless, QA-PE&C retains authority and responsibility for these activities and for assuring their adequate and timely accomplishment.

3.1.1 The objective of the assignment of authorities and responsibilities to QA-PE&C is to yield a total Quality Assurance Program resulting in the attainment of a facility which is designed in accordance with its design basis criteria and which is constructed in accordance with its drawing and specification requirements.

Figure 2 depicts the QA-PE&C organization.

Within QA-PE&C there are three types of sections - namely: Quality Assurance Engineering; Inspection, Examination and Test Verification; and Audit and Administration. Following is a discussion of the responsibilities of each of these types of sections.

3.1.2 The Quality Assurance Engineering sections are responsible for:

3.1.2.1 During the design concept activity, preparing the Project Quality Assurance Plan and assuring the Plan's timely issuance with the mutual concurrence of the organizations involved.

3.1.2.2 *During the design activity:

a. Participating in the establishment of the Design Plan by establishing the quality assurance aspects of the Plan;

b. Participating, as specified by the Design Plan.

3.1.2.3 During the hardware and services procurement activities:

a. Establishing supplier quality assurance requirements;

b. Performing pre-award supplier evaluations for quality assurance and quality control activities;

c. Preparing plans and procedures for procured item inspections, nondestructive examinations and tests (within the QA-PE&C jurisdiction);

*Not applicable to the Midland Project.

d. Evaluating supplier quality assurance-related documentation.

3.1.2.4 During the installation activity:

a. Preparing plans and procedures for the inspections, non-destructive examinations and tests (other than checkout, preoperational, hot functional and major modification tests and functional tests for the establishment of in-service baselines) for installed items;

b. Participating in the resolution of hardware and systematic nonconformances which are within jurisdiction of QA-PE&C and obtaining process corrective action.

3.1.2.5 During the checkout, preoperational, hot functional and major modification test activities:

a. Reviewing the Project Test Manual and concurring with its provisions as indicated by a concurrence signature;

b. Auditing the individual preoperational, hot functional and functional in-service baseline test procedures to assure:

(1) The preparation of procedures in compliance with the requirements of Regulatory Guides and CPCo procedures;

(2) The establishment of quality-related prerequisites for the performance of each test;

(3) The adequacy of the data collection format and content relative to the needs of the Quality Assurance Program regarding quality records.

c. Preparing procedures for the inspection, nondestructive examination and test verification of preventive and corrective maintenance activities.

3.1.2.6 Throughout all activities:

a. Assuring the maintenance and reporting of hardware design quality and corrective action status;

b. Maintaining and reporting hardware procurement quality and corrective action status;

c. Evaluating the implementation of the Quality Assurance Program and recommending improvements;

d. In accordance with Title 10 of the Code of Federal Regulations, Parts 21 and 50.55(e), making the determination as to the need to report any nonconformances and test deficiencies to the NRC and reporting them;

e. Issuing "Stop Work Orders" at any time that Quality Assurance Program commitments are violated if necessary to preclude a safety risk;

f. Performing quality audit, as requested.

3.1.3 The Inspection, Examination and Test Verification sections are responsible for:

3.1.3.1 During the procurement and installation activities, performing source, receiving, fabrication, assembly and installation inspections, nondestructive examinations and tests (within the QA-PE&C jurisdiction - other than checkouts, preoperational, hot functional and major modification tests and functional tests for the establishment of in-service baselines) and determining the acceptability or nonacceptability of hardware items;

3.1.3.2 During preoperational test activities, performing maintenance inspection, examination and tests (within the QA-PE&C jurisdiction).

3.1.3.3 During the installation activities, maintaining and reporting quality and corrective action status;

3.1.3.4 Prior to the performance of the checkout, preoperational, hot functional and major modification tests, and functional in-service baseline tests, directly verifying the accomplishment of quality-related construction prerequisites and signing off on each such prerequisite to signify:

a. That there has been a PMO turnover acceptance of the test unit(s);

b. That each nonconformance and deficiency, both pre-turnover and post-turnover, has been identified;

c. That each such nonconformance and deficiency has been adequately dispositioned.

3.1.3.5 At any time, prior to or during the performance of the checkout, preoperational, hot functional and major modification tests, and

functional in-service baseline tests, auditing compliance with other prerequisites, signifying the prerequisites actually audited by the application of a QA-PE&C signature for each such prerequisite.

3.1.3.6 During the performance of the checkout, preoperational, hot functional and major modification tests, and functional in-service baseline tests, evaluating compliance with test procedures on an audit and surveillance basis, signifying the test procedural steps actually audited and surveilled by the application of QA-PE&C signatures adjacent to those steps.

3.1.3.7 During the performance of checkout, preoperational, hot functional and major modification tests, participating as a member of the Test Work Group to assist in assuring that quality-related activities are being performed consistent with Testing Program Manual Requirements.

3.1.3.8 During the performance of the checkout, preoperational, hot functional and major modification tests, and functional baseline tests, contributing to the identification of plant quality status by transmitting QA-PE&C-originated NCRs to the Project Test Supervisor for their incorporation into the overall plant status accounting system.

3.1.3.9 Throughout the construction activities:

a. Issuing "Stop Work Orders" at any time that Quality Assurance Program commitments are violated if necessary to preclude a safety risk;

b. Making the determination as to the need to report any nonconformances and test deficiencies to the NRC;

c. Identifying inspection and examination problems and test problems within QA-PE&C's test jurisdiction, and causing their timely and adequate correction;

d. Assuring that nonconforming items are properly dispositioned.

e. Performing quality audit, as requested.

3.1.4 The Audit and Administration Section is responsible for:

3.1.4.1 Evaluating the adequacy of quality policies and procedures;

3.1.4.2 Evaluating the degree of compliance with quality policies and procedures;

3.1.4.3 Obtaining corrective action, as necessary, based on audit findings;

3.1.4.4 Performing departmental administrative functions, especially with regard to budgets, and other special assignments;

3.1.4.5 Providing quality assurance education, training and indoctrination;

3.1.4.6 Preparing, releasing and controlling inter and intra-departmental quality-related policies and procedures.

3.1.5 Project Management Organization (PMO)

Consumers Power has established a PMO to provide effective management of its large and complex construction projects. Although the PMO has primary responsibility for a specific project, it relies upon the corporate organization to provide personnel to the PMO and to perform certain other functions as needed. A typical PMO organization is shown in Figure 3. The Project Manager assigned to each nuclear plant project has overall responsibility for all activities related to design and construction of the plant except for defining and measuring the overall effectiveness of the Quality Assurance Program and for performing specific QA activities for Q-Listed items. These include cost and schedule control, obtaining appropriate licenses and permits, and coordinating the activities of the Architect-Engineer, Constructor, Nuclear Steam Supply System Supplier, other suppliers and the Projects, Engineering & Construction Departments. PMO personnel conduct their assigned activities in accordance with documented project policies and procedures. PMO is responsible for the implementation of checkout, preoperational and hot functional testing programs and for the evaluation of test results except for major modifications.

3.1.6 Generating Plant Modifications Department (GPMD)

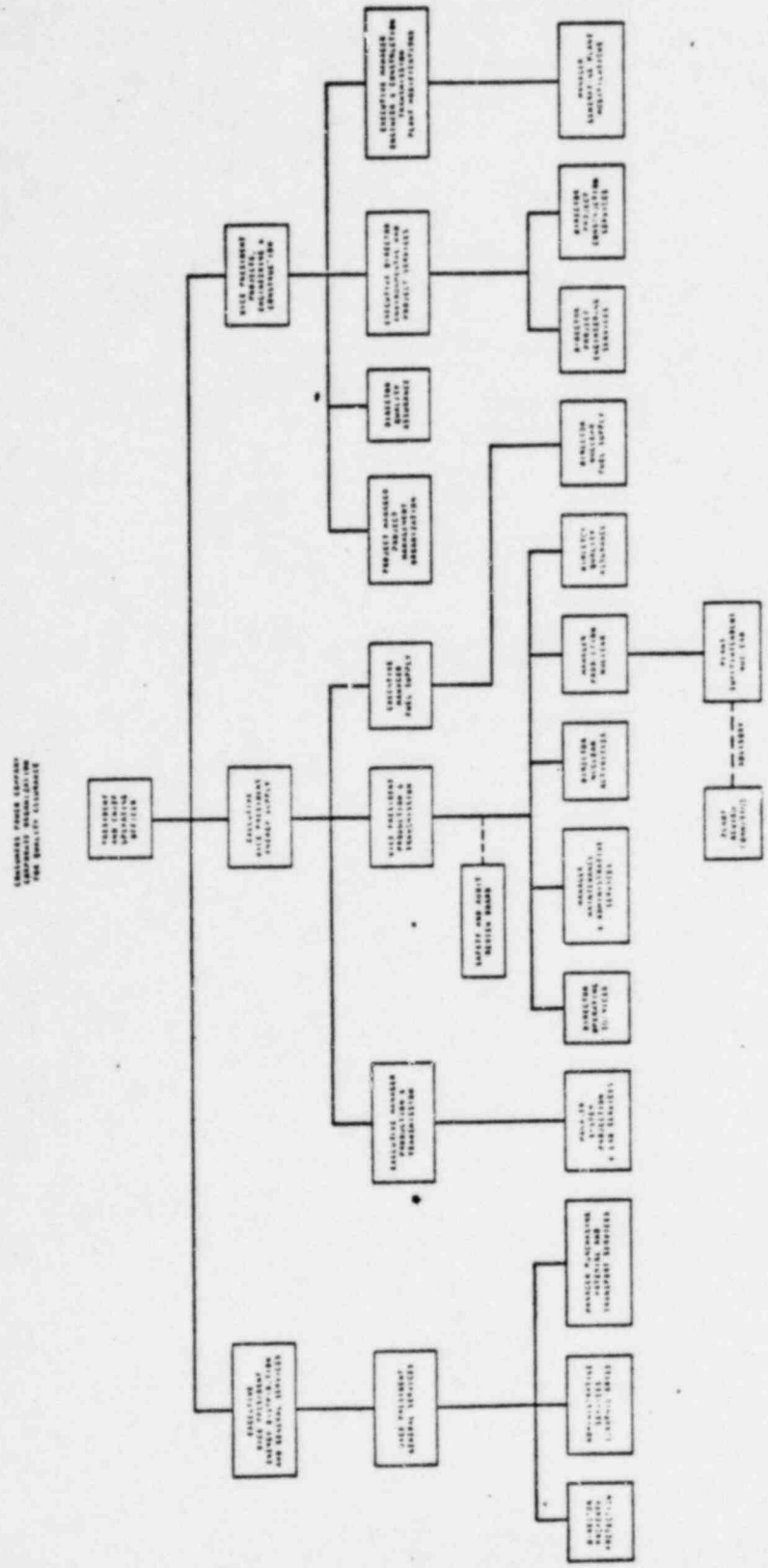
Minor modifications are the responsibility of Production & Transmission. Major modifications are the responsibility of the GPMD. The responsibilities of the department include design and construction for the required modifications. Figure 4 shows the department organization.

3.1.7 Environmental & Project Services

The Executive Director, Environmental & Project Services, is responsible for the following departments reporting to him:

3.1.7.1 Project Engineering Services Department (PESD)

PESD provides design review, procurement review, testing review, licensing assistance, and special technical services to the indi-



QUALITY ASSURANCE - PROJECTS, ENGINEERING AND CONSTRUCTION

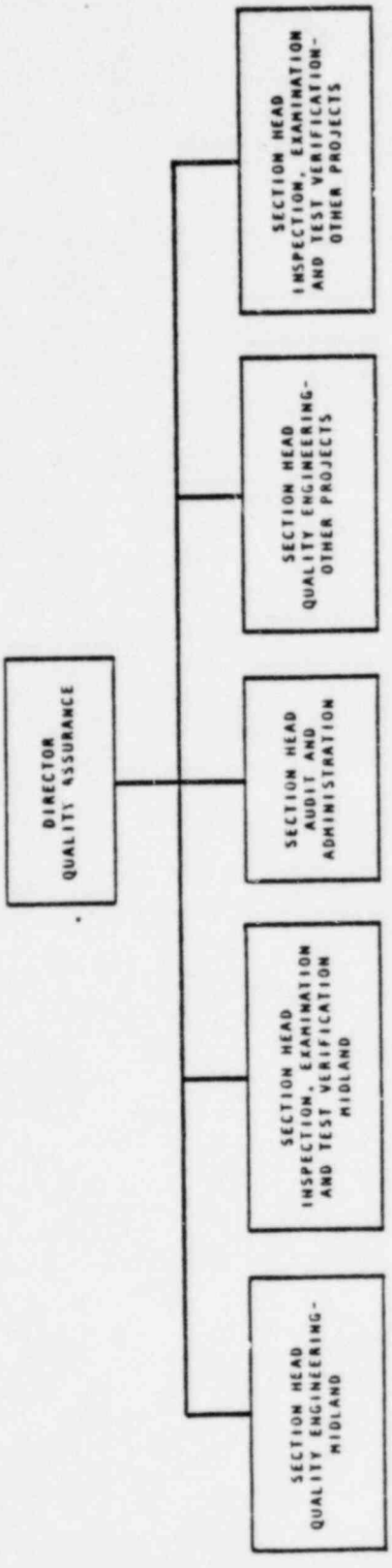
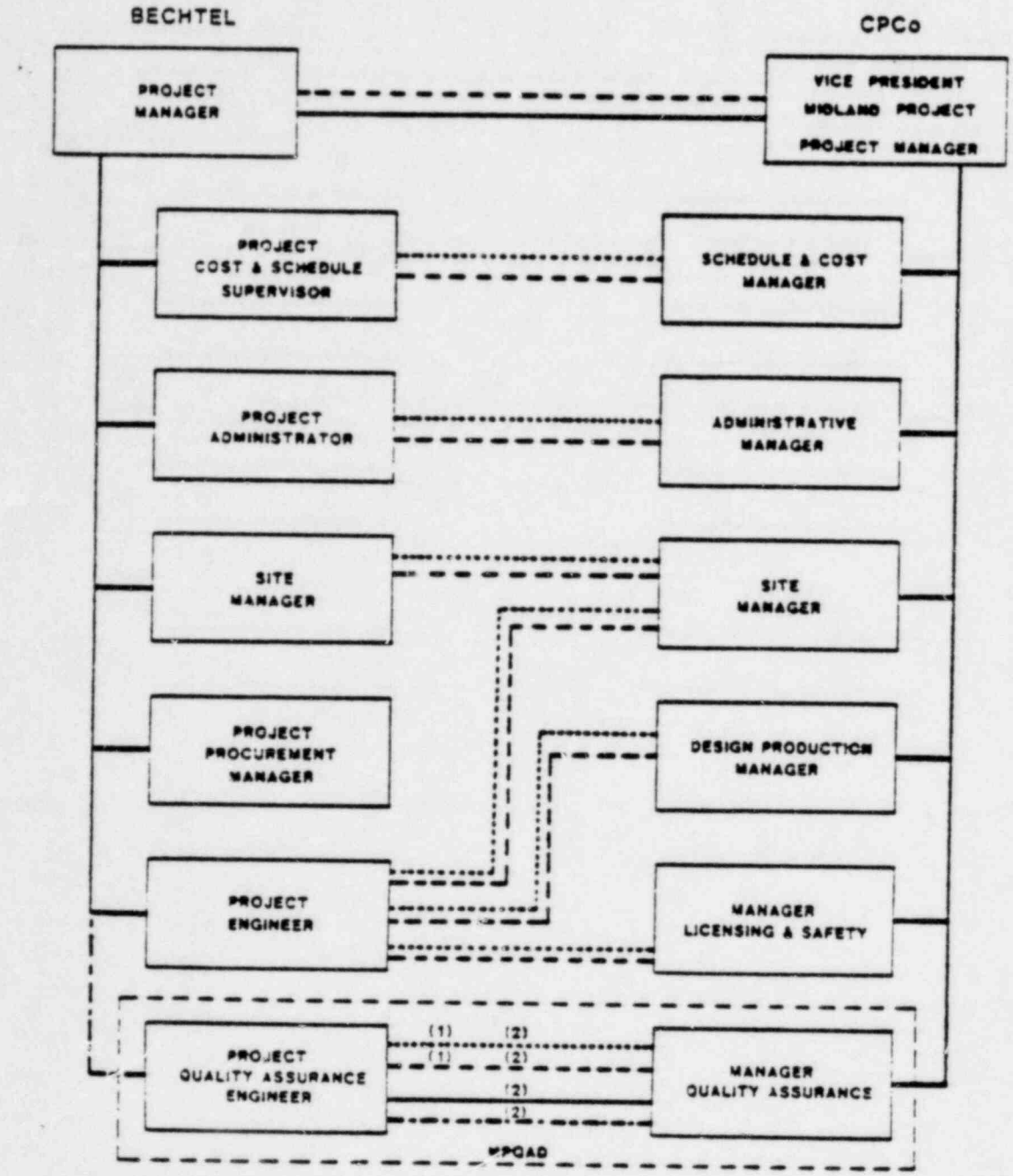


FIGURE 2

MIDLAND UNITS 1 AND 2

COMMUNICATION PATHS BETWEEN BECHTEL AND CPCo



LEGEND

- PROJECT DIRECTION
- COORDINATION CPCo BECHTEL
- WRITTEN COMMUNICATION
- QUALITY COORDINATION

(1) BECHTEL retains full QA responsibility for ASME code work.

(2) For integrated CPCo Midland Project QA Organization

00-0015-1006-4

MARGUGLIO EXHIBIT 2

Consumers Power

QUALITY ASSURANCE PROGRAM POLICY

ORGANIZATION

POLICY NO 1
PAGE 1 OF 44
REVISION 9
DATE 3/18/80

1.0 GENERAL

The President of Consumers Power is responsible for the safe and efficient operation of its nuclear power plants. Consumers Power Company retains responsibility for the Quality Assurance Program although it may delegate to its Principal Suppliers, the establishment and implementation of certain portions. Authority to develop and implement the Quality Assurance Program for Nuclear Power Plants is assigned by the President, for design and construction, to the Senior Vice President - Projects, Engineering and Construction; for operations, to the Executive Vice President - Energy Supply; and, for procurement, fire protection, security services and graphic arts, as requested, to the Executive Vice President - Energy Distribution and General Services.

Responsibility is further assigned by:

a. The Senior Vice President - Projects, Engineering and Construction -

(1) For the development and implementation of the Quality Assurance Program during the design and construction phase of the Midland Plant Project, during the Palisades Steam Generator Repair Project (SGRP), and during major modifications of existing nuclear plants, to the personnel reporting to him, as follows:

(a) Midland Project Office consisting of a Vice President - Midland Project assisted by a Midland Project Manager and reporting to the Midland Project Office:

Manager - Safety and Licensing
Manager - Design Production
Manager - Quality Assurance
Site Manager

(b) Executive Manager - Transmission, Plant Modifications & Project Services, and reporting to him:

Manager - Generating Plant Modifications
Manager - Electric Transmission Engineering and Construction
Director - Project Engineering Services
Project Engineer - Palisades Steam Generator Repair Project

(c) Director - Environmental Services, Quality Assurance and Testing and reporting to him:

Section Head - Quality Assurance Engineering & Inspection

Section Head - Quality Assurance Audit & Administration

Section Head - Testing

b. The Executive Vice President - Energy Supply -

(1) For the development and implementation of the Quality Assurance Program during the operations phase, to personnel reporting to him, as follows:

(a) Vice President - Nuclear Operations, and reporting to him, to the:

General Manager/Plant Superintendent

General Superintendent - Nuclear Operations

Director - Quality Assurance - Nuclear Operations

Director - Nuclear Activities

(2) For providing quality-related support during design and construction, operation, and modification phases, to personnel reporting to him, as follows:

(a) Vice President - Systems Operations and, reporting to him, to the:

Executive Manager - Production & Transmission and, reporting to him, to the:

Manager - System Protection and Laboratory Services

(b) Vice President - Fossil Operations and, reporting to him, to the:

Director - Operating Services

Director - Maintenance and Administrative Services

(c) Director - Management and Budget (Management Services)

(3) For nuclear fuel procurement to the:

(a) Vice President - Fuel Supply and, reporting to him, to the:

Director of Nuclear Fuel Supply

c. The Executive Vice President - Energy Distribution and General Services -

(1) For providing quality-related support during design and construction, operation, and modification phases, in the areas of procurement, property protection services and graphic arts, as requested, and to

personnel reporting to him, as follows:

(a) Vice President - General Services and reporting to him, to the:

Director - Purchasing

Director - Property Protection

Manager - Administrative Services (Graphic Services)

The organization relationship of these positions are shown in Figures 1, 2, 3 & 4.

2.0 BASIS DOCUMENTS

a. NRC 10CFR50, Appendix B, Criterion 1, "Organization"

b. ANSI N45.2, Criterion 3, "Organization"

c. ANSI N18.7

3.0 POLICY

3.1 PROJECTS, ENGINEERING & CONSTRUCTION ORGANIZATIONAL RESPONSIBILITIES DURING THE DESIGN AND CONSTRUCTION PHASE

3.1.1 Environmental Services, Quality Assurance and Testing

Environmental Services, Quality Assurance and Testing is responsible for setting quality assurance standards for design and construction consistent with CP Co objectives, and for assuring the establishment and implementation of quality policies and procedures to meet these standards. Environmental Services, Quality Assurance and Testing provides technical services in the area of testing to the individual PMO, GPM, and upon request, other Consumers Power Departments. These services are applied on a selective basis in accordance with established policies, plans and procedures. Environmental Services, Quality Assurance and Testing is also responsible for the development of testing programs during design, construction, the Palisades SGRP and major modifications and is responsible for the development and implementation of testing procedures during the Palisades SGRP and major modifications.

In performing their qa responsibilities, Environmental Services, Quality Assurance and Testing personnel have no responsibility for cost and scheduling; have the authority and organizational freedom to identify quality problems, initiate, recommend or provide corrective action and verify implementation of corrective action, and are independent from the individuals or groups performing the activities being inspected, tested or audited. Additional quality assurance-related activi-

ties, as given below, are assigned to Environmental Services, Quality Assurance and Testing for work performed either by CP Co or by Principal Suppliers, major subcontractors and sub-tier suppliers, or the activities may be delegated to a Principal Supplier's corresponding organization. The decision as to whether or not these activities are to be delegated shall be made with the mutual concurrence of both the PMO and Environmental Services, Quality Assurance and Testing. Nevertheless, Environmental Services, Quality Assurance and Testing retains authority and responsibility for these activities and for assuring their adequate and timely accomplishment. The objective of the assignment of authorities and responsibilities to Environmental Services, Quality Assurance and Testing is to yield a total Quality Assurance Program resulting in the attainment of a facility which is designed in accordance with its design basis criteria and which is constructed in accordance with its drawings and specification requirements.

Figure 5 depicts the Environmental Services, Quality Assurance and Testing organization. Figures 8 & 9, depict the Section organizations.

Within Environmental Services, Quality Assurance and Testing, there are three Sections - namely: Quality Assurance Engineering & Inspection, Quality Assurance Audit & Administration and Testing. Following is a discussion of the responsibilities of each of these Sections.

3.1.1.1 Quality Assurance Engineering and Inspection Section

The Quality Assurance Engineering and Inspection Section is responsible for:

a. During the design concept activity:
   (1) Preparing the Project Quality Assurance Plan and assuring the Plan's timely issuance with the mutual concurrence of the organizations involved;

b. During the design activity:
   (1) Participating in the establishment of the Design Plan by establishing the quality assurance aspects of the Plan;
   (2) Participating, as specified by the Design Plan;

(3) Assuring the maintenance and reporting of hardware design quality and corrective action status.

c. During the hardware and services procurement activities:

(1) Establishing supplier quality assurance requirements;

(2) Performing pre-award supplier evaluations for quality assurance and quality control activities;

(3) Preparing and implementing plans and procedures for procured item inspections, nondestructive examinations and tests (within the Section's jurisdiction);

(4) Evaluating and, when necessary, approving supplier quality assurance-related documentation;

(5) Determining the acceptability or nonacceptability of hardware items;

(6) Maintaining and reporting hardware procurement quality and corrective action status.

d. During the installation and construction activity:

(1) Preparing and implementing plans and procedures for the inspections, nondestructive examinations and tests (other than checkout and major modification tests and functional tests for the establishment of in-service baseline) for installed items and determining the acceptability or nonacceptability of the items;

(2) Identifying inspection and examination problems and test problems (within the Section's test jurisdiction), and causing their timely and adequate correction;

(3) Participating in the resolution of hardware and systematic nonconformances (which are within the jurisdiction of the Section) and obtaining process corrective action;

(4) Assuring that nonconforming items are properly dispositioned;

(5) Maintaining and reporting quality and corrective action status.

e. Prior to the performance of preoperational, hot functional and functional in-service baseline tests, directly verifying the accomplishment of quality-related construction prerequisites and signing off on each such prerequisite to signify:

(1) That there has been a turnover acceptance of the test unit(s);

(2) That each nonconformance and deficiency, both pre-turnover and post-turnover, has been identified;

(3) That each such nonconformance and deficiency has been adequately dispositioned;

(4) Contributing to the identification of plant quality status by transmitting Quality Assurance Engineering and Inspection-originated NCRs to the Project Test Supervisor or Superintendent for their incorporation into the overall plant status accounting system;

(5) Assuring the maintenance and reporting of test quality and corrective action status.

f. During the checkout, preoperational test, hot functional test and functional in-service baseline test activities for the Palisades Steam Generator Repair Project and major modifications:

(1) Reviewing the Project Testing Program Manual with respect to compliance with the Quality Assurance Program and annotating satisfactory completion of such review by a concurrence signature;

(2) Auditing the individual preoperational, hot functional and functional in-service baseline test procedures to assure:

(a) The preparation of procedures in compliance with the requirements of 10CFR50, Appendix B, ANSI N45.2, quality assurance-related Regulatory Guides, codes and standards, and CP Co procedures;

(b) The establishment of quality-related prerequisites for the performance of each test;

(c) The adequacy of the data collection format and content relative to the needs of the Quality Assurance Program regarding quality records.

(3) Preparing and implementing procedures for the inspection, nondestructive examination, tests(within the Section's test jurisdiction) and test verification for preventive and corrective maintenance activities;

g. At any time, prior to or during the performance of the preoperational, hot functional, major modification and Palisades SGRP tests, and other prerequisites, signifying the prerequisites actually audited by the application of a QAE&I signature for each such prerequisite.

h. During the performance of the checkout, preoperational, hot functional, major modification and Palisades SGRP tests, and functional in-service baseline tests, evaluating compliance with test procedures on an audit and surveillance basis, signifying the test procedural steps actually audited and surveilled by the application of QAE&I signatures adjacent to those steps.

i. Throughout all activities:

(1) Evaluating the implementation of the Quality Assurance Program and recommending improvements;

(2) Issuing "Stop Work Order" at any time that Quality Assurance Program commitments are violated if necessary to preclude a safety risk;

(3) Performing quality audit, as requested.

3.1.1.2 Quality Assurance Audit and Administration Section

The Quality Assurance Audit and Administration Section is responsible for:

a. Evaluating the adequacy of quality policies and procedures;

b. Evaluating the degree of compliance with quality policies and procedures;

c. Obtaining corrective action, as necessary, based on audit findings;

NOTE: Items a, b, and c, above, apply to primary suppliers as well as to "in-house" activities.

d. Performing departmental administrative functions, especially with regard to budgets, and other special assignments;

e. Providing quality assurance education, training and indoctrination;

f. Preparing, releasing and controlling inter and intra-departmental quality-related policies and procedures;

g. Issuing "Stop Work Orders" at any time that Quality Assurance Program commitments are violated, if necessary to preclude a safety risk.

3.1.1.3 Testing Section

The Testing Section is responsible for:

a. Preparation of Project Testing Program Manuals for checkout, preoperational, hot functional, Palisades SGRP and major modification testing prior to the implementation phase;

b. Providing for the preparation, review and approval of test procedures in support of the activities cited in (a) above;

c. Training and certifying qualified personnel and assembling other resources necessary to implement testing programs;

d. Implementing the Palisades SGRP and CPMD Testing Program;

e. Coordinating and providing the evaluation of test results.

3.1.2 Midland Project Management Organization

Consumers Power has established a Project Management Organization to provide effective management of the Midland Nuclear Plant Project. The Midland Project Management Organization is shown in Figure 6. The Project Management Organization is headed by a Project Management Office consisting of the Vice President - Midland Project assisted by the Midland Project Manager. The Midland Project Office has overall responsibility for all activities related to design, procurement and construction of the Midland Plant including design, obtaining appropriate licenses and permits, procurement, construction, preoperational and hot functional testing, quality assurance, cost, and schedule. These responsibilities include coordination

of the activities between the Architect-Engineer, Constructor, Nuclear Steam Supply System Supplier, and other suppliers and Consumers Power Company Departments. Within the Project Management Organization, Consumers Power overall design activities rest with the Design Production Manager; licensing activities with the Manager of Safety and Licensing; construction, preoperational and hot functional testing with the Site Manager; cost and schedule activities with the Schedule and Cost Manager; and quality assurance activities for the Midland Project with the Manager of Quality Assurance. The responsibility for overall quality assurance policy rests with the Director - Environmental Services, Quality Assurance and Testing. In performing their duties, Midland Project Quality Assurance personnel have no responsibility for cost and scheduling; have the authority and organizational freedom to identify quality problems, initiate, recommend or provide corrective action and to verify implementation of corrective action; and are independent from the individuals or groups performing the activities being verified, inspected, tested or audited. The Midland Project Quality Assurance Department retains authority and responsibility for quality assurance activities on the Midland Project. The Midland Project Quality Assurance Department receives direction with regard to overall quality assurance policy from the Director - Environmental Services, Quality Assurance and Testing. The Quality Assurance Audit & Administration Section of Environmental Services, Quality Assurance & Testing performs quality audits during the Midland Project in accordance with Section 3.1.1.2 of Policy 1. Following is a discussion of the responsibilities of the Midland Project Quality Assurance Department. Quality Assurance activities may be carried out solely by the Consumers Power Company Midland Project Quality Assurance Department or in combination with or delegation to a principal supplier's corresponding Quality organization.

3.1.2.1 Midland Project Quality Assurance Department

The Midland Project Quality Assurance Department is responsible for

a. During the design activity:

(1) Assuring that appropriate quality assurance standards are applied to the design process;

(2) Assuring that the design process is conducted in accordance with approved procedures;

(3) Assuring the maintenance and reporting of hardware design quality and corrective action status.

b. During the hardware and services procurement activities:

(1) Establishing supplier quality assurance requirements;

(2) Performing pre-award supplier evaluations for quality assurance and quality control activities;

(3) Preparing and implementing plans and procedures for procured item inspections, nondestructive examinations and tests (within the Department's jurisdiction);

(4) Evaluating and, when necessary, approving supplier quality assurance-related documentation;

(5) Determining the acceptability or nonacceptability of hardware items;

(6) Maintaining and reporting hardware procurement quality and corrective action status.

c. During the installation and construction activity:

(1) Preparing and implementing plans and procedures for the inspections, nondestructive examinations and tests (other than checkout and major modification tests and functional tests for the establishment of in-service baselines) for installed items and determining the acceptability or nonacceptability of the items;

(2) Identifying inspection and examination problems and test problems (within the Department's test jurisdiction), and causing their timely and adequate correction;

(3) Participating in the resolution of hardware and systematic nonconformances (which are within the jurisdiction of the Department) and obtaining process corrective action;

(4) Assuring that nonconforming items are properly dispositioned;

(5) Maintaining and reporting quality and corrective action status;

(6) Assuring the effectiveness of primary quality control activities and the conformance of all construction and installation activities to the established Program Procedures through audit and overinspection.

d. Prior to the performance of preoperational, hot functional and functional in-service baseline tests, directly verifying the accomplishment of quality-related construction prerequisites and signing off on each such prerequisite to signify:

(1) That there has been a turnover acceptance of the test unit(s);

(2) That each nonconformance and deficiency, both pre-turnover and post-turnover, has been identified;

(3) That each such nonconformance and deficiency has been adequately dispositioned;

(4) Contributing to the identification of plant quality status by transmitting Midland Quality Assurance Department-originated NCRs to the Project Test Superintendent for their incorporation into the overall plant status accounting system;

(5) Assuring the maintenance and reporting of test quality and corrective action status.

e. During the checkout, preoperational test, hot functional test and functional in-service baseline test activities:

(1) Reviewing the Project Testing Program Manual with respect to compliance with the Quality Assurance Program and annotating satisfactory completion of such review by a concurrence signature;

(2) Auditing the individual preoperational, hot functional and functional in-service baseline test procedures to assure:

(a) The preparation of procedures in compliance with the requirements of 10CFR50, Appendix B, ANSI N45.2,

quality assurance-related Regulatory Guides, codes and standards, and CP Co procedures;

(b) The establishment of quality-related prerequisites for the performance of each test;

(c) The adequacy of the data collection format and content relative to the needs of the Quality Assurance Program regarding quality records.

(3) Preparing and implementing procedures for the inspection, nondestructive examination, tests (within the Department's test jurisdiction) and test verification for preventive and corrective maintenance activities;

(4) Reviewing Corrective Action Requests for adequacy of disposition and need for further quality statusing or additional part or process corrective action.

f. At any time, prior to or during the performance of the pre-operational and hot functional tests and other prerequisites, signifying the prerequisites actually audited by the application of a Midland QA Department signature for each such prerequisite.

g. During the performance of the checkout and preoperational and hot functional tests, and functional in-service baseline tests, evaluating compliance with test procedures on an audit and surveillance basis, signifying the test procedural steps actually audited and surveilled by the application of Midland QA Department signatures adjacent to those steps.

h. Throughout all activities:

(1) Evaluating the implementation of the Quality Assurance Program and recommending improvements;

(2) Issuing "Stop Work Order" at any time that Quality Assurance Program commitments are violated if necessary to preclude a safety risk;

(3) Performing quality audit, as requested;

(4) Maintaining a trend program to identify adverse repetitive quality conditions;

(5) Maintaining a tracking program to assure all quality-

related action items from NRC inspections, 50.55(e) items, etc are scheduled and completed;

(6) In accordance with Title 10 of the Code of Federal Regulations, Part 21 and 50.55(e), making the determination as to the need to report any nonconformances and test deficiencies to the NRC and reporting them;

(7) Reviewing and concurring with other Departmental Program Procedures (Midland Specific) which are quality related;

(8) Participating in problem resolution to assure that part and process corrective action are appropriate and are implemented in a timely manner;

(9) Preparing responses to NRC Construction I&E Reports;

(10) Preparing 50.55(e) reports.

3.1.3 Transmission, Plant Modifications and Project Services Department

The Executive Manager, Transmission, Plant Modifications and Project Services Department is responsible for the following departments reporting to him: Figure 7 depicts the organization.

3.1.3.1 Generating Plant Modifications Department (GPMD)

Minor modifications are the responsibility of Nuclear Operations. Major modifications are the responsibility of GPMD, except where a separate PMO has been established to manage a specific project. The responsibilities of the department include design and construction for the required modifications. Figure 10 shows the department organization.

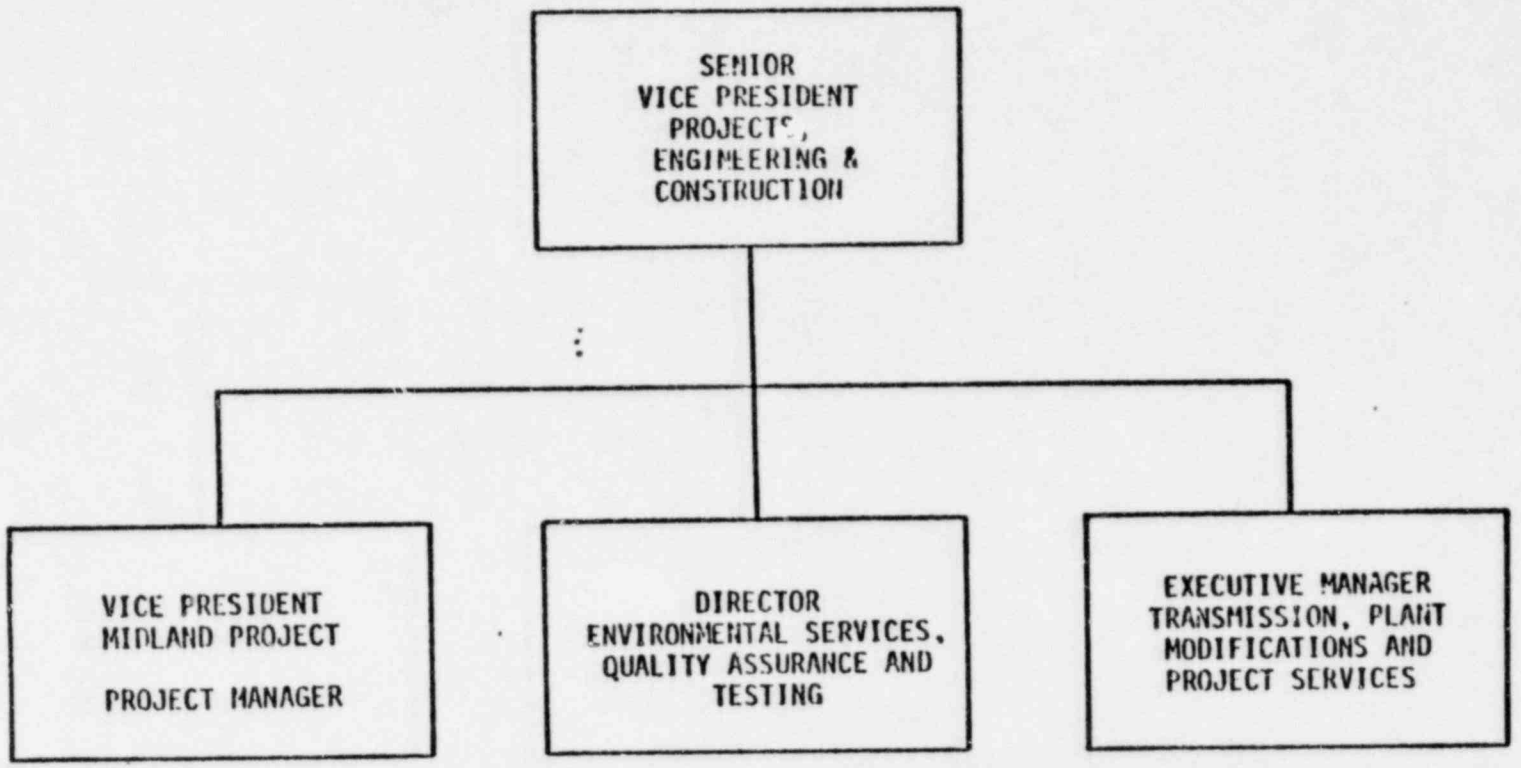
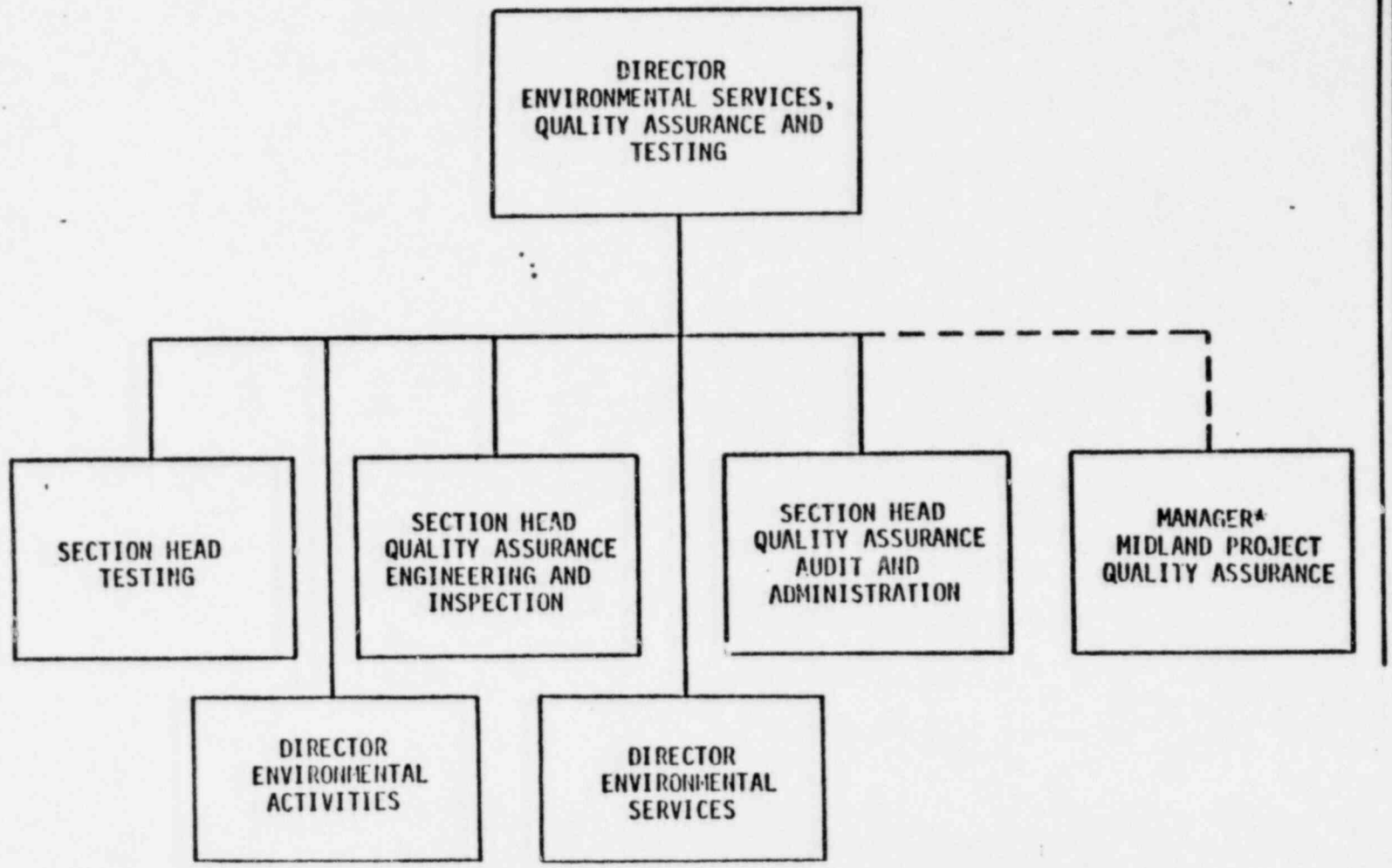


FIGURE 4 - PROJECTS, ENGINEERING AND CONSTRUCTION ORGANIZATION



*FOR OVERALL QUALITY ASSURANCE POLICY DIRECTION ONLY.

FIGURE 5 - ENVIRONMENTAL SERVICES, QUALITY ASSURANCE AND TESTING.

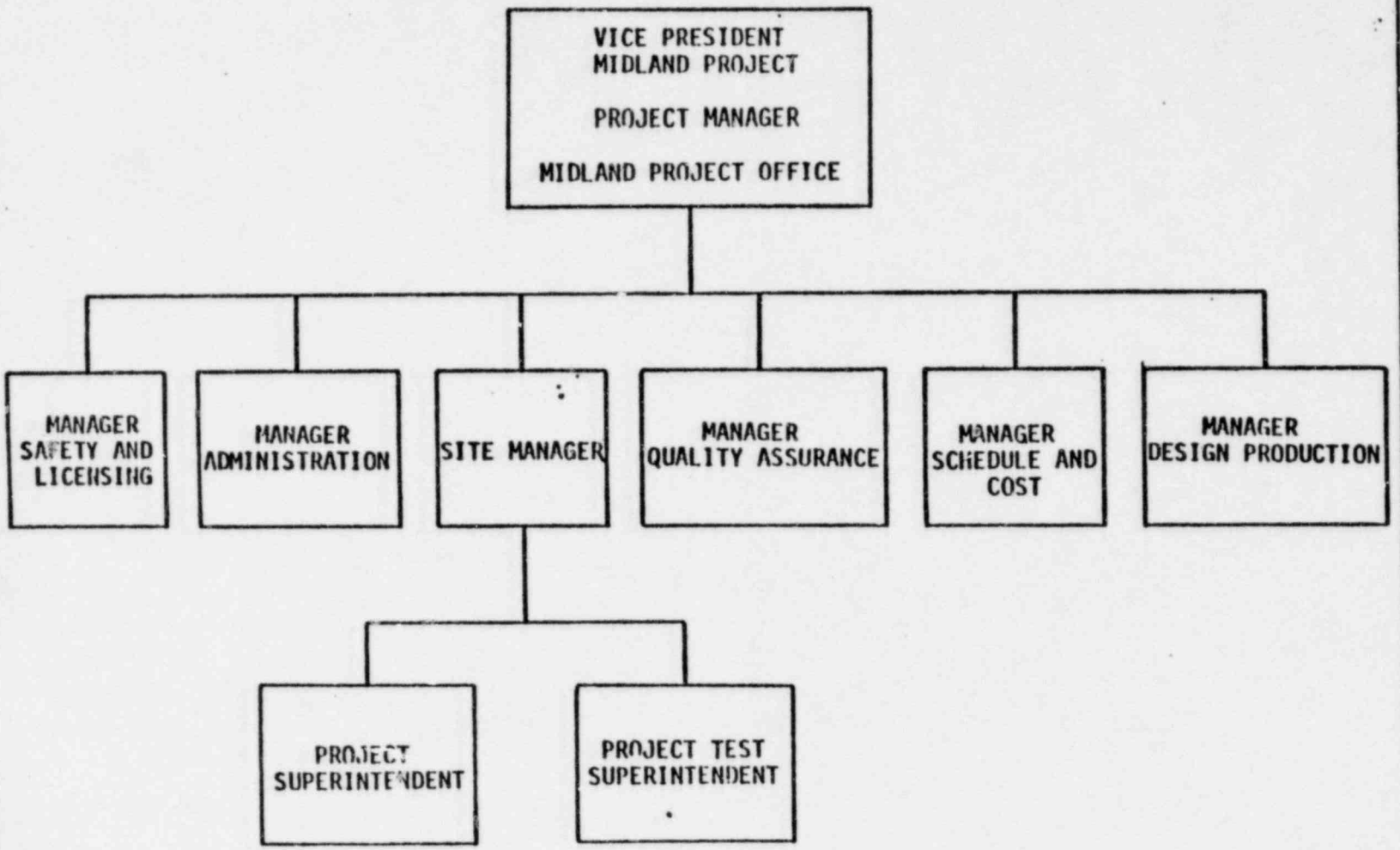
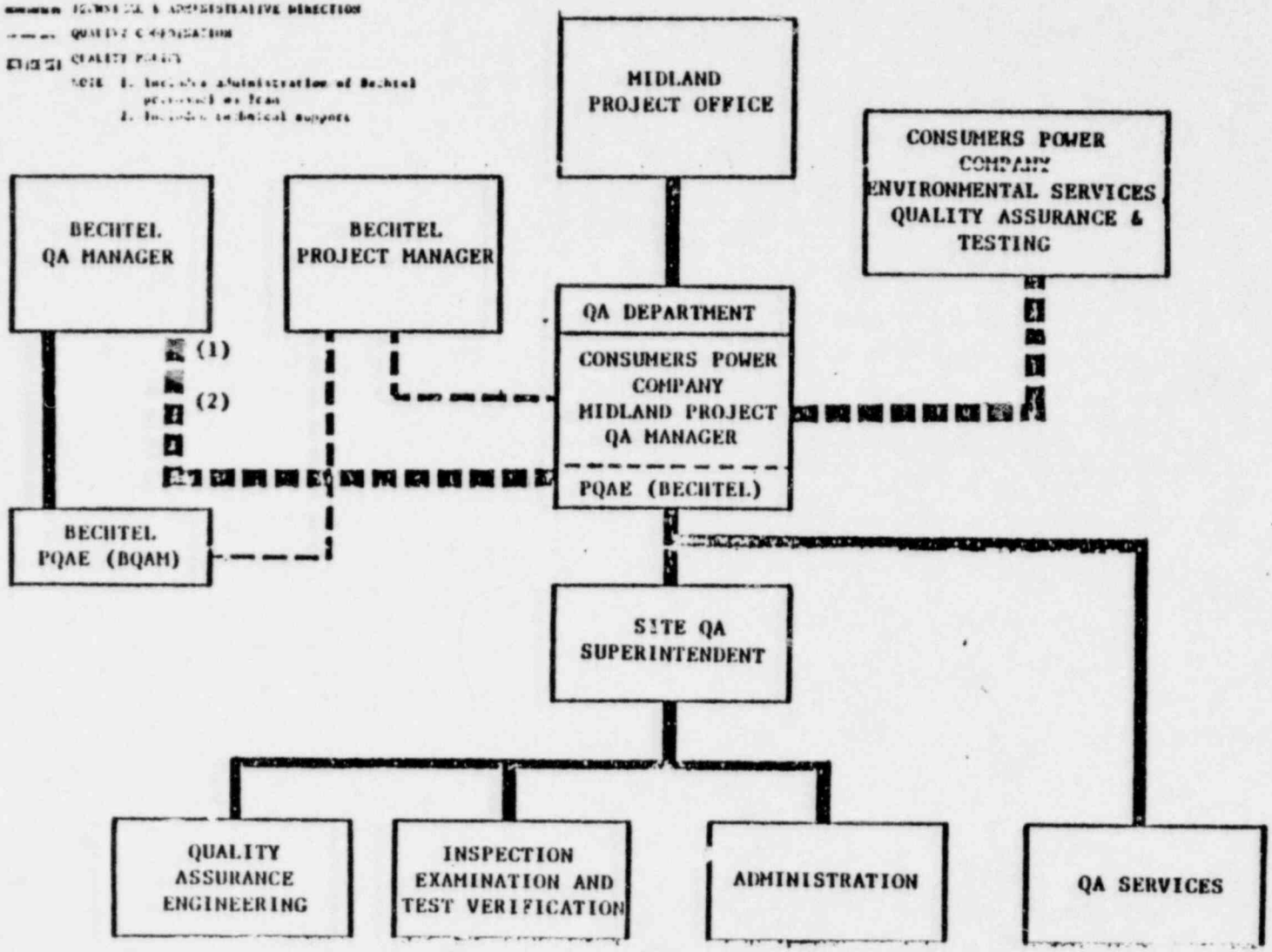


FIGURE 6 - MIDLAND PROJECT MANAGEMENT ORGANIZATION.

MIDLAND PROJECT
QUALITY ASSURANCE ORGANIZATION



Consumers Power Company

MIDLAND PROJECT
QUALITY ASSURANCE
DEPARTMENT PROCEDURE

CP CO - BECHTEL INTEGRATED QA ORGANIZATION

ATTACHMENT A

Proc No A-1M Supplement
Page 1 of 1
Revision 0
Date 8/15/80

EXHIBIT A
Page 6 of 7

C-1

MARGUGLIO EXHIBIT 4

Consumers Power

QUALITY ASSURANCE PROGRAM PROCEDURE FOR DESIGN AND CONSTRUCTION

AUDITS

PROC NO 18-1
PAGE 1 OF 3
REVISION 3
DATE 2/28/77

1.0 PURPOSE

To define responsibilities and establish a standard method for performing quality assurance audits.

2.0 SCOPE

This procedure applies to quality assurance audits of Consumers Power Company (CPCo) departments and principal suppliers during the design, construction, preoperational and hot functional phases, and major modifications. CPCo departments within the scope of this procedure:

a. Project Management Organization (PMO)
b. Generating Plant Modifications Department (GPMD)
c. Project Engineering Services Department (PESD)
d. Project Construction Services Department (PCSD)
e. Project Quality Assurance Services Department (PQASD)
f. System Protection and Laboratory Services (SP&LS)
g. Purchasing Department (PD)
h. Document Control Center (DCC) Section, Maintenance & Administrative Services (MAS)
i. Graphic Services (GS) Section, Administrative Services (AS)

3.0 DEFINITIONS

See "List of Definitions," Volume I

4.0 REFERENCE DOCUMENTS

a. Quality Assurance Policy 18, Audits
b. ANSI N45.2, Criterion 19, Audits
c. ANSI N45.2.12, Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants

5.0 PROCEDURE

5.1 PROCEDURE CONTROL

The Director, PQASD is responsible for the control and management of CPCo department and principal supplier audits and is responsible for the preparation of department procedures for auditing with, at least, the following requirements:

a. Audits are performed using written procedures or checklists and are conducted by trained personnel.

b. Audits are performed in accordance with ANSI N45.2.12.

c. Audits include the objective evaluation of:

   1) procedures
   2) practices
   3) instructions
   4) effectiveness of implementation
   5) work areas
   6) activities
   7) processes
   8) items
   9) review of documents and records

d. Audits are scheduled on the basis of status and safety importance of the activities being performed.

e. Audits are conducted on a regularly scheduled basis or at least once within the life of a contract with principal suppliers.

f. Audit results are documented and reviewed with the management heads responsible for the activity audited.

g. Deficient areas are reaudited to verify implementation of required corrective action if deemed necessary.

h. The PQASD and principal suppliers audit interface when it is necessary to audit the principal suppliers sub-tier supplier's quality assurance program.

i. The distribution of the audit report is to include the management head of the activity audited and for major modifications, the Safety and Audit Review Board (SARB).

j. The PQASD and other CPCo QA personnel or procured QA personnel services interface for joint audits.

5.4 AUDIT FOLLOW-UP

The department heads of audit activities respond to all Nonconformance Reports connected with an audit within thirty days after receipt of the Audit Report and the Nonconformance Report. The responses are forwarded to the Director, PQASD or the Director of the lead Quality Assurance department for joint audits.

5.5 CORPORATE AUDITS

The Corporate Audit is conducted, at least once every 24 months, to verify that the requirements identified in the Nuclear Quality Assurance Program Manual for Nuclear Power Plants are being implemented by the responsible CPCo management.

The Director, PQASD is responsible for coordinating the scheduling of Corporate Audits with the Director, QA-P&T. The results of Corporate Audits are reported to CPCo management in accordance with QAPP 19-1, Quality Assurance Program Review.

Approved: _____ 2/24/77
Executive Director,
Environmental and Project Services

Approved: _____ 2/24/77
Manager, PMO

Approved: _____ 2/22/77
Executive Manager,
Engineering and Construction -
Transmission & Plant Modifications

Approved: _____ 2/22/77
Manager, Maintenance and
Administrative Services

Approved: _____ 2/2/77
Director, PQASD

Approved: _____ 2/24/77
Manager, Purchasing, Material
and Transportation Services

Approved: _____ 2/22/77
Manager, Administrative Services

Approved: _____ 2/24/77
Manager, SP&LS

Approved: _____ 2/22/77
Director, QA-P&T

1.0 PURPOSE

To establish the requirements, responsibilities and methods for the performance of Audits.

2.0 SCOPE

This Procedure applies only to Audits for which a Quality Assurance - Projects, Engineering and Construction (QA-PE&C) representative acts as the Audit Team Leader.

3.0 REFERENCE DOCUMENTS

3.1 ANSI N45.2.12, "Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants."

3.2 Quality Assurance Program Policy 18, "Audits."

4.0 REQUIREMENTS, RESPONSIBILITIES & METHODS

This section is organized in accordance with the following sequential steps in the Audit process:

a. Selecting and scheduling Audits.

b. Planning Audits.

c. Performing Audits.

d. Reporting Audit results.

e. Following up on Corrective Action.

f. Records.

4.1 SELECTING AND SCHEDULING AUDITS

4.1.1 QA-PE&C:

4.1.1.1 Selects subjects for Audit.

4.1.1.2 Schedules Audits. As a minimum, Audits of the following activities are conducted at least annually:

a. Activities being performed by the Document Control Center* (DCC), the Engineering Records Center* (ERC), Graphic Services,* the Generating Plant Modifications Department (GPMD), the Project Engineering Services Department (PESD), the Project Management Organization

(PMO), the Preoperational Testing Section, the Purchasing Department* (PD), the Quality Assurance Department (QA-PE&C), and the System Protection and Laboratory Services Department* (SP&LS) at the General Office (with the recognition that Audits of the asterisked organizations may be made jointly with QA-Nuclear Operations).

b. Activities at new Plant sites being performed by the organizations listed in (a), above, except that none are made jointly with QA-Nuclear Operations.

c. Activities being performed by each architect-engineer, NSSS Supplier and principal construction Contractor at their home offices in support of new plant Projects.

d. Activities being performed by each architect-engineer, NSSS Supplier and principal construction Contractor at sites of new Plants under construction.

e. For Major Modifications, activities being performed, at the site or at the home office, by at least one architect-engineer, one major Equipment Supplier, one principal construction Contractor, and CP Co.

f. Activities being performed at facilities for any ten Principal Suppliers or major subtier Suppliers (with the recognition that credit may be taken for Audits of subtier Suppliers performed jointly with Principal Suppliers or with an ASME Survey Team).

4.1.1.3 Schedules Audits in conjunction with other department supervisors when their personnel are being requested to participate as part of the Audit team.

4.1.1.4 Two weeks prior to the end of each quarter, distributes the Audit schedule for the forthcoming quarter to the affected department heads, to the Executive Managers and Directors. As a minimum, the Audit schedule identifies the scope of each Audit, the organizations involved, the locations involved (GO, site, or supplier facilities) and the Audit dates.

4.1.1.5 Revises the Audit schedule and distributes any such revisions to those who received the original schedule.

4.1.2 Other departments:

4.1.2.1 When requested and, as appropriate, commit personnel to participate in an Audit as technical specialists (not requiring Certification).

4.1.2.2 May request adjustments to the Audit schedule, as appropriate.

4.2 PLANNING AUDITS

4.2.1 QA-PE&C:

4.2.1.1 Selects an Audit Team Leader and other members of the Audit team. Members of the Audit team are organizationally independent of the activity and area to be Audited.

4.2.1.2 Prepares an Audit Plan and distributes it to the Audit team members.

4.2.1.3 Briefs the Audit team members on the Audit Plan.

4.2.2 Audit team members committed from other than QA-PE&C participate, as requested, in the preparation of the Audit Plan and in the Audit Plan briefing session.

4.3 PERFORMING AUDITS

4.3.1 The Audit Team Leader, with the participation of the Audit team members:

4.3.1.1 Schedules and conducts an entrance meeting, the purpose of which is to confirm the Audit scope, present the Audit Plan, introduce the Audit team, establish channels of communication and discuss additional elements of the Audit.

4.3.1.2 Assures the performance of the Audit in accordance with the Audit Plan (including the established data collection methods) and checklists. The Audit checklists do not restrict the Audit when further investigation is required.

4.3.1.3 Assures that conditions requiring immediate Corrective Action are reported on a timely basis to the appropriate managers.

4.3.2 Appropriate supervisors and managers of the organization and function being Audited:

4.3.2.1 Participate in the entrance meeting, as scheduled.

4.3.2.2 Provide factual data in their areas of responsibility, as requested by any Audit team member.

4.4 REPORTING AUDIT RESULTS

4.4.1 Audit team members, under the direction of the Audit Team Leader:

4.4.1.1 Notify the responsible individual prior to the exit meeting to try to obtain his agreement as to the facts underlying the finding.

4.4.1.2 Document Audit Findings on the Audit Finding Report form, a Guideline of which is provided in Attachment A.

4.4.2 The Audit Team Leader, with the participation of the Audit team members and the appropriate line and functional supervisors and managers:

4.4.2.1 Schedules an exit meeting, the purpose of which is to review the Audit Findings and Audit Observations for validity and clarity, and to provide an opportunity for line and functional management to give a Corrective Action commitment relative to the Audit Findings for incorporation into the AFR or Audit Report. (A guideline of the Audit Report form is shown in Attachment B.)

4.4.2.2 Conducts the exit meeting.

4.4.2.3 Within three weeks after the exit meeting, publishes the Audit Report (including the AFRs) and distributes it in accordance with Attachment C.

4.4.2.4 Upon receipt of the Corrective Action commitment, on a timely basis, advises the line and functional supervisor or manager, as appropriate, of the adequacy of the commitment.

4.4.3 Line and functional supervisors and managers, as appropriate, who are affected by any Audit Findings or who are responsible for Corrective Action:

4.4.3.1 Attend the exit meeting.

4.4.3.2 Prior to the publication of the Audit Report, provide Corrective Action commitments, if desired. Each commitment clearly states the Corrective Action to be taken to preclude recurrence (if required), the name of the individual responsible for taking the Corrective Action, the date that the Corrective Action will be implemented, and the date by which it will be effective, if applicable.

4.4.3.3 Within 30 days after the issuance of the Audit Report, provide a written Corrective Action commitment for each AFR to the Audit Team Leader, if the commitment has not been given previously. (A Corrective Action commitment is not required in response to an Audit Observation.)

4.4.3.4 Implement the Corrective Action as committed and notify the Audit Team Leader to that effect.

4.5 FOLLOWING UP ON CORRECTIVE ACTION

4.5.1 The Audit Team Leader follows up to assure the receipt of a Corrective Action commitment and to evaluate its adequacy and effective implementation. QA-PE&C performs reaudits, as necessary, to Verify the implementation of Corrective Action. Upon such Verification, QA-PE&C closes out the AFR and distributes it to the same persons to whom the original AFR was distributed.

4.6 RECORDS

4.6.1 QA-PE&C retains a copy, as a Quality Record, of each of the following documents: Audit Plans; Audit Reports; final AFRs.

Director, Quality Assurance - Projects, Engineering & Construction

Executive Manager, Engineering & Construction - Transmission & Plant Modifications 11/15/79

Manager, Project Management Organization 11/14/79

Executive Director, Environmental & Project Services 11/9/79

Director, Purchasing 11/13/79

Manager, System Protection & Laboratory Services 11-19-79

Director, Energy Supply - Management & Budget 11/9/79

Manager, Maintenance & Administrative Services 11/8/79

Reviewed by:

Director, Quality Assurance - Nuclear Operations 11/15/79

Consumers Power	VOLUME II QUALITY ASSURANCE PROGRAM PROCEDURE FOR DESIGN AND CONSTRUCTION AUDIT	PROC NO 18-1 PAGE 7 OF 12 REVISION 4 DATE 1/1/80

Consumers Power Company
QA31-1

PROJECTS, ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT

AUDIT FINDING REPORT

"AS IS" CONDITION VERSUS "AS REQUIRED" / "AS SPECIFIED" CONDITION WITH REFERENCES:

AFR [illegible] NO:

[illegible] AUDITED:

DATE OF [illegible]:

FILE [illegible]:

[illegible]:

[illegible] CORRECTIVE ACTION:

CORRECTIVE ACTION COMMITMENT:

DATE OF C/A COMPLETION:

DATE OF C/A EFFECTIVENESS:

ORG. RESP FOR C/A:

[illegible] C/A COMMITMENT:

[illegible] OF VERIFICATION:

[illegible] YES ☐ NO ☐

IF "YES", DATE OF REPORT TO NRC:

IF "YES", TIME OF REPORT TO NRC:

IF "YES", NAME OF NRC OFFICIAL TO WHOM REPORTED:

IF "YES", WHO MADE REPORT:

[illegible] SIGNATURE:

SUPERVISOR'S SIGNATURE:

C/A VERIFICATION SIGNATURE:

VERIFICATION DATE:

Consumers Power

VOLUME II

QUALITY ASSURANCE PROGRAM PROCEDURE

FOR DESIGN AND CONSTRUCTION

AUDIT

PROC NO 18-1

PAGE 8 OF 12

REVISION 4

DATE 1/1/80

Consumers Power Company

AUDIT FINDING REPORT

PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT

Consumers Power

VOLUME II

QUALITY ASSURANCE PROGRAM PROCEDURE
FOR DESIGN AND CONSTRUCTION

AUDIT

PROC NO 18-1
PAGE 9 OF 12
REVISION 4
DATE 1/1/80

Consumers Power Company
CA23-0

AUDIT REPORT

PROJECTS, ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT

PAGE ___ OF ___

AUTHORIZED BY:	AUDIT NO:
	TYPE AUDIT:
	DATE OF AUDIT:
	ORGANIZATION AUDITED:

LEAD AUDITOR/DATE:	APPROVED BY/DATE:	PLANT & LOCATION:

Consumers Power

VOLUME II

QUALITY ASSURANCE PROGRAM PROCEDURE
FOR DESIGN AND CONSTRUCTION

AUDIT

PROC NO 18-1
PAGE 10 OF 12
REVISION 4
DATE 1/1/80

Consumers Power Company
QA24-0

AUDIT REPORT

PROJECTS, ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT

Consumers Power	VOLUME II QUALITY ASSURANCE PROGRAM PROCEDURE FOR DESIGN AND CONSTRUCTION AUDIT	PROC NO 18-1 PAGE 11 OF 12 REVISION 4 DATE 1/1/80

DISTRIBUTION FOR AUDIT REPORTS (1)

Senior Vice President, PE&C	
Director, QA-PE&C	
Section Head, QAE	(For Applicable Projects)
Section Head, IE&TV	(For Applicable Projects)
Section Head, AA	
Audit Team Members	
QA-PE&C Subject File	
Executive Manager, Engineering & Construction - Transmission & Plant Modifications	(For Applicable Projects
Executive Director, Environmental & Project Services	(For Applicable Projects)
CP Co Project Manager/GPMD Manager	(For Applicable Projects)
CP Co Responsible Line/Functional Department Head	(For Internal Audits)
CP Co Personnel Responsible for Corrective Action	(For Internal Audits)
AE's/Constructor's/NSSS'/Supplier's General Manager (2)	(For External, Audits Only)
AE's/Constructor's/NSSS'/Supplier's Line/Functional Department Head (2)	(For External Audits Only)
AE's/Constructor's/NSSS'/Supplier's Quality Department Head (2)	(For External Audits Only)

(1) This is a minimum distribution. Additional copies of the Report may be distributed at the discretion of the Audit Team Leader.

(2) Audit Reports are provided directly to the supplier if he has a QA organization. Otherwise, these Reports are provided to the CP Co PMO or GPMD for timely transmittal to the supplier.

Nuclear Licensing Administrator	(For Major Modifications & the Palisades Steam Generator Repair Project)
Plant Superintendent	(For Major Modifications & the Palisades Steam Generator Repair Project)
Director, QA-Nuclear Operations	(For Major Modifications & the Palisades Steam Generator Repair Project)

1.0 PURPOSE

To establish the requirements and responsibilities for the conduct of and participation in the Quarterly Quality Assurance Meetings.

2.0 SCOPE

This Procedure applies to Projects and Major Modifications.

3.0 REFERENCE DOCUMENTS

3.1 Quality Assurance Program Policy 20, "Program Reporting."

4.0 REQUIREMENTS AND RESPONSIBILITIES

4.1 Quality Assurance - Projects, Engineering and Construction (QA-PE&C) is responsible for:

4.1.1 Scheduling a Quality Status Meeting with the Senior Vice President - Projects, Engineering and Construction, at least once each calendar quarter, for each plant Project, for the Palisades Steam Generator Repair Project and for Major Modifications as a whole.

4.1.2 Identifying the individuals who are to attend these meetings with the Senior VP - PE&C. As a minimum, they are:

a. The Director of QA-PE&C or his designee.

b. The Manager of the Project Management Office, or his designee, for the Project being discussed.

c. The Executive Manager, Engineering and Construction - Transmission and Plant Modifications, or his designee, for the Palisades Steam Generator Repair Project and for Major Modifications.

d. Other Executive Managers or Directors or Department Heads, or their designees, whose activities are being discussed.

4.1.3 Preparing the agenda for the Quality Status Meeting and distributing the agenda to the attendees. The agenda includes items relating to the status of the Quality Assurance Program, significant quality-related problems being encountered and Corrective Actions being taken or planned to be taken. The meeting agenda is distributed at least two weeks prior to the meeting.

4.1.4 Preparing and distributing the minutes of the meeting including the identification of the personnel in attendance, the subjects discussed, the resulting action items, and the personnel responsible for the required actions with their completion due dates.

4.1.5 Following up to assure the completion of the required Corrective Actions.

4.2 Appropriate items are reported by the Senior VP - PE&C to the President and Chief Executive Officer.

11/9/79
Executive Director,
Environmental & Project Services

11/15/79
Executive Manager,
Engineering & Construction -
Transmission & Plant Modifications

11/14/79
Manager, Project
Management Organization

11/7/79
Director, Quality Assurance -
Projects, Engineering & Construction

1.0 PURPOSE

To define responsibilities and establish a standard method for reporting the status and adequacy of the Quality Assurance Program to Consumers Power Company (CPCo) management.

2.0 SCOPE

This procedure applies to reporting by CPCo departments involved in quality activities during the design, construction, preoperational and hot functional phases, and major modifications of nuclear power plants. CPCo departments within the scope of this procedure:

a. Project Management Organization (PMO)
b. Generating Plant Modifications Department (GPMD)
c. Project Engineering Services Department (PESD)
d. Project Construction Services Department (PCSD)
e. Project Quality Assurance Services Department (PQASD)
f. System Protection and Laboratory Services (SP&LS)
g. Purchasing Department (PD)
h. Document Control Center (DCC) Section, Maintenance & Administrative Services (MAS)
i. Graphic Services (GS) Section, Administrative Services (AS)

3.0 DEFINITIONS

See "List of Definitions," Volume I

4.0 REFERENCE DOCUMENTS

a. Quality Assurance Program Policy 20, Program Reporting

5.0 PROCEDURE

5.1 QUALITY STATUS REPORTING

The Director, PQASD provides a monthly status report to the Vice President, Projects, Engineering and Construction (PE&C). This report summarizes those quality-related problems and nonconformance reports requiring management attention, describes the status of resolution, and makes recommendations for required actions.

The Director, PQASD acts as the focal point for all quality-related problems discovered and reported by the departments listed in the scope of this procedure,

coordinates resolution of the problems; and reports the results, along with the status of the program, to the Vice President, PE&C in the monthly reports. If further action is required, it is requested by the Vice President, PE&C.

5.2 QUALITY STATUS MEETINGS

The Director, PQASD is responsible for scheduling quality status meetings at least once each calendar quarter to discuss the status and adequacy of the Quality Assurance Program. The Director, PQASD determines the personnel that attend these meetings in addition to the following:

a. Vice President - PE&C
b. Project Quality Assurance Administrator and/or Field Quality Assurance Superintendent.
c. Manager, PMO and/or GPMD or their representatives.

The purpose of these meetings is to inform those present of the status of the Quality Assurance Program based on problems reported and the results of audits and surveillance, and to discuss required corrective actions. The results of the meetings are documented, including personnel in attendance, subjects discussed, action items resulting from the meeting, and personnel responsible for required action. Copies of the reports of the meeting are distributed to those in attendance, and pertinent results are reported to the President, CPCo.

Approved: Gilbert S. Keeley
Manager, PMO
2/24/77

Approved: [signature]
2/22/77 Executive Manager, Engineering and Construction - Transmission & Plant Modifications

Approved: [signature] 2/24/77
Executive Director, Environmental and Project Services

Approved: S Rittenhouse 2/23/77
Manager, SP&LS

Approved: Roger C. [signature]
Manager, Purchasing, Material and Transportation Services 2/24/77

Approved: [signature] 2/25/77
Manager, Administrative Services

Approved: [signature]
Manager, Maintenance and Administrative Services
2/24/77

Approved: [signature]
Director, PQASD 2/21/77

Question 1

Your quality assurance (QA) program, which falls under the provisions of 10 CFR 50, Appendix B, was applicable to the technical information that went into the PSAR and FSAR and the design and construction of the diesel generator building. In our view, the unusual settlement problem at the site points to an apparent lack of implementation of certain QA program requirements. Therefore, provide the following:

(a) Identify those quality assurance deficiencies that contributed to this problem, the possibilities of these deficiencies being of a generic nature and affecting other areas of the facility, and describe the corrective actions you have taken to preclude these deficiencies from happening in the future.

(b) What assurance exists that the apparent areas of contradictions in the PSAR and FSAR as described by I&E during the meetings of February 23 and March 5, 1979, do not exist in other sections of the PSAR and FSAR dealing with matters other than fill?

(c) Investigate other activities not associated with the fill, but important to safety for other systems, components, and structures of the Midland facility to determine if quality assurance deficiencies exist in view of the apparent breakdown of certain quality assurance controls. Identify those items investigated and the results of your investigation.

(d) Considering the results of your investigation on Item (c) above, describe your position as to the overall effectiveness of your QA program for the design and construction of the Midland Plant.

Response (to Question 1, Part a)

Appendix I provides the quality assurance deficiencies. Each item included in Appendix I has been classified as a deficiency for the purpose of assuring that each item is addressed for generic implications. The items may be Items of Noncompliance identified by the NRC, deficiencies identified by Bechtel or CPCo, or conditions which have not been ruled out as possibly contributing to the diesel generator building settlement problem. Appendix I also provides:

1. A detailed discussion of each deficiency, including its scope and possible generic implications

2. The corrective actions taken to correct each deficiency associated with the settlement problem

3. If the deficiency has generic implications, actions taken to preclude recurrence of the same or similar deficiency

Response (to Question 1, Part b)

The Midland Final Safety Analysis Report (FSAR) was prepared in accordance with Bechtel's Engineering Department Procedure (EDP) 4.22, Preparation and Control of Safety Analyses Reports. The Bechtel-originated FSAR sections were written based upon information, requirements, criteria, and commitments contained in the various documents identified in the Midland Project FSAR Section References form (Attachment 1-1).

These sections, as well as those originated by CPCo or B&W, were distributed for internal Bechtel interface coordination with review by project discipline groups, off-project support groups, and the discipline chief engineers. Documentation of this coordination and resolution of comments were maintained by the use of three additional forms: Midland Project FSAR Interface Routing Slip (Attachment 1-2), Midland Project FSAR Interface Comment Closure (Attachment 1-3), and Midland Plant FSAR Chief Engineer's Comment Closure (Attachment 1-4). Finally, the individual FSAR sections were distributed to CPCo and B&W and a three-company meeting was held to review and approve the final sections. The purpose of this overall procedure was to ensure that all appropriate licensing and project design documents were considered when preparing the FSAR sections and that appropriate interface coordination was conducted.

The Midland FSAR was submitted to the NRC at an earlier point in the project schedule than would have normally occurred in order to provide additional time for the operating license hearings due to the forecasted intervention. Consequently, some of the material required to be included in the FSAR was not available at the time of its initial submittal, or was supplied based upon preliminary design information. As the design and construction continued, the appropriate sections of the FSAR were revised or updated to include the necessary information.

In addition, 973 official NRC questions were issued on the Midland docket (850 on the FSAR and 123 on the environmental report). Several of these questions resulted in design changes. As these changes were made, the appropriate sections of the FSAR were revised. An audit of Bechtel Project Engineering was conducted by Bechtel Quality Assurance on

January 22 through 30, 1979, to ensure that there is a system by which design changes are reflected in the FSAR and that this system is properly implemented. In addition, there were numerous CPCo QA audits which included this aspect.

To identify and track missing information in the FSAR, an Amendment/Commitment List was created. This list gives the appropriate FSAR section reference, a brief description of the missing information and the action required to resolve the open item, the due date for closure, and the responsible organization. An example of the Amendment/Commitment List is included as Attachment 1-5.

Through the above procedures and actions, the FSAR and project design documents are constantly being reviewed and compared against each other. When inconsistencies are identified, they are corrected. However, there are some sections of the FSAR that are essentially inactive (e.g., the FSAR section relates to items for which the design, procurement, and construction phases have been completed and there have been no recent document changes or NRC questions to prompt a review of the section).

Prior to the identification and investigation of the diesel generator building settlement starting in August 1978, FSAR Section 2.5 and Subsection 3.8.5 (which were the areas of contradictions in the PSAR and FSAR as described by I&E during the meetings of February 23 and March 5, 1979) were considered inactive. All of the major plant backfill operations were completed, no significant revisions to the related civil specifications or calculations were made, and only two NRC questions were received at that time. These two NRC questions were related to Section 2.5 and dealt with the seismicity of the Michigan region.

Although the above activities have been and are now being implemented, it has been decided that in order to provide assurance that areas of contradiction do not exist in other sections of the PSAR and FSAR dealing with matters other than fill, the following additional actions will be taken.

1. A PSAR Commitment List was created in 1973 to identify and track design commitments made in the PSAR and related licensing documents. A sample sheet from this list is included as Attachment 1-6. Several revisions of this list were issued to update the "status" and "disposition document" columns. This list was also used in developing FSAR Table 1.3-2, Significant Design Changes, which identifies the significant changes made since issuance of the construction permit. To assure that the PSAR design commitments were properly dispositioned through incorporation into a project design

document or the FSAR, a final review and update of the PSAR Commitment List will be completed by January 1, 1980. | 1

2. To assure that no areas of contradiction exist between the FSAR, PSAR, and project design documents, a review of sections of the FSAR that are determined to be inactive will be completed by January 1, 1980. For this purpose, an inactive FSAR section is defined as any section for which the basic technical content has not changed since the initial preparation of the FSAR and for which there are no outstanding unanswered NRC questions or identified Safety Evaluation Report open items. Any inconsistencies identified during these review activities will be resolved and all appropriate changes will be made to the FSAR. A review of the remaining sections of the FSAR is not considered necessary because of the ongoing review process described above. | 1

3. EDP 4.22, Preparation and Control of Safety Analysis Reports, provides a system for controlling the preparation and revision of safety analysis reports. This procedure will be reviewed by June 29, 1979, although there are no apparent needed improvements noted at this time.

4. A Quality Assurance audit will be made of the three actions noted above.

Response (to Question 1, Part c)

The previous discussions describe known quality assurance deficiencies relating to the diesel generator building settlement, corrective actions taken with regard to the deficiencies as they apply to the settlement problem, and actions taken for the deficiencies as they apply generally.

In addition to these specific actions previously noted, other actions related to the generic nature of the deficiencies identified have been taken or are in progress. These resulted from CPCo and Bechtel's implementation of their QA programs. A brief description of these actions follows.

1. A review was completed by Bechtel Quality Assurance in January 1978 of the use of the Field Change Request and Field Change Notice to obtain clarifications of specifications and drawings. This review concluded that there is an awareness of the need for specificity in specification and drawing preparation on the Midland project.

2. A review of specifications covering items such as references, tolerances, and clarity of the specifications was undertaken by Bechtel and CPCo in late 1977. This

study resulted in revision of several specifications. Most of the specifications used by construction were included, but the soils and concrete specifications were not used because the status of this construction was nearing completion. A review will be undertaken and completed by June 29, 1979, of specifications not included in the initial study, but still in use in the field. This review will cover the same areas as the original study. Specifications C-210 and C-211 have been the subject of review subsequent to the discovery of the settlement problem, and have been revised to provide a better definition of the requirements.

3. During the specification review, Bechtel Quality Control and CPCo QA also reviewed each active Quality Control Instruction (QCI) in use to ensure the callout of adequate inspection criteria. Where additional clarification of specifications was considered necessary, this information was forwarded to Bechtel Project Engineering for resolution and included in the study discussed previously.

4. During September 1977, Bechtel QA revised their monitoring program to provide for more in-depth verification of QA program requirements. At the same time, Bechtel QA management audits were increased from one to two per year. Bechtel QA engineers assigned to the site have been increased from five in 1977 to a present level of eight.

5. In 1976, CPCo QA instituted a program of overinspection of certain Q-listed construction activities. To implement this program, CPCo QA personnel at the site were increased from 5 to an average of 20 over the period from 1976 to 1978 to support new activities (mechanical, electrical, etc) being started. CPCo QA personnel in the Jackson office were increased from one to six (excluding the Audit and Administration Section).

   a. Areas that were subject to overinspection included the following:

      (1) Reinforcing steel installation - initiated in June 1976 on a sampling basis, and in October, 1976, for 100% review

         (a) 1976 - 53 inspections

         (b) 1977 - 306 inspections

         (c) 1978 - 145 inspections

(2) Structural embedment installation - 100% (initiated during June 1977)

(a) 1977 - 168 inspections

(b) 1978 - 84 inspections

(3) Vendor x-ray interpretation - initiated in late 1978 and presently 100% review for radiographs received

(4) Field radiograph interpretation - sample basis started concurrent with the start of radiography

b. Other areas subject to a total increase in audits and overinspections included, but were not limited to:

(1) Mechanical activities

(2) Electrical activities

Overinspections in these areas total 101 for the last 6 months of 1978.

c. Audits conducted in all areas by CPCo site QA personnel are as follows:

(1) 1976 - 76 audits

(2) 1977 - 48 audits

(3) 1978 - 51 audits

6. Resident engineers have been assigned at the site to aid construction in the proper interpretation of drawings and specifications, aid in the resolution of problems such as interferences, and provide clear direction of the specification intent. These residents have been increased in number from 1 in March 1976, to the current figure of 22.

7. In April 1978, Bechtel QA initiated supplementary guidelines to indicate certain criteria for initiating tracking charts to aid in identifying trends in any particular area for repetitive occurrences. These charts are issued monthly to CPCo and Bechtel QA management.

The composite effect of these actions is to provide increased assurance of program compliance in all areas.

Response (to Question 1, Part d)

The preceding discussions describe various discrepancies discovered as a result of the settlement investigation, corrective actions associated with the soils activity, and corrective actions planned or taken in other areas to assure that these deficiencies do not exist and are precluded elsewhere. This discussion also describes reviews and corrective actions which were taken prior to the advent of the settlement problem, but which continue to apply generically. It is emphasized that the settlement monitoring program (by which the settlement problem was initially detected) was an integral and continuing part of the overall Midland Quality Assurance Program.

It is CPCo's position that the Midland Quality Assurance Program being implemented on the Midland Project is effective.

CATEGORY I
DESIGN ACTIVITIES

A. Deficiency Description:

1. Inconsistency Between Specifications And The Dames & Moore Report

A number of consultant reports have been added as appendixes to the PSAR. These reports contain numerous and sometimes conflicting recommendations. These reports are subject to be construed as commitments. For example, the Dames & Moore Report (referenced as an attachment to the PSAR in Amendment 3 to the PSAR) makes certain recommendations relating to the compaction and protection of soils. Certain of these recommendations were not specifically called out as requirements in the implementing specification.

2. Lack Of Formal Revisions Of Specifications To Reflect Clarification Of Specification Requirements

Conflicts existed between Sections 13.7 and 12.4 of Specification C-210 relating to the laboratory standard to be used. These paragraphs were the subject of clarification communications.

a. Specification C-210, Revisions 2 through 4, Section 13.7 originally required cohesive soils to be compacted to not less than 95% of "...modified proctor method (ASTM 1557, Method D)."

b. Specification C-210, Revisions 5 and 6, Section 13.7.1, Cohesive Soils, states, "All cohesive backfill in the plant area and the berm shall be compacted to not less than 95 percent of maximum density as determined by ASTM D 1557, Method D."

c. Specification C-210, Revisions 2 through 6, Section 13.4, Testing, states, "Testing of all materials placed in the plant area and the berm will be performed in accordance with the tests listed in Section 12.4"

d. Specification C-210, Revisions 2 through 6, Section 12.4.5.1, Cohesive Soils, states: "The maximum dry density and optimum moisture

content of cohesive material will be determined in the laboratory in accordance with ASTM Designation D 1557, Method D, provided that the sample is prepared in 4 layers, each compacted with 25 blows with a 10 pound hammer dropping 18 inches giving a compactive energy equal to 20,000 foot-pounds per cubic foot. (Bechtel modified Proctor Density test)."

3. Inconsistency Of Information Within The FSAR Relating To Diesel Generator Building Fill Material And Settlement

The FSAR submitted to the NRC (through Amendment 17) contained certain inconsistencies:

a. Tables 2.5-9 and 2.5-14 identify the foundations under the diesel generator building to be cohesive fill. The actual material specified and used was random fill, which includes cohesive and cohesionless material and concrete.

b. FSAR Subsection 3.8.5.5 indicates a settlement of 1/2 inch for shallow spread footings (such as the diesel generator building). FSAR Table 2.5-48 indicates a settlement of the diesel generator building of approximately 3 inches.

4. Inconsistency Between Basis For Settlement Calculations For Diesel Generator Building And Design Basis

a. Settlement calculations for the diesel generator building differ from the design requirements in the following ways:

(1) A uniform load of 3,000 psf was used rather than the 4,000 psf shown in Figure 2.5-47 in the FSAR.

(2) An index of .001 was used rather than the index of .003 shown in Table 2.5-16 in the FSAR.

(3) The calculations assumed a mat foundation rather than a spread footing foundation, which is the actual design condition.

b. The results of these erroneous calculations were included in the FSAR.

5. Inadequate Design Coordination in the Design of the Duct Bank

Four vertical duct banks were designed and constructed without sufficient clearance to allow a relative vertical movement between the duct bank and the building, and therefore restricted the settlement of the diesel generator building.

B. Discussion Of The Deficiency, Its Scope, And Generic Implications: (The numbers below correspond to the numbers under Part A above.)

1. Project engineering specifications meet the commitment for compaction of soil as stated in PSAR Amendment 3, dated August 13, 1969. PSAR Subsection 2.8.4.1 states, "All fill and backfill materials are adequately compacted to insure stability of the fill and to provide adequate support for structures founded on this fill without excessive settlement." Specifications C-210 and C-211 provide sufficient criteria by which to ensure that the fill is adequately placed to prevent excessive settlement.

As stated in PSAR Subsection 2.8.1, Introduction, "This section presents the summarized results of studies of the foundation investigation phase...." Although the Dames & Moore report is referenced in this subsection, it was not intended to be a PSAR commitment except for those portions specifically indicated in the PSAR.

Therefore, the differences between the Dames & Moore recommendations (or other consultant recommendations) and the specification requirements do not indicate a failure to meet commitments in the PSAR. These recommendations were considered by Bechtel Project Engineering and appropriate ones were committed to in the PSAR and included as requirements in the specifications.

2. Letters, TWXs, telecons, and memorandums are often used to clarify the intent of the specifications. It is possible that in some situations the clarification provided through the above methods may have modified the specification without formally changing the wording of the specifications. This is considered potentially generic to other areas.

3. Refer to the response to Question 1, Part b.

4. The diesel generator building settlement calculations were based on preliminary information supplied by Bechtel Project Engineering in March 1976 which included a uniform loading of 3,000 psf over the entire building. The calculations were checked in the San Francisco office in March 1977. The final design was released by Bechtel Project Engineering in March 1977.

   A fill soil compressibility factor of .001 which was used in the original settlement calculation was later determined to be less appropriate than factor of .003, and a factor of .003 was stated in the FSAR. The individual responsible for the original calculation did not become aware of this change until after the diesel generator settlement problem surfaced. Thereafter, he determined that the change, in this case, would result in a predicted settlement that was insignificantly different from that predicted in the original calculation. This was not noted in the original calculation.

   Checking of the calculation was completed prior to completing the coordination of the final design configuration. The original calculations were based on a uniform load of 3,000 psf and a mat foundation, whereas the final design was based on a uniform load of 4,000 psf and a spread footing foundation. The originator of the calculation was aware of this change on a timely basis, but it was determined that because conservatism was used in the calculations, the change in results using the final design parameters would be small and within the accuracy limits of the analysis. However, this was not noted in the calculation.

   Although it is felt that this is an isolated case, to assure compliance with the requirements of EDP 4.22, and EDP 4.37, refer to Part C (below) for a discussion of the corrective action.

5. Project design Drawings E-502 and C-1001, Revision 2 and C-1002, Revision 2 resulted in a 1-inch separation gap being specified between the duct banks and the diesel generator building foundations to allow for differential settlement. The applicable electrical drawings indicate

minimum dimensions only, and do not reflect as-built dimensions. Therefore, the cognizant engineer went to the jobsite, measured the exposed duct banks, and designed the openings in the footings accordingly. At the time of this jobsite visit, the backfill and a mud mat covered the enlarged cross-sectional area of the duct banks below the footings. From the information available to the engineer, it was not apparent that the duct bank under the opening was larger than the part projecting through the mud mat.

Coordination failed to identify a second electrical drawing, Drawing E-42, Sheet 33, Revision 4, which shows that buried duct banks have more concrete cover over the conduits in the duct than was required for the exposed duct bank above the footing level. As a result, the design did not specify a vertical gap between the bottom of the footings and the enlarged duct bank section.

Coordination of drawings is accomplished in accordance with EDP 4.46. This procedure requires a coordination print to be utilized and signed by the affected discipline engineers. Only the last revision of the coordination print is required to be retained.

Most interdisciplinary interfaces are self-evident as to interferences that may arise from other design or construction. There are specific design bases for the separation between Seismic Category I systems, and between Seismic Category I and non-Seismic Category I systems. Below grade interfaces are not easily accessible for later verification, whereas accessible interfaces will be subject to walkdown inspections at the completion of construction. This final check will verify compliance with separation criteria and the absence of interferences.

Based on the above, we do not consider this case to be generic, but rather an anomaly. This is supported by the fact that Bechtel Quality Assurance and Quality Engineering have completed 16 monitors and audits in the area of design coordination over the last 16 months, and have not identified any significant deficiencies.

C. Actions Taken To Correct The Deficiency Associated With The Settlement Problem: (The numbers below correspond to the numbers under Parts A and B above.)

1.a. Specifications C-210 and C-211 have been revised by issuance of Specification Change Notices (SCNs) C-210-9001 (March 30, 1979) and C-211-9001 (April 2, 1979), which provide for:

(1) Maximum density of cohesive soils using ASTM D 1557, Method D, with a minimum compaction of 95%;

(2) Moisture verification of adequacy to be at the time of field density testing;

(3) Maximum loose lift thickness of 8 inches for motorized equipment and 4 inches for hand-held equipment;

(4) Minimum compaction of 85% relative density for cohesionless soils.

1.b. A complete review of the Dames & Moore Report will be completed and a documented disposition will be made for any other apparent differences between the Report recommendations and the project specifications. This review will be completed by June 29, 1979.

2. Specifications C-210 and C-211 have been revised as previously stated in Section C.1.a above.

On April 3, 1979, the Midland Project Engineering Group Supervisors were reinstructed that the only procedurally correct methods of implementing specification changes are through the use of specification revisions or SCNs. This was reiterated in an IOM to the Group Supervisors from the Midland Project Engineer on April 11, 1979.

3. Pertinent portions of FSAR Sections 2.5 and 3.8 are being reviewed, and FSAR change notices have been and may be written to correct the inconsistencies and to add clarification to the material presented. FSAR change notices were incorporated into the FSAR in Revision 18 (dated February 28, 1979). The remainder of these reviews will be completed by June 29, 1979.

4.a. Settlement calculations will be made again subsequent to the completion of the diesel generator building surcharge operation.

4.b. The importance of updating support documents (such as calculations) as new design information becomes available in order to avoid discrepancies has been reiterated by an internal memorandum to the Bechtel Geotech Design Team dated April 12, 1979.

4.c. A recent Bechtel Quality Assurance audit of the Bechtel Geotech Section was conducted in February, 1979. Although the results of this audit indicated that this area is effectively controlled, additional audits will be performed in this area on a 6-month cycle until completion of soils work.

5.a. Provisions were made to allow independent vertical movement between the diesel generator building and the duct banks.

5.b. Bechtel Project Engineering will review design drawings for cases where ducts penetrate vertically through foundations. The possibility of the duct being enlarged over the design requirements and the effect this enlargement may have upon the structure's behavior will be evaluated by June 1, 1979. Proper remedial measures will be taken if the investigation shows potential problems.

D. Corrective Actions Taken To Preclude Recurrence Elsewhere: (The numbers below correspond to the numbers under Parts A, B, and C above.)

1. Engineering Department Project Instruction (EDPI) 4.1.1 (issued in July 1974) provides a system requiring that design criteria, contained in documents such as the PSAR or FSAR, be incorporated into the design. This requirement was previously found in the Bechtel Job Procedure (7220) entitled, "Design Document Requirements Procedure."

EDPI 4.1.1, Revision 0, Paragraph 3.1 states: "The Discipline Engineer who originates a design document shall fill out the attached Design Requirement Verification Checklist (DRVCL) as he develops the design document to assure that all applicable design criteria contained in each referenced document has been incorporated into the design document and to verify that no omission or conflict exist. If a particular Design Requirements Document is not applicable to the design document, place 'N/A' in the space provided for identification."

Exhibit 1 to EDPI 4.1.1 includes a "PSAR/FSAR" category and a "Bechtel discipline standards" category.

To assure that this system is being implemented, Bechtel QA conducted an audit of this system on January 22 through 30, 1979. This audit resulted in two findings for which corrective actions are scheduled to be completed by May 18, 1979.

2.a. A review of the references, tolerances, and clarity of the specifications was undertaken by Bechtel and CPCo in late 1977. This study resulted in appropriate revisions to several specifications. Most of the specifications used for construction were included in this study, but the soils and concrete specifications were not because the status of this construction was nearing completion at that time.

2.b. Using the installation of the reactor building spray pump and ancillary system as a study mechanism, Bechtel and CPCo performed a dimensional tolerance study. The purpose of this study was to evaluate drawing and specification tolerances and clarity. This study was concluded in early 1978, and preceded the majority of the mechanical and electrical installations. The generic findings resulting from this study were applied to other mechanical and electrical drawings and specifications, and they have been revised as needed.

2.c. A review of those specifications being used for remaining construction and not included in the studies described in Parts 2.a and 2.b above will be completed by June 29, 1979.

2.d. EDPI 4.49.1, Specification Change Notice, will be revised by May 1, 1979, to incorporate clarifications and instructions concerning use of specification change notices.

2.e. A specific review of the FSAR and specification requirements for the qualification of electrical and mechanical components has been made as part of the corrective action relating to CPCo's 50.55(e) report on component qualification.

3. Refer to the response to Question 1, Part b.

4. Calculational techniques and actual analysis will be audited to sample the effectiveness of the

design calculational process. Recent audits have been conducted of the ITT Grinnel hanger design and CPCo relay setting calculations. Bechtel will, on a yearly basis, audit each of their design disciplines.

5. No further actions are required on this item.

CATEGORY II
CONSTRUCTION ACTIVITIES

A. Deficiency Description:

1. Insufficient Compactive Effort Used In Backfill Operation

There are no records available to indicate that the various types of compaction equipment used for structural backfill were evaluated or qualified to handle the specified lift thicknesses and that appropriate lift thicknesses were established for each type of equipment.

2. Insufficient Technical Direction In The Field

The Dames & Moore Report and the Civil-Structural Design Criteria 7220-C-501, Revision 9, Section 6.1.1 state, in part, "Filling operations shall be performed under the technical supervision of a qualified soils engineer...."

Technical direction and supervision were provided by Field Engineers and Superintendents who were assigned the responsibility for soils placement. The direction and supervision were not sufficiently employed.

B. Discussion Of The Deficiency, Its Scope, And Generic Implications: (The numbers below correspond to the numbers under Part A above.)

1. Areas of low density appear to be mostly confined to structural backfill placed in confined areas using vibratory type hand-operated equipment and in areas placed under Specification C-210 where equipment was not prequalified and acceptance was by test. The equipment was evaluated for its ability to handle lift thicknesses of up to 12 inches based on achieving satisfactory in-place test results. However, the specific type of equipment used and the number of passes needed to achieve the required density were not recorded. | 1

Category III provides a discussion of the generic implications of the quality control and testing factors which had a primary inpact on equipment qualification.

2. The soils tests during plant fill operations generally showed good compaction, and this informa-

tion was utilized by field personnel in determining the amount of direction necessary. Soils operations are unique and there are no physical attributes available to supervisory personnel by which to check the quality of the compactive effort other than the test results. Each lift is subsequently covered by the following lift. For most other work (such as piping), the results of the work efforts remain visible (such as alignment at subassembly closure points), or subsequent inspections can be made or repeated to verify the quality (e.g., hydrostatic tests, nondestructive examinations, and functional tests).

C. Actions Taken To Correct Deficiencies Associated With Settlement Problems: (The numbers below correspond to the numbers under Parts A and B above.)

1. Prior to the resumption of soils work in the plant area, compaction equipment will be reevaluated or requalified as to material type (cohesionless or cohesive soil), lift thickness, number of passes or rate of coverage (i.e., compaction effort), and compaction achieved based on field and laboratory density testing. This will be documented.

2.a. Permanent fill operations will not be conducted unless a Field Soils Engineer is onsite to provide technical direction for the operations. SCN C-211-9001 adds this requirement. In addition, a Soils Engineer from the Bechtel Design Section will be assigned to provide an overview of the field operation. The duties and responsibilities of these personnel will be defined prior to the resumption of soils operations.

2.b. CPCo will implement overinspection for soils placement, utilizing a specific overinspection plan.

D. Corrective Action Taken To Preclude Recurrence Elsewhere: (The numbers below correspond to the numbers under Parts A, B, and C above.)

1. A review of specifications and procedures used for construction will be made to identify all construction equipment requiring qualification. This review will be completed by June 29, 1979.

2. The duties and responsibilities for field engineers and field crafts supervision are defined in Field

Procedure FPG-3.000. This procedure will be reviewed by May 31, 1979 to assure the clarity and completeness of the definition of duties and responsibilities, although there is no apparent need for improvement at this time.

CATEGORY III
QUALITY CONTROL AND TESTING ACTIVITIES

A. Deficiency Description:

1. Inadequate Quality Control Inspection Of Placement Of Fill

Bechtel Quality Control inspection of soils work did not identify deficiencies which may have contributed to placement of fill that appears to have densities in place that are lower than those specified.

2. Inadequate Soil Moisture Testing

Prior to 1978, moisture content was controlled by tests taken after compaction. Few or no tests were taken on the fill prior to compaction, as required by Specification C-210, Section 12.6. Attachment 1-7 describes the methods that were used for soil control during the various stages of soil placement.

3. Incorrect Soil Test Results

A review of soils test reports indicates that there are some reports which contain errors and inconsistencies in the data. Technical direction, surveillance, and test report reviews by Bechtel Quality Control did not identify these errors and inconsistencies.

In addition, a preliminary review of these reports also indicates other possible problems with the compaction test data. Attachment 1-8 presents the preliminary findings of this review.

4. Inadequate Subcontractor Test Procedures

U.S. Testing's QA Program, Revision 6, dated March 20, 1978, did not provide procedures or instructions for the following areas: | 1

a. Developing and updating the family of proctor curves;

b. Visually selecting the proper proctor curve;

Revision 1
5/79

c. Developing additional proctor curves for changing materials occurring between normal frequency curves;

d. Alternative methods of determining the proper laboratory maximum density where visual comparison is not adequate.

Specification G-22, Revision 1, dated June 22, 1973, is an attachment to Specification C-208 and specifies the requirements for U.S. Testing's QA Program. Section 3.1.5 of Specification G-22 requires that this program provide instructions, procedures, and drawings, although it does not specifically call out the requirements of Subparagraphs a through d listed above. 1

B. Discussion Of the Deficiency, Its Scope, And Generic Implications: (The numbers below correspond to the numbers under Part A above.)

1. The inspection for soils was accomplished by surveillance which did not require extensive documentation of the specific characteristics inspected. In other construction areas for which surveillance is employed, acceptance is based on the final inspection of the physical characteristics after completion of the construction activity and the final inspection results are documented on a characteristic-by-characteristic basis. As such, the application of a defect prevention surveillance is not a generic problem where final inspections of record also exist. This item is considered to have generic implications in areas where inspection of processing methods, equipment, and personnel during construction is intended as an inspection of record requiring clear direction and recording of the specifics.

2. Prior to 1978, Section 12.6 of Specification C-210 was interpreted by field personnel as follows: "during compaction" was interpreted as the entire process of placing, compacting, and testing fill. The moisture content was measured during the density test, which was taken immediately after compaction. Therefore, by field interpretation, the moisture content was measured "during compaction" and the fill was not tested in its loose state. Reconditioning was done after testing. A summary of moisture measurements taken for each time period of construction is given in Attachment 1-7.

When cohesive soils are used, moisture control in the borrow areas or stockpiles is for the purpose of minimizing the construction impact of performing

moisture conditioning in the area where fill is being placed and compacted.

The specifications, as now revised, require that the moisture content for cohesive soils be within +2% of optimum moisture at the time of field density testing. The specification further states that field density tests are to be taken immediately following compaction.

Moisture conditioning of soil (preconditioning of material) is unique to fill placement and is, therefore, not generic to other areas or disciplines.

3. Bechtel's quality control of testing performed by the testing laboratory subcontractor included steps to verify that the test results were reported as either percent compaction or relative density (as appropriate to the material being tested), the specification compaction requirement was met, the moisture content was within the required limits (when required for cohesive soils), and the report form was properly completed providing date of test, location, elevation, and laboratory chief's signature attesting to procedure compliance.

   This item is considered to be potentially generic to other testing performed by this subcontractor. It is not considered generic to the activities performed by the nondestructive examination (NDE) subcontractor, as indicated by recent monitors and audits as follows:

   a. Since January 1978, there have been ten audits of the NDE subcontractor's operations completed by CPCo, Bechtel, an Authorized Inspection Agency, and the subcontractor's management. The findings resulting from these audits do not indicate any significant or repetitive problems.

   b. Bechtel Quality Control surveys the NDE subcontractor's testing operations and reviews all Q-listed radiographic film for final acceptance.

   c. The authorized inspector reviews ASME radiographs and surveys other NDE.

   d. CPCo QA provides an overinspection of NDE on a sampling basis.

4. The inadequacy of the test laboratory subcontractor's test procedures is considered to be potentially generic to other testing performed by this subcontractor. It is not considered generic to the testing performed by the NDE subcontractor for the reasons cited in Part 3 immediately above.

C. Actions Taken To Correct Deficiency Associated With The Settlement Problem: (The numbers below correspond to the numbers under Parts A and B above.)

1.a. PQCI C-1.02, Compacted Backfill, is being revised to include a Daily Soil Placement Report, which is to be used in each area where soils work is being performed. This report will include:

(1) Area sketch showing areas of placement;

(2) Identification of equipment being used;

(3) Identification of supporting personnel;

(4) Recording lift thickness measurements (by elevation differences) which are representative of the fill being placed;

(5) Compactive effort used (rate of coverage or number of passes);

(6) Location by grid coordinates and elevation of all tests taken and testing frequencies.

1.b. Bechtel Quality Control "surveillance" will be changed in PQCI C-1.02 to "inspection" for inspections of record prior to the resumption of soils operations.

1.c. As previously noted under Category II, Section C.2.b, CPCo will perform overinspection on a sampling basis.

2.a. SCN C-210-9001, issued on March 29, 1979, and SCN C-211-9001, issued April 4, 1979, provide more direction as to the manner in which moisture is to be controlled in the field.

2.b. Bechtel Quality Control will continue to review field moisture and density test results to verify that moisture content is within the required moisture limits. When test results are not acceptable, the area affected will be identified to the Field Soils Engineer for appropriate action. The corrective action taken will be documented by

Bechtel Quality Control on the Daily Soils Placement Report, Discrepancy Report, or Nonconformance Report, as appropriate.

2.c. In addition, when cohesive material is used from borrow areas and stockpiles, moisture tests may be taken for production control. Such information will be provided to the Field Soils Engineer for his evaluation of the need for any preconditioning of materials prior to placement and compaction. Final acceptance of moisture content will be at the time of compaction testing, as required by the specifications.

2.d. The CPCo commitment given in Section C.1.c above also applies here.

3.a. An in-depth review of testing and test results is being conducted by Bechtel. The Bechtel Geotech group is leading the investigation. This investigation will include:

(1) Borings taken in areas placed throughout construction;

(2) Test pits;

(3) Laboratory tests on samples from borings and test pits;

(4) Analysis of past test results (Some preliminary results are given in Attachment 1-8.);

(5) Overlay plots of all tests.

This will be completed by July 31, 1979.

3.b. PQCI C-1.02 is being revised to improve the clarity of the specific items covered by Bechtel Quality Control's inspection of U.S. Testing's soils compaction test reports.

3.c. CPCo will perform overinspection of the U.S. Testing soils testing activities and reports, utilizing a specific overinspection plan.

4.a. Selection of proctor curves will no longer be a problem because each field density test will be accompanied by a separate laboratory standard compaction test which will provide a direct comparison. This has been directed by a letter to U.S. Testing and has also been reflected in SCN C-208-9004 dated April 13, 1979.

4.b. An in-depth audit of U.S. Testing's operations will be performed by Bechtel by May 31, 1979. This audit will include an evaluation of the need for any other procedures.

D. Corrective Actions Taken To Preclude Recurrence Elsewhere: (The numbers below correspond to the numbers under Parts A, B, and C above.)

1. Bechtel Quality Control has initiated a review of all active Quality Control Instructions (QCIs). This review is being performed to identify those QCIs similar to PQCI C-1.0% which provide for defect prevention surviellances. Modifications will be made to these QCIs to distinguish between the defect prevention surveillances and the final inspections of record, recognizing that the final inspections of record may be made during or at the completion of the construction activity. The final inspections of record will be required to be documented, whereas the surveillances for defect prevention will not be required to be documented. The review is scheduled to be completed by June 29, 1979. Modifications to QCIs will then commence as necessary in accordanace with SF/PSP G-6.1. |1

2. No additional action is required.

3.a. Quality Control Instructions will be evaluated to ensure that the documentation characteristics which are to be inspected (i.e., review callouts) are clearly specified. This will be completed by June 29, 1979.

3.b. The laboratory testing subcontractor is also performing other testing work, such as that for concrete materials and reinforcing steel mechanical splices. Through reviews of test results, test procedures, equipment used, and personnel performing the tests, similar deficiencies as addressed above are not apparent.

3.c. An in-depth Bechtel QA Project and Engineering audit of U.S. Testing operations covering testing and implementation of their QA program will be conducted in late April or early May 1979. This audit will consider generic elements.

4. No additional action is required.

Revision 1
5/79

5. Additional Actions Applicable Across the Board:

a. During May and August of 19[illegible], a review of all QCIs was performed jointly by CPCo and Bechtel to accomplish the following:

(1) Delineate inspection technique (visual, measurement, or visual and measurement);

(2) Assure the existence of adequate inspection criteria (reference specifications, drawings, etc, as required);

(3) Modify the inspection record to require that the QC Engineer utilizes the acceptance criteria as stated in the source document and records the actual inspection results;

(4) Delineate interfaces;

(5) Clarify instructions to the Bechtel Quality Control Engineer;

(6) Clarify the scope of the inspection.

b. CPCo Project Management and QA reviews field procedures (new and revised) and CPCo QA reviews QCIs (new and revised) in line with Bechtel before release.

c. In 1978, CPCo implemented an overinspection plan to independently verify the adequacy of construction and the Bechtel inspection process, with the exception of civil activities. Reinforcing steel and embeds were covered in the overinspection. CPCo, however, has audited and surveilled other civil activities numerous times, as indicated in the individual engineer's activity logs.

d. CPCo reviews onsite subcontractor QA manuals and covers their work in the audit process.

e. An ongoing effort is improving the "surveillance" mode called for in the QCIs by causing more specific accountability as to what characteristics are inspected on what specific hardware and in some cases changing "surveillance" to "inspection."

f. Bechtel is working to incorporate scientific sampling plans for inspection areas, whereas the existing practice is to use percentage sampling.

CATEGORY IV
QUALITY ASSURANCE ACTIVITIES

A. Deficiency Description:

1. Inadequate Corrective Action For Repetitive Conditions

There have been nonconformances which could be considered to be repetitive. NCRs documenting these nonconformances include, but are not limited to, QF-29, QF-52, QF-68, QF-120, QF-130, QF-147, QF-172, QF-174, QF-199, QF-203, Audit Findings F-77-21, and F-77-32, NCR 421, NCR 686, NCR 698, and NCR 1005.

Quality Assurance Department Procedure C-101, Revision 1, Paragraph 1.0 states, in part, "This procedure provides a mechanism for identifying quality trends, and initiating corrective action to prevent recurrence...."

The reviews made in accordance with the procedure did not identify the need for additional process corrective actions beyond those which had been taken already as part of the dispositions for the individual nonconformance reports.

2. The Bechtel Quality Assurance Audit and Monitor Program did not identify the problems relating to the settlement. This lack of identification of problems by the audit program contributed to a conclusion that soils operations were adequately controlled.

B. Discussion Of The Deficiency, Its Scope, And Generic Implications: (The numbers below correspond to the numbers under Part A above.)

1. Bechtel implements a trend program to assist in the determination of additional actions needed to correct repetitive problems. This program includes all noncompliances, including CPCo NCRs and AFRs. The repetitive problems concerning soils operations were included in this program, but the Bechtel and CPCo individuals responsible for review of the trend program outputs did not identify the need for corrective actions in addition to those already taken. This item could be generic to other areas where repetitive nonconformances have occurred.

In addition, the CPCo program to detect significant conditions adverse to quality did not identify a need to take corrective action beyond that outlined in CPCo NCRs and AFRs.

2. The use of auditing and monitoring to detect such problems is considered to have possible generic implications in other areas, even though it is recognized that an audit program only samples operations.

C. Actions Taken To Correct The Deficiency Associated With The Settlement: (The numbers below correspond to the numbers under Parts A and B above.)

1. See Section D.1.a and D.1.b below.

2. See Section D.2 below.

D. Corrective Actions Taken To Preclude Recurrence Elsewhere: (The numbers below correspond to the numbers under Parts A, B, and C above.)

1.a. An in-depth review of the Bechtel trend program data will be undertaken by Bechtel QA management to assure the identification of any other similar areas that were not analyzed in sufficient depth in the past reviews. This will be completed by June 1, 1979. If the results of this review indicate a need for additional corrective actions, these will be taken as required by the existing program.

1.b. An in-depth training session will be given to Midland QA Engineers covering the settlement problem and methods to identify similar conditions in the future. This will be completed by June 1, 1979.

CPCo Quality Assurance personnel have been directed to require timely corrective action when the purpose of the corrective action is either to prevent recurrence of the nonconformance or to acquire additional information as to the nature or degree of the nonconformance.

2. An in-depth training session will be given to all CPCo and Bechtel QA Engineers and Auditors to increase their awareness of the settlement problem and discuss auditing and monitoring techniques to increase audit effectiveness. This will be done by June 1, 1979.

Attachment 1-1

DATES

REV. A _____
REV. B _____
REV. C _____

MIDLAND PROJECT
FSAR SECTION REFERENCES

Job No. 7220

Section No. _____ Rev. _____

Section Title _____

Originating Discipline _____

The following documents were reviewed while preparing the above titled section of the FSAR (indicated by Section No., Rev. No., etc.):

1. Regulatory Guide 1.70, Rev. 2, Section _____
2. NRC Standard Review Plan, Section _____
   NRC Branch Position Papers _____
3. DRL Safety Evaluation, Section _____
4. PSAR Section or Questions _____
5. Unincorporated SAR Change Notice
   Incorporated by This Text _____
6. Unincorporated SAR Change Notice
   Considered _____
7. Regulatory Guides No./Rev. _____
8. Project Regulatory Guide Position
   Considered. NA _____ YES _____
9. Responses to NRC Regulatory Guide
   Questions No. _____
10. Supplemental Environmental Report Section _____
11. Final Environmental Report Section _____
12. System Description/Rev. _____
13. Dwgs. or Specs./Rev. _____
14. BESSAR Section Reviewed _____
15. BESSAR Section Adapted _____

BESSAR Section Found Non-Applicable Because _____
_____

BY: _____
Originating Engineer

CHECKED: _____
FSAR Coordinator

Attachment 1-2

MIDLAND PROJECT
FSAR INTERFACE ROUTING SLIP

Attached is the following FSAR Sub-Section(s) for your review:

TITLE: _____

NUMBER(S): _____ rev. _____

Please return to _____, 8th floor, after review is completed by your discipline. Please keep routing slip with the FSAR text material. Please initial all comments for historical tracking purposes.

In order to be able to maintain our FSAR schedule, all comments must be returned no later than five (5) working days after the issue date below. We appreciate your cooperation in expediting review and return to us in the shortest possible time.

Thank you,

_____
FSAR Administrator

Comments: Refer questions to:

_____

_____

_____

_____

_____

_____

_____

_____

_____

FOR INFORMATION ONLY

COORDINATION PRINT
JOB 7220

DATE _____

TO	INITIAL	DATE
Architech		
Civil		
Control Sys		
Electrical		
Geotech		
Nuc Eng		
Plant Desgn		
Mechanical		
Don Riat		
FSAR Coor		
return to: CINDY FLNZ	by:	

Attachment 1-3

MIDLAND PROJECT FSAR
INTERFACE COMMENT CLOSURE

Job No. 7220 Date _____

Section No. _____ Rev. _____

Section Title _____

Originating Discipline _____

The above titled section has been reviewed by the following disciplines. The initials below, of the EGS or his designee, indicate satisfactory resolution of his group's comments.

1. _____
2. _____
3. _____
4. _____
5. _____
_____
_____

Prepared: _____
Originating Engineer

Approved: _____
Discipline Team Leader

Attachment 1-4

MIDLAND PLANT FSAR
CHIEF ENGINEER'S COMMENT CLOSURE

Job No. 72 Date _____

Section No. _____

Section Title _____

Originating Discipline _____

The above titled section has been reviewed by the following chief engineers and all comments are closed. Original DRNs are attached for the project files.

1. _____
2. _____
3. _____

The text changes required to resolve Chief's Comments have been coordinated as necessary with the following affected disciplines. The initials below, of the EGS or his designee, indicate satisfactory resolution of the Chief's comments which affect his discipline.

1. _____
2. _____
3. _____

Prepared: _____
Originating Engineer

Approved: _____
Discipline Team Leader

AMENDMENT/COMMI..JMT LIST

MIDLAND 1&2-FSAR
(Sorted by Sections)

Section	Page/ Table	Area/ System	Missing Information	Date Due	Responsibility Company	Responsibility Group	Closed by Amend-ment
1.2	FIG 1.2-22	Equipment location figure	Revise Drawing M-19 to eliminate incomplete sections (V)	N/S	Bechtel	PD/M	
3.5.6	1.8-3	Blowdown forces on internals and core (Licensing Issue 1)	Results of reactor internals and core analyses	04/80	B&W	-	
1.7	TBL 1.7-10 and 1.7-11	ESFAS, HPI lube oil pumps	Revise J-237, J-238, and J-239 logic diagrams with regard to RAS actuating HPI lube oil pumps (Q&R 211.124)	04/79F	Bechtel	CS	
2.5.4.13.1	2.5-69	Benchmark locations	Survey settlement measurements (TBL 2.5-14A) will be submitted yearly until commercial operation	N/S	Bechtel	CV/GT	
2.5	TBL 2.5-14	Contact stresses and ultimate bearing capacity for foundations supporting seismic Category I and II structures (Licensing Issue 44)	Provide ultimate bearing capacity and factor of safety for the diesel generator building, solid radwaste building, and condensate, primary, and borated water storage tanks (footnote 2)	N/S	Bechtel	CV	
2.5	TBL 2.5-16	Idealized soil profile and parameters	Provide average values for layers A and B	07/79	Bechtel	CV	
3.5	FIG 3.5-10 through 3.5-14	Licensing commitment: equipment locations for missile protection study	B&W to review figures (M-45 through M-49) (Refer to Bechtel-1235, 2-22-79)	04/79F	B&W		
3.5	FIG 3.5-10 through 3.5-14	Reactor building internal missile study	Revise figures to indicate changes in plant layout and missile protection design (M-45 through M-49)	N/S	Bechtel	PD	
3.6.2.1.1	3.6-9	Pipe break locations	Finite element analysis on primary loop, B&W (Mt. Vernon) provides detailed analysis of pipe stress, radial and axial (A)	07/79	Bechtel (JPK)	M	

Attachment 1-5

PSAR COMMITMENT LIST

SECTION	COMMITMENT	PSAR PAGE	REV.	RESPONSIBILITY	STATUS	DISPOSITION DOCUMENT
3.2.3.1.13	A 1/6 scale model test of the reactor and internals is being performed... final variations in flow will be determined when the tests are completed.	3-34	4	-W----------	Incorporated	FSAR Section 4.4.2.5 Rev 0
3.2.3.1.1f 1.1f	The reactor trip point is 107.5% rated power, and the maximum overpower which is 114%, will not be exceeded under any condition.	3-35	0	-WC----------	Incorporated	FSAR Ch 15 Rev 0, Section 3A, R.G. 1.49
3.2.3.2.4	At the present time, an analog computer simulation is being developed to evaluate the performance of the vent valves in the plenum chamber. This analysis will be used to demonstrate that adequate steam relief exists so that cooling of the core will be accomplished.	3-44	4	-W----------	Incorporated	FSAR Sections 1.3.4, 6.2.1.3.2, Rev 0 (Supp 2 to S.E.R. of Midland Plant Units 1 & 2) NRC, July 1977)
3.2.4.1	The reactor internal components are designed to meet the requirements specified in section 3.2.4.1 of the PSAR.	3-45	4	-W----------I	Incorporated	FSAR Section 3.9.5 Rev 0
	Material for the reactor internals bolting will be subjected to rigid quality control requirements to insure structural integrity. The bolts will be inspected for surface flaw indications after all fabrication operations have been completed. Torque values will be specified for the final assembly to develop full-bolting capability. All fasteners will be lock-welded to insure assembly integrity.	3-46	4	BW-W-----QF-QI	Closed	E-Spec 08-1023000012-01 describes torquing and locking requirements; fastener inspection is also in this E-Spec.

Attachment 1-6

Time Period	Moisture Measurements to Aid Compaction			Control for Final Acceptance	
	As Practical in the Borrow Area	Loose Fill Prior to Compaction (±2%)	During Compaction (±2%)	Moisture	Density
Prior to August 1, 1977	No measurements taken	No measurements taken	No measurements taken	Measurements taken (moisture controlled here)	Tests taken (density controlled here)
August 1, 1977, to winter of 1977-1978	Measurements taken, but not compared to laboratory standard	No measurements taken	No measurements taken	Measurements taken	Tests taken (density controlled here)
1978 to 3/29/79	Measurements were taken and controlled in at least one of these areas		No measurements taken	Measurements taken	Tests taken (density controlled here)
3/29/79	Measurements may be taken	Measurements may be taken	No measurements taken	Measurements taken (moisture controlled here)	Tests taken (density controlled here)

PRELIMINARY RESULTS OF REVIEW OF COMPACTION SOIL TEST DATA

Described below are preliminary findings:

- Indicated in the chart below and attached Pages 2 through 9 are examples of certain laboratory standard compaction tests which were used many times more than would be expected. Many tests plot outside the appropriate zero air voids curve.

Soil Classification Standard	Approximate Number of Times Referenced	Approximate Number of Times Outside Zero Air Voids
RD-61	556	-
RD-59	65	-
RD-55	555	-
BMP-270	220	85
BMP-271	135	50
BMP-269	225	20
BMP-277	150	70
BMP-278	80	45

- The time span over which standards were used has been found to be as long as 24 months.
- Retesting of failing tests may have improperly used different standards with lower maximum densities and resulted in passing tests.
- Certain errors in actual calculations have been discovered.
- There is some evidence that proctor curves that do not represent the materials may have been erroneously selected.
- There are indications that moisture readings obtained with the Nuclear Moisture-Density Device might be in error.

HISTOGRAM OF COMPACTION FOR CLASSIFICATION P061

FOR THIS CLASSIFICATION, MAX LAB DRY DENSITY = 125.3

RANGE, % COMP.	HIST %	TEST COUNT
< 55	2.9	16
55-60	1.6	9
60-65	3.1	17
65-70	3.4	19
70-75	3.6	20
75-80	4.9	27
80-85	12.1	67
85-90	10.6	59
90-95	14.6	81
95-100	14.9	83
100-105	12.1	67
105-110	6.7	37
110-115	4.5	25
115-120	2.2	12
120-125	1.3	7
> 125	1.8	10

TOTAL COUNT OF TESTS = 556

HISTOGRAM OF COMPACTION FOR CLASSIFICATION 8059

FOR THIS CLASSIFICATION, MAX LAB DRY DENSITY = 126.3

RANGE, % COMP.	HIST %	TEST COUNT
< 55	3.1	2
55-60	.0	0
60-65	.0	0
65-70	3.1	2
70-75	1.5	1
75-80	4.6	3
80-85	4.6	3
85-90	7.7	5
90-95	6.2	4
95-100	16.9	11
100-105	10.8	7
105-110	15.4	10
110-115	10.8	7
115-120	4.6	3
120-125	3.1	2
> 125	7.7	5

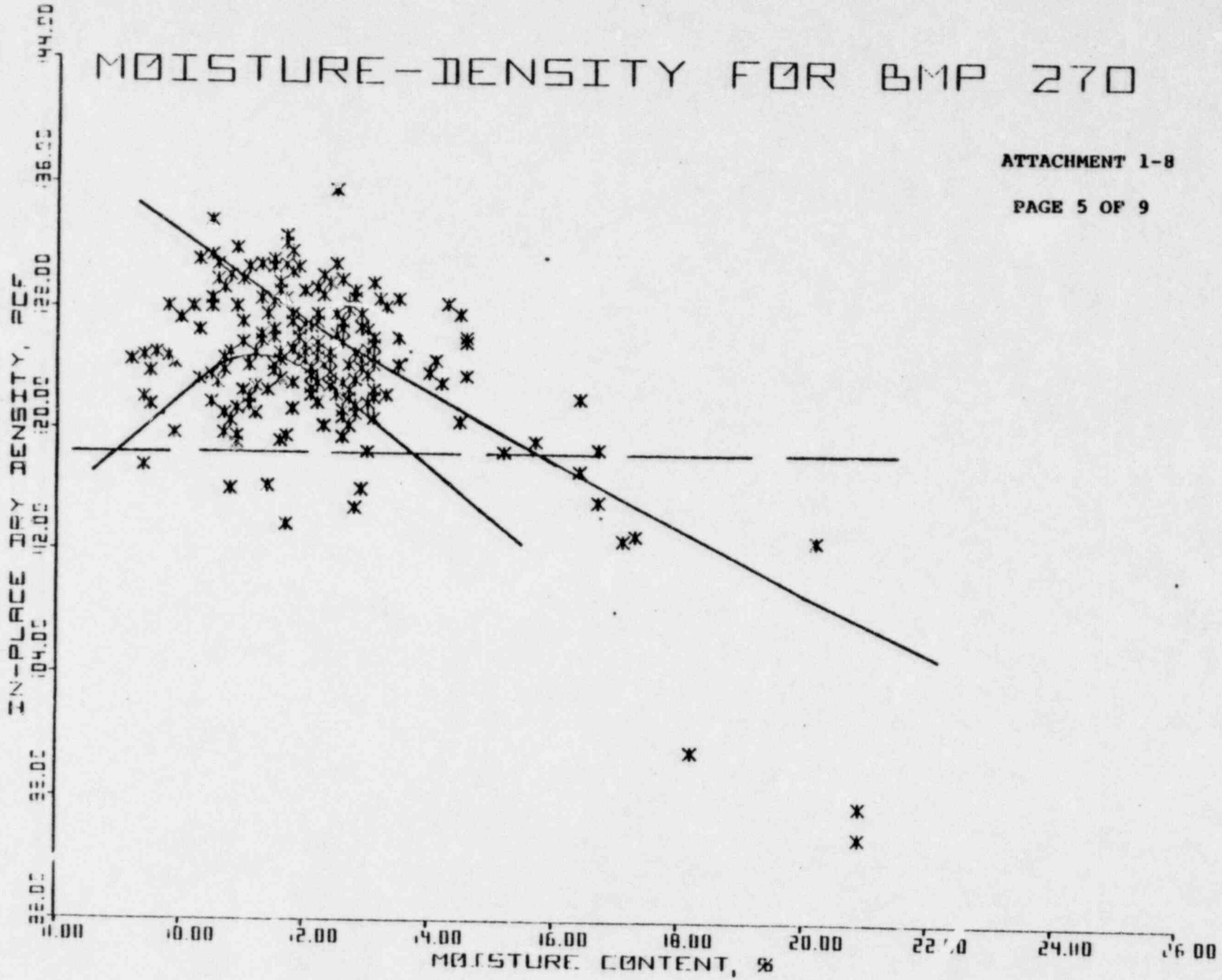
TOTAL COUNT OF TESTS = 65

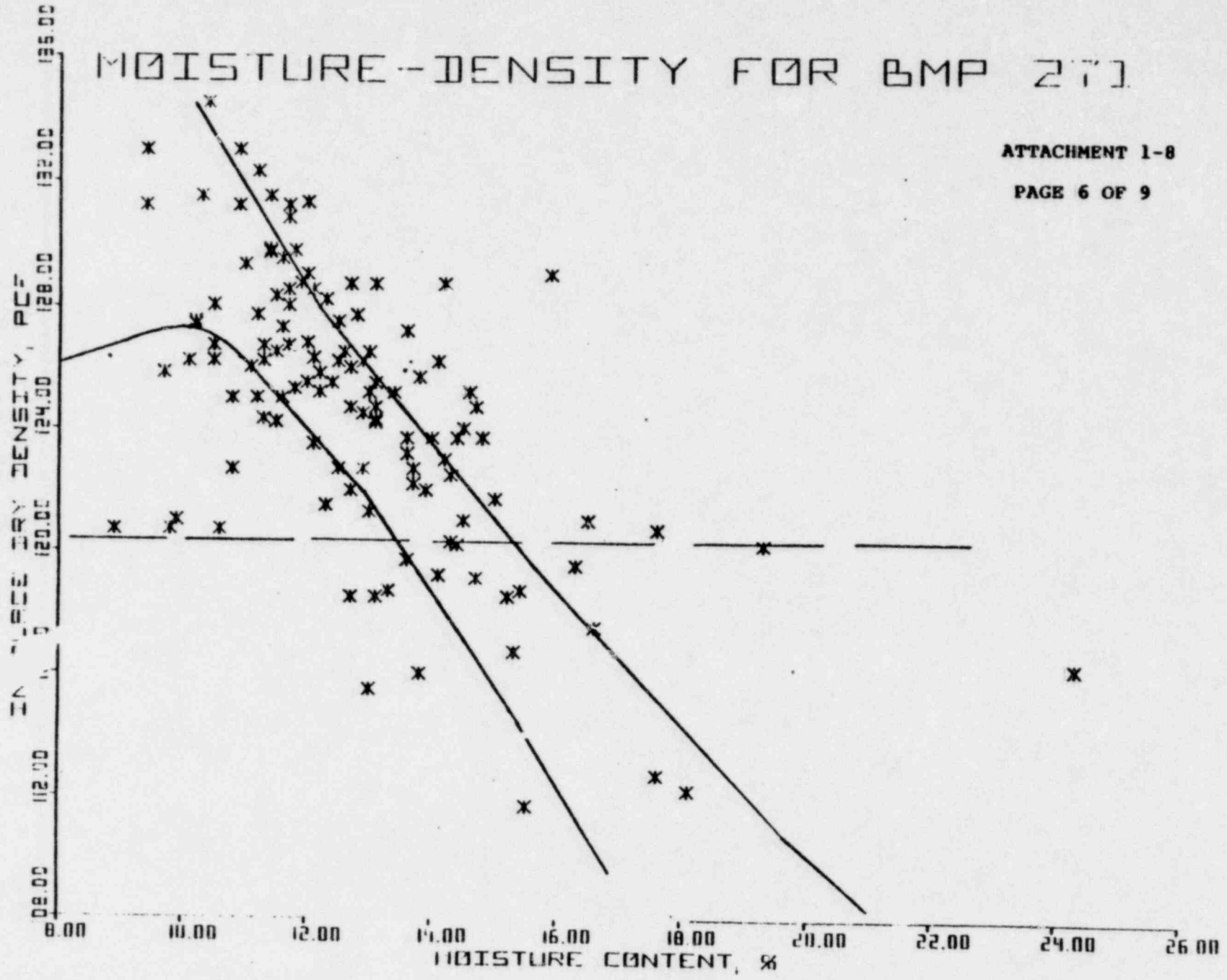
HISTOGRAM OF COMPACTION FOR CLASSIFICATION BOSS

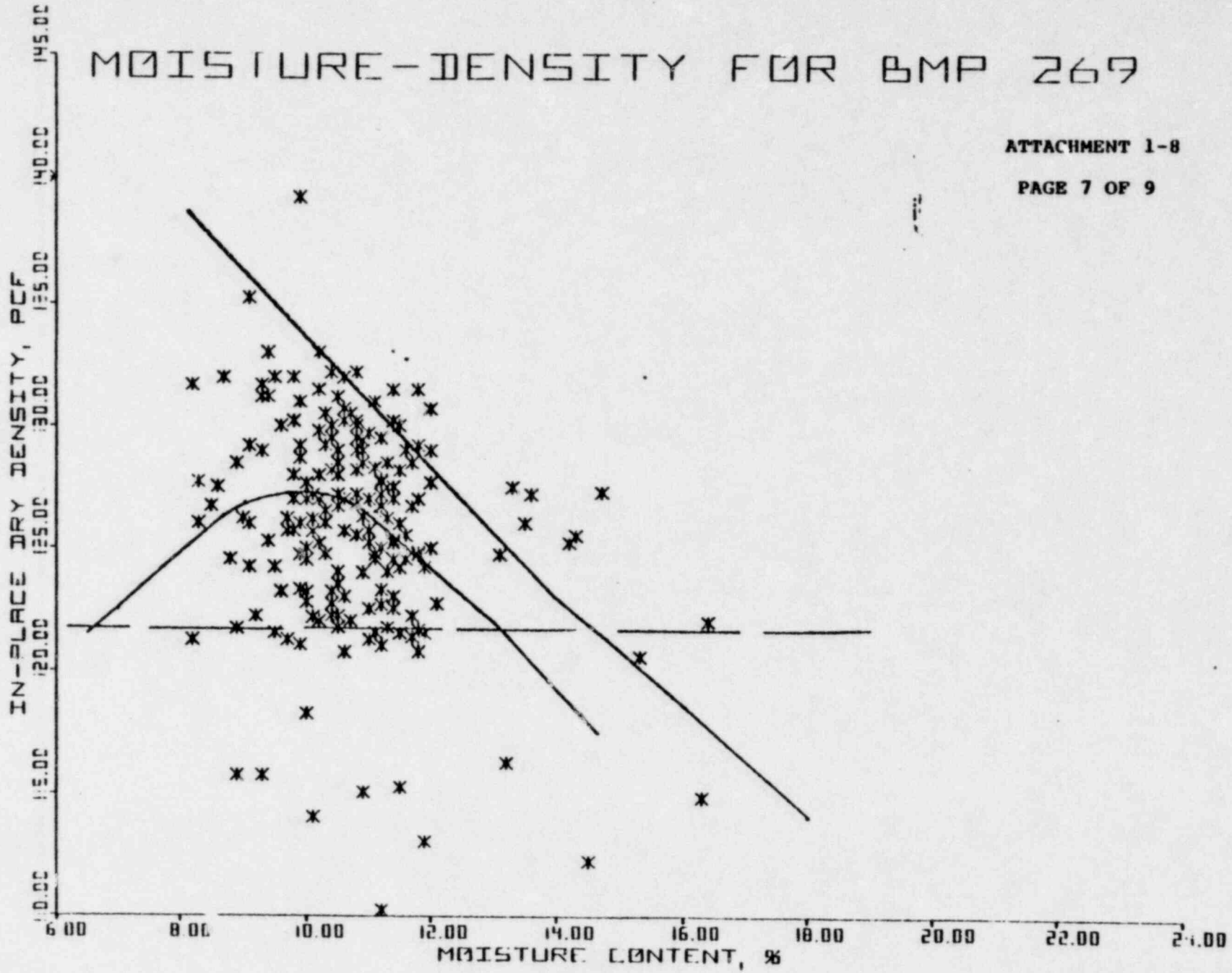
FOR THIS CLASSIFICATION, MAX LAB DRY DENSITY = 109.7

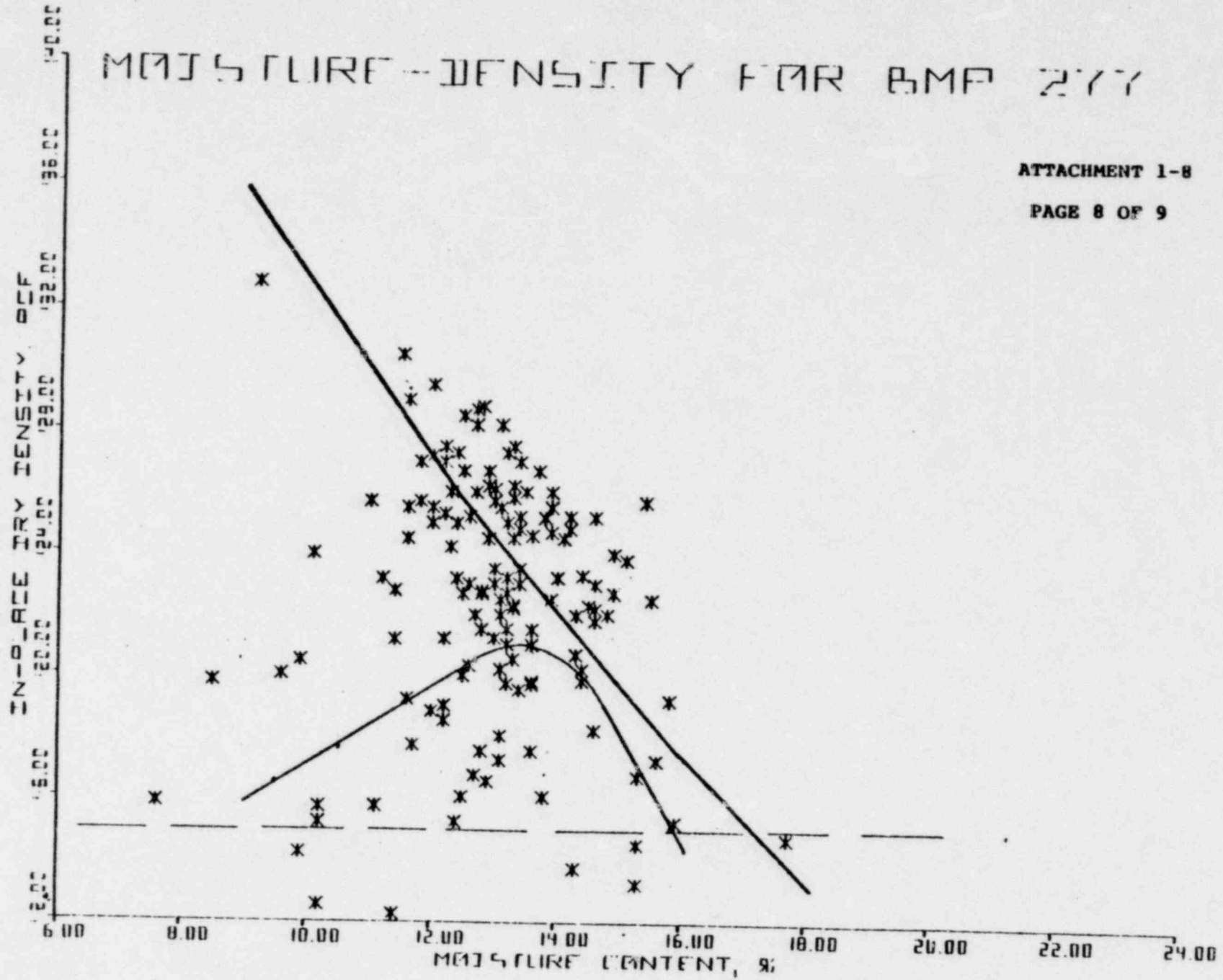
RANGE, % COMP.	HIST %	TEST COUNT
< 55	.4	2
55-60	.0	0
60-65	.2	1
65-70	1.4	8
70-75	.4	2
75-80	2.2	12
80-85	3.4	19
85-90	4.0	22
90-95	10.3	57
95-100	11.9	66
100-105	15.5	86
105-110	13.5	75
110-115	12.4	69
115-120	10.3	57
120-125	6.7	37
> 125	7.6	42

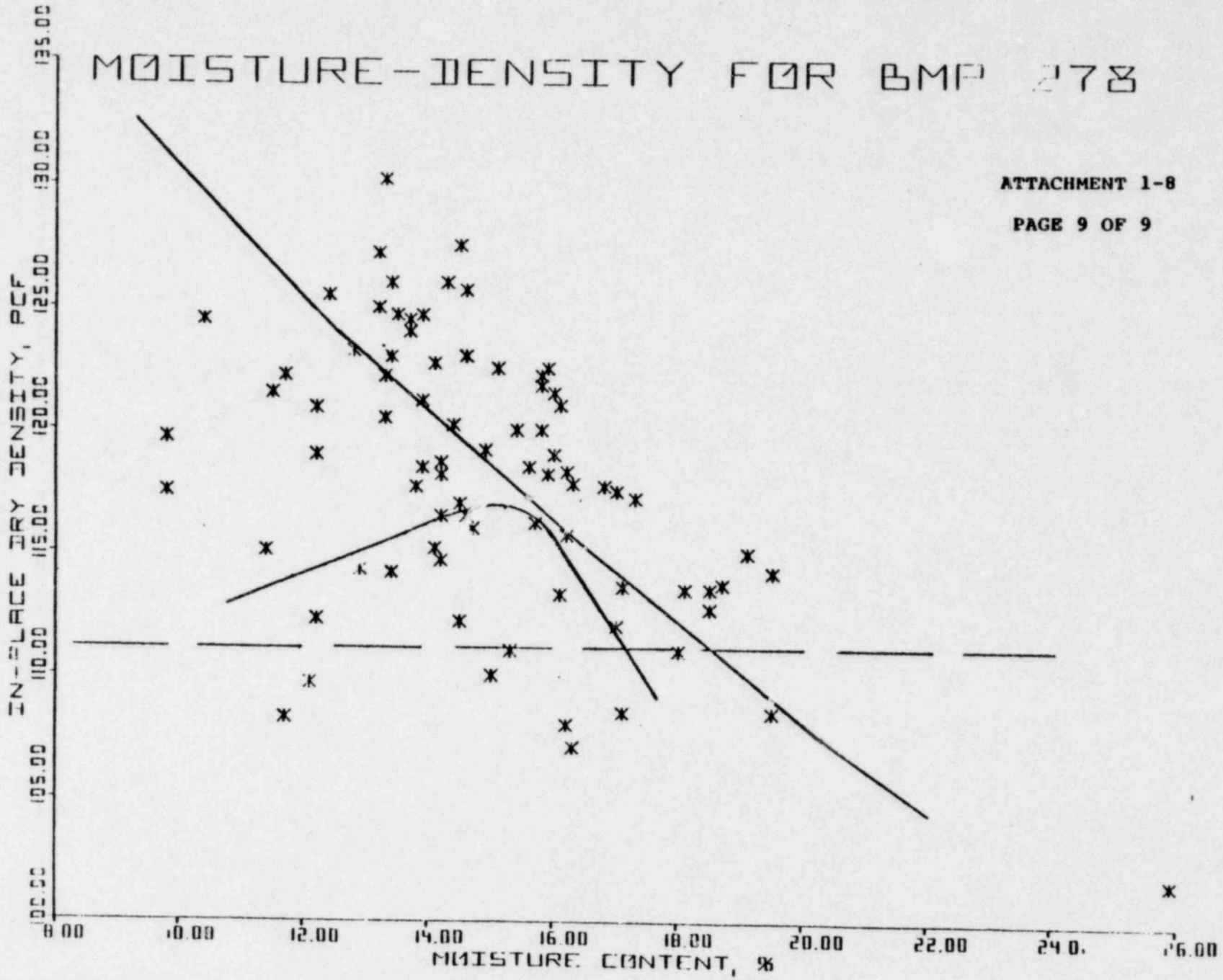
TOTAL COUNT OF TESTS = 555


MOISTURE-DENSITY FOR BMP 270
IN-PLACE DRY DENSITY, PCF
MOISTURE CONTENT, %
0.00
2.00
4.00
16.00
18.00
20.00
24.00


MOISTURE-DENSITY FOR BMP 27
DRY DENSITY, PCF
136.00
132.00
128.00
124.00
120.00
112.00
108.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
MOISTURE CONTENT, %


MOISTURE-DENSITY FOR BMP 269
IN-PLACE DRY DENSITY, PCF
MOISTURE CONTENT, %
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
120.00
125.00
130.00
135.00
140.00
145.00


MOISTURE-DENSITY FOR BMP 277
DRY DENSITY, PCF
MOISTURE CONTENT, %
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00


MOISTURE-DENSITY FOR BMP 278
IN-PLACE DRY DENSITY, PCF
135.00
130.00
125.00
120.00
115.00
110.00
105.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.0
MOISTURE CONTENT, %

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

SECTION 1.0, NRC QUESTION

SUPPLEMENTAL REQUEST FOR ADDITIONAL SOILS SETTLEMENT INFORMATION

23. We have reviewed your response to question 1 of our March 21, 1979 letter, "10 CFR 50.54 Request Regarding Plant Fill," including related amendments or supplements in your letters dated May 31, July 9, and August 10, 1979. We find that the information provided is not sufficient for completion of our review. Accordingly, provide the following additional information:

(1) Your response to question 1a does not provide sufficient information relative to the root causes of the 13 deficiencies. In order to determine the acceptability of corrective actions for the 13 deficiencies considering the possibility that these deficiencies are of a generic nature that could affect other areas of the facility, a more complete understanding of the root cause of each deficiency is necessary. Accordingly, provide a clearer description of the root causes of each of the 13 deficiencies, including a detailed discussion of the conditions that existed to allow these deficiencies and the changes that have been made to preclude the recurrence of such deficiencies. In this regard, if contributing causes are inadequate procedures, inspections, specification call outs, design reviews, audits, and/or technical direction, a clear and detailed description is necessary as to what allowed these conditions to exist and why.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

SECTION 2.0, INTRODUCTION

2.1 General

Subsections 3.1 through 3.13 of this Response to Question 23, Part (1) provide information supplementing our Responses to the NRC 10 CFR 50.54(f) Request Regarding Plant Fill for Midland Plant Units 1 and 2, Consumers Power Company Docket Numbers 50-329 and 50-330, transmitted from CPCo (S.H. Howell) to the NRR (H.R. Denton) on April 24, 1979 and our presentation to the Staff given on July 18, 1979, in Bethesda, Maryland, and documented via our transmittal from CPCo (S.H. Howell) to I&E (J.G. Keppler) on August 10, 1979. This introduction provides the rationale for determining the root cause of each of the 13 deficiencies identified through the investigations by the NRC, CPCo, and Bechtel; comments concerning the significance of the 13 deficiencies; and an explanation of the format used in addressing each deficiency.

In arriving at the root cause, the following factors were considered.

a. The purpose of the quality assurance program is to provide confidence that quality-related activities are performed in a controlled manner such that the product conforms to the FSAR and design requirements.

b. The control measures applicable to the performance of the quality-related tasks are to provide sufficient direction and methodology to supplement the capability of the assigned personnel.

c. Personnel assigned the responsibility of performing the quality-related tasks are to have the required capability, knowledge, and skill (when supplemented by specifications, drawings, procedures, instructions, and the prescribed control measures) to satisfactorily perform their assigned responsibilities.

d. As the quality assurance program develops and is implemented, revisions or corrections will be necessary to:

1. Achieve the optimum balance or relationship between personnel capabilities and the prescribed control measures

2. Accommodate unique or unplanned events

3. Incorporate related experience and state-of-the-art improvements

The 13 deficiencies identified through investigations by Bechtel, CPCo, and the NRC are each addressed with the same intensive effort, irrespective of their contribution to the cause of the settlement. The relative contribution that each deficiency made to the settlement can be qualitatively derived from Sections 7.0 (Cause Investigation) and 8.0 (Quality Assurance and Quality Control Aspects) of the documentation transmitted on August 10, 1979. Essentially, this documentation pointed out tnat the most probable causes of the settlement were as follows:

a. In some cases, lift thickness exceed the capability of the equipment being used. This was shown by the lift thickness/compactive effort tests conducted to qualify compaction equipment prior to resuming soils work. This indicates that the equipment was not adequately qualified.

b. Reliance on soil test results, or on the evaluation of the test results, provided a common mode failure mechanism because:

1. Construction relied on test results, or on the evaluation of the test results, from inprogress placements for qualification of equipment during the work.

2. Quality Control depended on the results, or on the evaluation of the results, of in-place soils tests for acceptance of the work. Associated with this principal reliance, surveillance type inspection procedures were applied to other soils work activity in the power block at least part of the time.

Therefore, deficiencies most closely associated with these two probable causes would bear the most significant contribution to settlement.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

2.2 Definitions

The following information is provided to achieve a common understanding of the terms used and information included in Part (1) of this Response to Question 23.

Title: This identifies the information as being in response to the applicable part of Question 23 under 10 CFR 50.54(f), transmitted from the NRR (L.S. Rubenstein) to CPCo (S.H. Howell) on September 11, 1979.

Deficiency Description: This provides a restatement of the reported deficiency as originally stated in the CPCo response referenced below.

I&E Report Reference: This identifies the pages of Inspection Report 78-20 which bear upon the reported deficiency.

CPCo Response Reference: This identifies the portion of the CPCo (S.H. Howell) letter to the NRR (H.R. Denton), Serial Howe-121-79, Appendix I, dated April 24, 1979, which provided the original response.

Discussion: This provides background information relative to the reported deficiency as it relates to the implementation of the Quality Assurance Program.

Quality Assurance Program Criterion: This identifies, by title, the Quality Assurance Program criterion, listed in Appendix B to 10 CFR 50, which is applicable to the reported deficiency and the identified root cause.

Program Element: This identifies the program element, governed by the criterion, which is applicable to the reported deficiency and the identified root cause.

Quality Assurance Program Policy: This identifies the Nuclear Quality Assurance Manual, Job 7220 section and number which define the related Quality Assurance Program Policy. The Manual identifies requirements and assigns responsibility for developing and implementing control measures for performing related quality assurance activities.

Control Document: This identifies the current control document developed and implemented by the organizations assigned the responsibility for performing the quality assurance activities under their cognizance.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

Instructions, Procedures, and Drawings: This identifies the instructions, procedures, and drawings which are prepared to supplement the control documents when it is necessary to provide more specific direction and methodology. This information is provided only when this level of subtier document is pertinent to the deficiency being discussed.

Root Cause: This identifies the root cause, for the reported deficiency described under "Discussion."

Remedial Action (Soils): This describes the actions taken or to be taken as a result of the reported deficiency which are needed to assure that prior and future soil placements conforms to the quality requirements defined in the FSAR and design documents.

Corrective Action (Programmatic): This describes the actions taken or to be taken to correct the root cause in the policies, procedures, and instructions in order to prevent recurrence of a similar type of deficiency.

Corrective Action (Generic): This describes the actions taken or to be taken when root causes are potentially generic to work other than soils work. The actions are to assure that the same deficiencies do not exist or, if found to exist on completed work, are investigated to the extent necessary to assure that the work conforms to quality requirements defined in the FSAR and design documents and that the work quality is evidenced in the quality records.

In view of your comments during our presentation to the NRC Staff on September 5, 1979 in Bethesda, Maryland, during which we presented some of this information, please note the added emphasis that we have placed on communicating both the programmatic and generic corrective actions.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

SECTION 3.0, DISCUSSION AND EVALUATION

3.1 Category I, Item 1

Deficiency Description: Inconsistency between specifications and the Dames & Moore Report

I&E Report Reference: Pages 9, 10, 16, and 17

CPCo Response Reference: Category I, Item 1

Discussion: A number of consultant reports were added to the PSAR as appendixes. The reports contained considerable and sometimes conflicting information. The information contained in the consultant reports was subject to being misconstrued as commitments. The personnel who reviewed and provided input for the PSAR did not provide documented disposition of the Dames & Moore Report recommendations to identify those recommendations which were PSAR commitments and those which were not.

Quality Assurance Program Criterion: Design control

Program Element: Design input

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section II, Number 2, "Design Control Procedure" (April 1978); and Section II, Number 4, "Design Criteria" (March 1974)

Control Document: Engineering Department Procedure 4.22, Revision 1, "Preparation and Control of SAR" (June 1974)

Root Cause: During the preparation and early revisions of the PSAR there were no procedural requirements or methods for documenting the disposition of consultant recommendations in the PSAR.

Remedial Action (Soils): The Dames & Moore Report was reviewed and recommendations were identified and dispositioned. Dames & Moore recommendations which were included in the FSAR were unaffected by this review and no revisions to the FSAR were necessary as a result of this review. However, as a result of other activities, changes were made in design and construction documents which relate to some subjects covered in the Dames & Moore Report.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

Corrective Action (Programmatic): Engineering has revised Engineering Department Procedure 4.22 to clarify that Engineering personnel preparing the FSAR will follow the requirements of Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" (September 1975). Specifically, Regulatory Guide 1.70 (Pages iv and v of the Introduction) requires that such consultant reports only be referenced with the applicable commitments and supporting information included in the text (third paragraph, Page v). Such a requirement precludes repetition of this circumstance. | 8 | 8

Corrective Action (Generic): Consultant reports other than Dames & Moore were considered in accordance with the guidelines provided in NRC Regulatory Guide 1.70, Revision 2. Consultant reports were not attached to the FSAR, but portions of consultant reports were extracted and incorporated into the FSAR text itself. Those portions incorporated into the FSAR become commitments. Therefore, disposition of recommendations in consulting reports has been adequately accounted for in the preparation of the FSAR.

Verification that those portions of consultant reports determined to be commitments and incorporated into the FSAR have been adequately reflected in project design documents has been accomplished via the FSAR rereview program described in the response to Question 23, Part (2). | 10

The two Bechtel QA audit findings reported in our April 24, 1979, response (Paragraph D.1, Page I-8) have been closed out. The results of this audit are being utilized in the FSAR control system study committed to in Subsection 3.3 of this response to Part (1).

3.2 Category I, Item 2

Deficiency Description: Lack of formal revisions of specifications to reflect clarification of specification requirements

I&E Report Reference: Pages 9 through 14

CPCo Response Reference: Category I, Item 2

Discussion: Interoffice memoranda, memoranda, telexes, TWXs, etc were often used to clarify the intent of the specifications. It is possible that in some situations the clarifications provided through these methods were interpreted by the user as modifying the specification without formally changing the wording of the specification.

Quality Assurance Program Criterion: Design control

Program Element: Design change control

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section II, Number 5, "Design Process and Change Control" (June 1977)

Control Document: Engineering Department Project Instruction 4.49.1, Revision 3, "Specification Change Notice" (May 1979)

Root Cause: Prior to Revision 2 (May 4, 1979), Engineering Department Project Instruction 4.49.1 did not address the use of interoffice memoranda, memoranda, telexes, TWXs, etc which might be interpreted by the user as modifying the requirements of the specification.

Remedial Action (Soils): Applicable Specifications 7220-C-210 and 7220-C-211 were revised to incorporate interpretations that affected specification requirements. The acceptability of the completed work was independently determined by a subsequent subsurface investigation program.

Corrective Actions (Programmatic):

1. On April 3, 1979, Midland Project Engineering Group Supervisors in all disciplines were reinstructed that the only procedurally correct methods of implementing specification changes are through the use of specification revisions or Specification Change Notices. This was followed by an interoffice memorandum from the Project Engineer to all Engineering Group Supervisors on April 12, 1979.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

2. Engineering Department Project Instruction 4.49.1 was revised in Revision 2 to state, "Under no circumstances will interoffice memoranda, memoranda, telexes, TWXs, etc be used to change the requirements of a specification."

Corrective Action (Generic): A review of interoffice memoranda, memoranda, telexes, TWXs, and other correspondence relating to specifications for construction and selected procurements of Q-Listed items will be initiated.

The purpose of the review will be to identify any clarifications which might reasonably have been interpreted as modifying a specification requirement and for which the specification itself was not formally changed. An evaluation will be made to determine the effect on the technical acceptability, safety implications of the potential specification modification, and any work that has been or may be affected. If it is determined that the interpretation may have affected any completed work or future work, a formal change will be issued and remedial action necessary for product quality will be taken in accordance with approved procedures.

The foregoing procedure will be followed for all specifications applying to construction of Q-Listed items.

For specifications concerning the procurement of Q-Listed items, the foregoing procedure will be implemented on a random sampling basis. The sample size has been established and the specification selection has been made.

Review and acceptance criteria for the specifications have been defined.

The review of the initially selected procurement specifications indicated that the acceptance criteria were not met in one discipline. The review was expanded to 100% of the specifications in that discipline (both construction and procurement specifications), and for the other disciplines the sample of procurement specifications was increased to permit each discipline's review to be evaluated individually.

This expanded review is scheduled to be completed by June 5, 1981.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

3.3 Category I, Item 3

Deficiency Description: Inconsistency of information within the FSAR relating to diesel generator building fill material and settlement

I&E Report Reference: Pages 6 through 8

CPCo Response Reference: Category I, Item 3

Discussion: When the FSAR was prepared and reviewed, the major backfill operations were complete. There were no known inconsistencies or recent design document changes related to FSAR Subsections 2.5.4 and 3.8.5; therefore, these subsections were essentially inactive and were not subject to any further review. The inconsistencies within the FSAR and between the FSAR and design documents were not detected. The inconsistency between Subsections 2.5.4 and 3.8.5 with respect to the settlement values resulted because the two subsections were prepared by separate organizations (Geotechnical Services and Civil Engineering), neither of which were aware of the multiple display of similar information in the opposite subsection. The inconsistency between FSAR Subsection 2.5.4 and the project design drawing (Drawing 7220-C-45) with respect to the fill material resulted because at the time of FSAR preparation the Geotechnical Services personnel preparing the FSAR were unaware, in this case, of the status of the design drawing prepared by Civil Engineering.

Quality Assurance Program Criterion: Design control

Program Element: Design input

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section II, Number 4, "Design Criteria" (March 1974)

Control Documents: Engineering Department Procedure 4.22, Revision 1, "Preparation and Control of Safety Analysis Reports" (June 1974); Engineering Department Project Instruction 4.25.1, Revision 6, "Design Interface Control (Internal)" (September 1979); and Engineering Department Project Instruction 4.1.1, Revision 0, "Preparation of the Design Requirements Verification Checklist" (July 1974)

Root Cause: The control document did not provide sufficient procedural control for preparation and review of the FSAR.

RESPONSE TO QUESTION 23, PART (1) 50.54(f)

Remedial Action (Soils): The inconsistencies between FSAR Subsections 2.5.4 and 3.8.5 have been corrected via FSAR Revision 18 (February 28, 1979). The same revision also corrected the inconsistency between FSAR Subsection 2.5.4 and Design Drawing C-45.

Corrective Actions (Programmatic):

1. A study was completed which examined current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes have been initiated by the revision of or addition to the Engineering Department Procedures. | 8 | 8

2. To preclude any future inconsistencies between the FSAR and specifications, Engineering Department Project Instruction 4.1.1 has been revised to state that all specification changes, rather than just "major changes," will be reviewed for consistency with the FSAR. | 8 | 8

Corrective Action (Generic): FSAR sections have been rereviewed as discussed in the Response to Question 23, Part (2). | 10

3.4 Category I, Item 4

Deficiency Description: Inconsistency between basis for settlement calculations for diesel generator building and design basis

I&E Report Reference: Pages 20 and 21

CPCo Response Reference: Category I, Item 4

Discussion: The initial settlement calculations were performed by Geotechnical Services based on preliminary information provided by Project Engineering. The final diesel generator building foundation design configuration (as described in the FSAR) was different from the preliminary information. The originator of the final design configuration did not interface with Geotechnical Services to verify impact on final settlement calculations. It was subsequently determined that the change in foundation design would have an insignificant effect on the calculation. However, no changes or notations to the original calculations were made, thus resulting in an inconsistency between the basis for settlement calculations and design basis.

Quality Assurance Program Criterion: Design control

Program Element: Design coordination

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section II, Number 2, "Design Control Procedures" (April 1978); Section II, Number 9, "Design Interface" (March 1974); and Section II, Number 10, "Speciality Group Design Control" (June 1977)

Control Documents: Engineering Department Procedure 4.22, Revision 1, "Preparation and Control of Safety Analysis Reports" (June 1974); Engineering Department Project Instruction 4.25.1, Revision 6, "Design Interface Control (Internal)" (September 1979); Procedure FP-6437-1, "Design Calculations" (January 1979); and Engineering Department Procedure 4.37, Revision 2, "Design Calculations" (May 1976).

Root Causes:

1. Diesel generator building foundation design changes initiated by Project Engineering were not coordinated with Geotechnical Services, as required by the control documents.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

2. Geotechnical Procedure FP-6437 did not require that the calculations show evidence of any evaluations for changes to input data, even when considered to be of no significance to the results.

Remedial Action (Soils): Settlement calculations will be revised after the completion of the diesel generator building surcharge operation. At that time, the design drawing will be coordinated with Geotechnical Services and any changes or notations needed to reflect design changes will be made.

Corrective Actions (Programmatic):

1. An interoffice memorandum dated April 12, 1979, was issued by Geotechnical Services to alert personnel of the need to revise or annotate calculations to reflect current design status.

2. In view of the above, Geotechnical Services has revised Procedure FP-6437 to require that calculations be annotated to reflect current design status. | 8

3. Engineering Department Procedure 4.37 has also been revised to require that calculations be annotated to reflect current design status. | 8

Corrective Action (Generic): This is considered an isolated case and not generic based on Quality Assurance audits of Geotechnical Services conducted in February and August 1979. The results of these audits indicate that this area is effectively controlled. Quality Engineering surveys and Quality Assurance monitorings will verify future coordination of design documents by Geotechnical Services and Project Engineering.

3.5 Category I, Item 5

Deficiency Description: Inadequate design coordination in the design of the duct bank

I&E Report Reference: Pages 23 and 24

CPCo Response Reference: Category I, Item 5

Discussion: Four vertical duct banks were designed and constructed without sufficient clearance to allow for relative vertical movement between the duct banks and the building footings. Civil Drawings 7220-C-1001 and 7220-C-1002 (which show the footing requirement) were coordinated with Electrical Drawing 7220-E-502 (which shows the duct bank stub-up location and dimensions), as required by Engineering Department Procedure 4.46 and Engineering Department Project Instruction 4.25.1. Drawing 7220-E-502 refers to Drawing 7220-E-543, which shows a minimum size for the underground duct bank some distance away from the stub-up. Neither electrical nor civil drawings show how or where to accomplish the transition from the stub-up size to the underground duct size, nor do they show firm definition of duct size. The transition and final size of each duct were established by the Field Engineers during construction. The civil design was based on the stub-up dimensions shown in Drawing 7220-E-502, and did not acknowledge that the duct bank size under the slab and/or footing was to be determined by Field Engineering.

Quality Assurance Program Criterion: Instructions, procedures, and drawings

Program Element: Preparation of drawings

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section II, Number 2, "Design Control Procedures" (April 1978); and Section II, Number 9, "Design Interface" (March 1974)

Control Documents: Engineering Department Procedure 4.46, Revision 3, "Project Drawings" (May 1976) and Engineering Department Project Instruction 4.25.1, Revision 6, "Design Interface Control (Internal)" (September 1979)

Instructions, Procedures, and Drawings: Electrical Standard Detail Drawings and Civil Standard Detail Drawings

RESPONSE TO QUESTION 23, PART (1) 150.54(f)1

Root Cause: Failure of the drawings to provide Construction with the information necessary to prevent interference.

Remedial Actions (Soils):

1. Provisions were made to allow independent vertical movement between the diesel generator building and the duct banks.

2. Bechtel Project Engineering has reviewed the design drawings for cases where ducts interface with structures to determine the possibility of the duct being enlarged over the design requirements and the effect this enlargement may have upon the structures' behavior. Forty-four individual or groups of similar buried electrical duct banks were reviewed. The terminations of each case were reviewed, resulting in the identification of 23 questionable vertical interfaces. Based on geometry, depth of vertical leg, and whether sufficient details were available on the design drawing, 11 cases were identified for detailed investigation. Additional information was obtained from the jobsite to define how the interface was constructed and whether any unusual behavior existed.

   The review concluded that several nonsafety-related transformer pads experiencing differential settlement may be exaggerated by the duct bank interface. However, in no case except the diesel generator building has settlement been completely restricted or do details, geometry, or subgrade conditions indicate that settlement would be completely restricted.

Corrective Actions (Programmatic):

1. Civil/Structural Design Criteria 7220-C-501 has been modified to contain the requirement that a duct bank penetration shall be designed to eliminate the possibility of the nonspecific size duct interacting with the structures. | 10 | 10

2. The civil standard detail drawings have been revised to include a detail showing horizontal and vertical clearance requirements for duct bank penetrations. The detail addresses any mud mat restrictions. | 8 | 8

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

Corrective Action (Generic): This condition is not considered generic, but rather an anomaly unique to electrical duct banks. The uniqueness arises from the practice of not pinpointing the size or location of the duct bank on the drawings and leaving it to be established during construction.

3.6 Category II, Item 1

Deficiency Description: Insufficient compactive effort used in backfill operation

I&E Report Reference: Not applicable

CPCo Response Reference: Category II, Item 1

Discussion: Specifications 7220-C-210 and 7220-C-211 specified requirements for selection and approval of compaction equipment on the basis of demonstration. The equipment was used on the basis of achieving either satisfactory in-place test results or satisfactory evaluation of the test results. There were no field control documents or procedures to define requirements for the qualification of soils compaction equipment. There were no control documents to govern the requirements for control measures pertaining to soils placement and compaction. Construction and Quality Control relied on in-place soil test results, or on the evaluation of these results, to determine the acceptability of placement and compaction activities. These soil test results or their evaluations were in error in numerous cases.

Quality Assurance Program Criterion: Instructions, procedures, and drawings

Program Element: Preparation of instructions, procedures, and drawings

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section IV, Number 1, "Construction Site Quality Program" (April 1978); and Section V, Number 13, "Procedure Control" (June 1977)

Control Document: Field Procedure FPG-1.000, "Initiating and Processing Field Procedures, Instructions, and Specifications" (January 1979)

Instructions, Procedures, and Drawings: Field Instruction FIC 1.100, Revision 0, "Q-Listed Soils Placement Job Responsibilities Matrix" (July 1979)

Root Causes:

1. Reliance was placed on in-place test results, or on the evaluation of the test results, for evaluating compaction equipment. Satisfactory soil test results, or evaluations of test results, implied that adequate compactive effort was obtained and equipment capability and fill placement methods were not questioned. (Incorrect soils test results are addressed in Subsection 3.10.)

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

2. The Quality Assurance Program requirement to establish responsibility for measures to control the placement and compaction of soils and the qualification of construction equipment was not adequately implemented.

Remedial Actions (Soils):

1. Compaction equipment currently in use has been qualified and Construction has been notified of the parameters governing the use of the equipment.

2. Project Quality Control Instruction (PQCI) C-1.02 was revised to include verification of the use of qualified equipment and compliance with qualified procedures.

Corrective Actions (Programmatic):

1. Field Instruction FIC 1.100, "Q-Listed Soils Placement Job Responsibilities Matrix," has been prepared and establishes responsibilities for performing soils placement and compaction.

2. Field Instruction 1.100 has been supplemented by establishing requirements for demonstrating equipment capability, including responsibility for equipment approval, and providing records identifying this capability. | 8 | 8

3. Quality Assurance has issued a Nuclear Quality Assurance Manual amendment to clarify the requirement that procedures include measures for qualifying equipment under specified conditions. | 10 | 10

4. Engineering clarified specifications and Construction prepared procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Item 3 (above). | 10 | 8 | 10

Corrective Action (Generic): Construction specifications, instructions, and procedures were reviewed to identify any other equipment requiring qualification which has not yet been qualified. No such equipment was identified.

3.7 Category II, Item 2

Deficiency Description: Insufficient technical direction in the field

I&E Report Reference: Pages 24 through 26

CPCo Response Reference: Category II, Item 2

Discussion: The Dames & Moore Report and Civil/Structural Design Criteria 7220-C-501 state, in part, "Filling operations shall be performed under the technical supervision of a qualified Soils Engineer...." The technical direction and supervision were provided by Field Engineers and Supervisors who were assigned the responsibility for soils placement. The technical direction and supervision provided were not properly deployed to overcome the lack of documented instructions and procedural controls. Reliance on test results, or on the evaluations of test results, did not identify the need for additional direction and supervision.

Field Procedure FPG 3.000, "Job Responsibilities of Field Engineers, Superintendents, and Field Subcontract Engineers," was not intended to provide instructions for the performance of specific tasks and functions.

Quality Assurance Program Criterion: Instructions, procedures, and drawings

Program Element: Preparation of instructions, procedures, and drawings

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section IV, Number 1, "Construction Site Quality Program" (April 1978); and Section V, Number 13, "Procedure Control" (June 1977)

Control Document: Field Procedure FPG 3.000, "Job Responsibilities of Field Engineers, Superintendents, and Field Subcontract Engineers" (October 1977)

Instructions, Procedures, and Drawings: None

Root Cause: Reliance on test results, or on the evaluations of test results, and surveillance by Quality Control instead of providing sufficient technical direction through documented instructions and procedural controls. (Incorrect Soil Test Results are addressed in Subsection 3.10).

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

Remedial Action (Soils): One fulltime and one parttime onsite Geotechnical Soils Engineer have been assigned. These engineers provide technical direction and monitoring of the process.

Corrective Action (Programmatic): Field Instruction FIC 1.100, "Q-Listed Soils Placement Job Responsibilities Matrix," has been prepared and establishes responsibilities for performing soils placement and compaction.

Corrective Action (Generic): Design documents, instructions, and procedures for those activites requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed, and Field Engineering and Quality Control review is scheduled for completion by February 27, 1981. Any revisions required will be completed by April 17, 1981. 10

3.8 Category III, Item 1

Deficiency Description: Inadequate Quality Control inspection of placement of fill

I&E Report Reference: Pages 25 through 29

CPCo Response Reference: Category III, Item 1

Discussion: The Nuclear Quality Assurance Manual requires that Construction Quality Control Procedures "define the method for indirect control by monitoring of processing methods, equipment, and personnel, when inspection of processed items is impossible or disadvantageous." Control Document SF/PSP G-6.1, "Quality Control Inspection Plans," does not adequately include or reference this requirement in the instructions for preparation of Quality Control Instructions. Quality Control Instruction PQCI C-1.02 did not adequately satisfy this requirement. The inspection of soils was accomplished by "surveillance," and did not require verification of the controls specified in Specifications 7220-C-210 and 7220-C-211. Soil test results, or the evaluations of soil test results, were used as the basis for quality verification.

Quality Assurance Program Criterion: Inspection instructions, procedures, and drawings

Program Element: Establishment of an inspection program, documented instructions and procedures for accomplishing the inspection activity, and the preparation of instructions and procedures

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section IV, Number 5, "Field Inspection and Test" (June 1977)

Control Document: SF/PSP G-6.1, Revision 4, "Quality Control Inspection Plans" (January 1978)

Instructions, Procedures, and Drawings: PQCI C-1.02, Revision 4, "Compacted Backfill" (July 1979)

Root Causes:

1. Control Document SP/PSP G-6.1 does not include sufficient specificity in its requirements for the preparation of inspection instructions.

2. Too much reliance was placed on the Quality Control Inspector's ability, without sufficiently specific inspection instructions.

3. Reliance was placed on soil test results, or on the evaluation of soil test results, which were in error in numerous cases. (Incorrect Soil Test Results are addressed in Subsection 3.10.)

Remedial Actions (Soils):

1. PQCI C-1.02 has been revised to incorporate the specific characteristics to be verified by Quality Control.

2. An in-depth soils investigation program, which was implemented as described in our prior transmittals, provides verification of the acceptability of the soils or identifies any nonconformances requiring further remedial action.

Corrective Action (Programmatic): Control Document SP/PSP G-6.1 has been revised to provide requirements for inspection planning specificity and for the utilization of scientific sampling rather than percentage sampling. |10 |10

Corrective Actions (Generic)

1. QCIs in use will be reviewed to ascertain that provisions have been included consistent with the revised control document. This action and any required revisions are scheduled to be completed by April 17, 1981. |10

2. The impact of Corrective Action Item 1 (above) on completed work will be evaluated, and appropriate actions will be taken as necessary. This action is scheduled to be completed by April 17, 1981. |10

3.9 Category III, Item 2

Deficiency Description: Inadequate soil moisture testing

I&E Report Reference: Pages 14 through 16

CPCo Response Reference: Category III, Item 2

Discussion: Prior to 1978, moisture content was controlled by tests performed after compaction. Few or no tests were performed on the fill during compaction, as required by Specification 7220-C-210, Section 12.6. "During compaction" was interpreted by personnel in the field as the entire process of placing, compacting, and testing. The moisture content was measured during the density test, which was performed immediately after compaction. Reconditioning was done after testing.

Quality Assurance Program Criterion: Inspection instructions, procedures, and drawings

Program Element: Establishment of an inspection program, the documented instructions and procedures for accomplishing the inspection activity, and the preparation of instructions and procedures

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section IV, Number 5, "Field Inspection and Test" (June 1977)

Control Document: SF/PSP G-6.1, Revision 4, "Quality Control Inspection Plans" (January 1978)

Instructions, Procedures, and Drawings: PQCI, C-1.02, Revision 4, "Compacted Backfill" (July 1979)

Root Causes:

1. Control Document, SF/PSP G-6.1 does not require sufficient specificity for establishing an inspection program and for the preparation of inspection instructions.

2. Reliance was placed on the informal incorrect interpretations of the specification relative to moisture testing. This is discussed in Subsection 3.2.

3. Reliance was placed on Quality Control surveillances of moisture testing.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

4. Reliance was placed on the incorrect results of the density tests, or on the incorrect evaluation of the results, to the exclusion of the moisture test results. (Incorrect Soil Test Results are addressed in Subsection 3.10).

Remedial Actions (Soils):

1. The specifications were revised to provide more definitive requirements for soil moisture testing.

2. PQCI C-1.02 was revised to provide specific inspection requirements for verifying soil moisture content, rather an surveillance.

3. Field instruction FIC 1.000, "Q-Listed Soils Placement Job Responsibility Matrix," has been prepared, and establishes responsibilities for performing soils placement and compaction.

Corrective Actions (Programmatic):

1. Control Document SF/PSP G-6.1 has been revised to provide requirements for inspection planning specificity and for the utilization of scientific sampling rather than percentage sampling. |10 |10

2. Engineering Department Project Instruction 4.49.1, Revision 3 now states, "Under no circumstances will interoffice memoranda, memoranda, telexes, TWXs, etc be used to change the requirements of a specification." This will provide controlled and uniform interpretation of specification requirements.

3. On April 3, 1979, Midland Project Engineering Group Supervisors in all disciplines were reinstructed that the only procedurally correct methods of implementing specification changes are through the use of specification revisions or Specification Change Notices. This was followed by an interoffice memorandum from the Project Engineer to all Engineering Group Supervisors on April 12, 1979.

RESPONSE TO QUESTION 23, PART (f) [50.54(f)]

Corrective Actions (Generic):

1. QCIs in use will be reviewed to ascertain that provisions have been included consistent with the revised control document. This action and any required revisions are scheduled to be completed by April 17, 1981.

2. The impact of Corrective Action Item 1 (above) on completed work will be evaluated, and appropriate actions will be taken as necessary. This action is scheduled to be completed by April 17, 1981.

3. A review of interoffice memoranda, memoranda, telexes, TWXs, and other correspondence relating to specifications for construction and selected procurements of Q-Listed items will be initiated.

   The purpose of the review will be to identify any clarifications which might reasonably have been interpreted as modifying a specification requirement and for which the specification itself was not formally changed. An evaluation will be made to determine the effect on the technical acceptability, safety implications of the potential specification modification, and any work that has been or may be affected. If it is determined that the interpretation may have affected any completed or future work, a formal change will be issued and remedial action necessary for product quality will be taken in accordance with approved procedures.

   The foregoing procedure will be followed for all specifications applying to construction for Q-Listed items.

   For specifications concerning the procurement of Q-Listed items, the foregoing procedure has been implemented on a random sampling basis. The sample size has been established and the specification selection has been made.

   Review and acceptance criteria for the specifications have been defined.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

The review of the initially selected procurement specifications indicated that the acceptance criteria were not met in one discipline. The review was expanded to 100% of the specifications in that discipline (both construction and procurement specifications), and for the other disciplines the sample of procurement specifications was increased to permit each discipline's review to be evaluated individually.

This expanded review is scheduled to be completed by June 5, 1981.

3.10 Category III, Item 3

Deficiency Description: Incorrect soil test results

I&E Report Reference: Not applicable

CPCo Response Reference: Category III, Item 3

Discussion: A review of soils test reports indicates that some test reports contain errors and inconsistencies in data. Surveillance and test report reviews did not identify these errors and inconsistencies. The Quality Control surveillance and review included steps to verify that the test results were reported as either percent compaction or relative density, as appropriate; that specification requirements for compaction and moisture content were within specified limits; and that the report form was properly completed and contained the required data and authorized signature. This was in accordance with the requirements of Quality Control Instruction 7220-SC-1.05, "Material Testing Laboratories," which includes instructions for monitoring the performance of verification testing performed by the testing laboratory.

Quality Assurance Program Criterion: Control of purchased material, equipment, and services (subcontractors)

Program Element: Surveillance of the subcontractor's performance

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section IV, Number 11, "Field Subcontractor Control" (June 1977); and Section IV, Number 5, "Field Inspection and Test" (June 1977)

Control Document: SF/PSP G-9.1, Revision 1, "Control of Subcontractor Work" (July 1977)

Instructions, Procedures, and Drawings: Quality Control Instructions 7220-SC-1.05, "Material Testing Services" (October 1977)

Root Cause: Technical procedures available to control the testing were inadequate, and the technical direction of the testing operations did not avoid or detect the incorrect soil test results.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

Remedial Actions (Soils):

1. Geotechnical Services has completed an investigation which includes an in-depth review of testing performed by U.S. Testing and the reported test results. The purpose of this investigation was to identify the type of testing errors which were made in order to facilitate analysis by U.S. Testing and to accomplish Programmatic Corrective Action (below) and Remedial Action Item 2 (below).

2. Based on Item 1 above, the requirements for the control of testing were adjusted, requiring the Testing Subcontractor to check all field density tests for cohesive material against a zero-air-voids curve. A specification change has been issued. Selection of proctor curves will no longer be a problem because each field density test will be accompanied by a separate laboratory standard which will provide a direct comparison. This was directed by a letter to U.S. Testing and reflected in Specification Change Notice C-208-9004, dated April 13, 1979.

3. PQCI-SC-1.05 was revised to add more stringent requirements for in-process inspection of U.S. Testing's soil testing activities.

4. An in-depth soils investigation program which was implemented as described in our prior transmittals, provides verification of the acceptability of the soils or identifies any nonconformances requiring further remedial action. This action is identical to Remedial Action Item 2 in Subsection 3.8.

Corrective Action (Programmatic): Guidelines for surveillance of testing operations have been developed and included in Field Instructions for the onsite Soils Engineer. Engineering/Geotechnical Services has developed the guidelines, and Field Engineering has prepared the instructions. | 8 | 8

Corrective Actions (Generic):

1. U.S. Testing was required to demonstrate to cognizant Engineering Representatives that testing procedures, equipment, and personnel used for | 10

quality verification testing (for other than NDE and soils) were capable of providing accurate test results in accordance with the requirements of applicable design documents. |10 |10

2. A sampling of U.S. Testing's test reports (for other than NDE and soils) were reviewed by cognizant Engineering Representatives to ascertain that results evidence conformance to testing requirements and design document limits. |10 |10

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

3.11 Category III, Item 4

Deficiency Description: Inadequate subcontractor test procedures

I&E Report Reference: Not applicable

CPCo Response Reference: Category III, Item 4

Discussion: The procedures used for soils testing did not cover the following activities:

1. Developing and updating the family of proctor curves;

2. Visually selecting the proper proctor curves;

3. Developing additional proctor curves for changing materials occurring between normal frequency curves; and

4. Using alternative methods of determining the proper laboratory maximum density where visual comparison is not adequate.

Bechtel Specification 7220-G-22, Revision 1 (June 22, 1973) is an attachment to Specification 7220-C-208 and specifies the requirements for instructions, procedures, and drawings. These technical procedures were not prepared.

Quality Assurance Program Criterion: Control of purchased material, equipment, and services (subcontractor)

Program Element: Control of supplier-generated (subcontractor-generated) documents

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section III, Number 9, "Supplier Document Review" (June 1977); and Section IV, Number 11, "Field Subcontractor Control" (June 1977)

Control Document: SF/PSP G-9.1, Revision 1, "Control of Subcontractor Work" (July 1977)

Instructions, Procedures, and Drawings: Quality Control Instructions 7220/SC-1.05, "Material Testing Services" (October 1977)

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

Root Cause: Adequate technical procedures for control of the testing were not prepared.

Remedial Actions (Soils):

1. Geotechnical Services has completed an investigation which includes an in-depth review of testing performed by U.S. Testing and the reported test results. The purpose of this investigation was to identify the type of testing errors which were made in order to facilitate analysis by U.S. Testing and accomplish Remedial Action Item 2.

2. Based on Item 1 above, the requirements for the control of testing were adjusted requiring the Testing Subcontractor to check all field density tests for cohesive material against a zero-air-voids curve. A specification change has been issued. Selection of proctor curves will no longer be a problem because each field density test for cohesive material (unless otherwise directed by the onsite geotechnical soils engineer) will be accompanied by a separate laboratory standard which will provide a direct comparison. This was directed by a letter to U.S. Testing and reflects Specification Change Notice C-208-9004, dated April 13, 1979.

3. One full-time and one part-time onsite Geotechnical Soils Engineer have been assigned. These engineers will review U.S. Testing's procedures and monitor their implementation.

Corrective Action (Programmatic): Field Instruction FIC 1.100, "Q-Listed Soils Placement Job Responsibilities Matrix," has been prepared and establishes responsibilities for performing surveillance of testing operations.

Corrective Actions (Generic):

1. Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed, and Field Engineering and Quality Control review is scheduled for completion by February 27, 1981. Any revisions required will be completed by April 17, 1981.

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

2. U.S. Testing was required to demonstrate to cognizant Engineering Representatives that testing procedures, equipment, and personnel used for quality verification testing (for other than NDE and soils) were capable of providing accurate test results in accordance with the requirements of applicable design documents. | 10 | 10 | 10

3. A sampling of U.S. Testing's test reports (for other than NDE and soils) were reviewed by cognizant Engineering Representatives to ascertain that results evidence conformance to testing requirements and design document limits. | 10 | 10

3.12 Category IV, Item 1

Deficiency Description: Inadequate corrective action for repetitive nonconforming conditions

I&E Report Reference: Pages 17 through 20

CPCo Response Reference: Category IV, Item 1

Discussion: There were nonconformances reported which are considered to be repetitive. These include, but are not limited to: CPCo Nonconformance Reports QF-29, QF-52, QF-68, QF-120, QF-130, QF-147, QF-172, QF-174, QF-199, and QF-203; CPCo Audit Findings F-77-21 and F-77-32; and Bechtel Nonconformance Reports 421, 686, 698, and 1005.

The Nuclear Quality Assurance Manual, Section V, Number 10, states in Subparagraph 2.5.2, "Nonconformances which, due to their repetition or impact (potential or actual) upon quality, should be brought to management's attention for special action." | 10

Quality Assurance Department Procedure C-101, Revision 1, "Project Quality Assurance Trend Analysis" (July 1977) states in Paragraph 1.0, "This procedure provides a mechanism for identifying quality trends and initiating corrective action to prevent recurrence...." The reviews made in accordance with this procedure did not identify the significance of the repetitive nature of the nonconformances and the need for special action beyond that for the individual reports.

Control Document SF/PSP G-3.2 defines the requirements for review of Management Corrective Action Requests (MCARs).

Quality Assurance Program Criterion: Corrective action

Program Element: Actions pertaining to significant conditions adverse to quality

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section V, Number 10, "Management Corrective Action" (March 1979)

Control Documents: SF/PSP G-3.2, Revision 5, "Control of Nonconforming Items" (September 1979) and QADP C-101, Revision 1, "Project Quality Assurance Trend Analysis" (July 1977)

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

Root Causes:

1. The conditions under which nonconformances are considered to be repetitive are not adequately defined in the control documents.

2. The trending activity did not provide timely responses to repetitive product nonconforming conditions.

Remedial Action (Soils): Not applicable

Corrective Action (Programmatic): Control documents have been revised to provide an improved definition of implementing requirements for identifying repetitive non-conforming conditions. This action has been completed for QADP C-101. Action for SF/PSP G-3.2 has also been completed. | 10 | 10

Corrective Action (Generic): Consistent with the intent of the programmatic change above, Quality Assurance will review nonconformance reports which were open, as of November 13, 1979, or became open prior to implementation of the improved Project Quality Assurance Trend Analysis program as stated above. This review will be to identify any repetitive nonconforming conditions pertaining to product type or activity, or pertaining to nonconformance cause. This action is scheduled to be completed by December 31, 1980. | 10 | 8

RESPONSE TO QUESTION 23, PART (1) [50.54(f)]

3.13 Category IV, Item 2

Deficiency Description: Bechtel Quality Assurance auditing and monitoring did not identify the problems relating to the settlement. This lack of identification of problems by the auditing and monitoring contributed to a conclusion that soils operations were adequately controlled.

I&E Report Reference: Pages 17 through 20

CPCo Response Reference: Category IV, Item 2

Discussion: Quality Assurance auditing and monitoring is aimed at evaluating the adequacy of policies and procedures and evaluating the degree of compliance with the policies and procedures. It is not a quality verification activity, although it may identify deficiencies in the performance of quality-related activities that could result in unsatisfactory product quality. In the case of soils operations, Quality Assurance auditing and monitoring found that quality-related activities were being performed as planned, quality verification activities (primarily soil testing) were being performed, and the soil test results, or their evaluation, provided evidence of compliance with the established standards. The auditing and monitoring did not identify the policy and procedure inadequacies.

Quality Assurance Program Criterion: Auditing

Program Element: Auditing

Quality Assurance Program Policy: Nuclear Quality Assurance Manual, Section VI, Number 1, "Quality Audit System" (March 1979)

Control Documents: Quality Assurance Department Procedure, Section C, Number 1, "Project Quality Monitoring" (September 1977); and Section C, Number 5, "Project Quality Audits" (September 1977)

Root Cause: Quality Assurance audit and monitoring was oriented more toward evaluating the degree of compliance with established procedures rather than toward the assessment of policy and procedural adequacy or toward the assessment of product quality.

RESPONSE TO QUESTION 23, PART (2)

Revision 4
11/79

RESPONSE TO NRC QUESTION 23, PART (2) [50.54(f)]

SECTION 1.0, NRC QUESTION

SUPPLEMENTAL REQUEST FOR ADDITIONAL SOILS SETTLEMENT INFORMATION

23. We have reviewed your response to question 1 of our March 21, 1979 letter, "10 CFR 50.54 Request Regarding Plant Fill," including related amendments or supplements in your letters dated May 31, July 9, and August 10, 1979. We find that the information provided is not sufficient for completion of our review. Accordingly, provide the following additional information:

(2) Regarding your response to question 1b:

a. The first seven paragraphs do not provide sufficient information to assure that contradictions do not continue to exist in the PSAR, FSAR, design documents, implementing procedures, and as-built conditions since the controls described in these seven paragraphs were in effect prior to the I&E findings reported in J. Keppler's letter of March 15, 1979. Modify your response to clearly describe the control revisions you have instituted to preclude design contradictions.

b. Items 1, 2, and 3 of the eighth paragraph describe the review and update of the PSAR commitment list, the review of the inactive sections of the FSAR, and the review of procedure EDP 4.22, "Preparation and Control of Safety Analysis Reports," without describing the extent of the review process or the qualifications of personnel involved in the review. Accordingly, describe what each of these reviews entails, including the extent to which these reviews are verified, approved, and documented. Identify the organizational unit that is, or will be, involved in these reviews and the qualifications of the involved personnel.

c. Item 2 of the eighth paragraph states that a review of the remaining sections of the FSAR is not necessary, "... because of the ongoing review process described above." Describe your rationale for not reviewing these remaining sections of the FSAR when it appears that the original review of the FSAR was performed prior to issuance of the March 15, 1979 letter providing the I&E findings and prior to any corrective actions resulting therefrom.

d. Describe the extent of the audit to which you have committed in item 4 of the eighth paragraph.

RESPONSE TO QUESTION 23, PART (2) [50.54(f)]

SECTION 2.0, RESPONSE TO PART (2)a

Mr. J. Keppler's letter of March 15, 1979 described inconsistencies in the FSAR which occurred at the time of origination of the FSAR.

Paragraphs 1 and 2 of the CPCo response to Question 1, Part b dated April 24, 1979, describe the procedures used to prepare the FSAR. Paragraph 3 of that response provides a brief history of the preparation of the FSAR. Paragraphs 4, 5, and 6 describe the procedures and activities undertaken, subsequent to the submittal of the FSAR, to update the FSAR to include missing information, reflect design changes, and resolve identified inconsistencies between the FSAR and project design documents. Paragraph 7 explains why the inconsistencies created in FSAR Section 2.5 and Subsection 3.8.5 at the time of preparation of the FSAR were not initially identified and corrected by the implementation of the original procedures.

The following supplements the response to Question 1, Part b, and describes the control revisions instituted since submittal of the FSAR to preclude design contradictions.

When the FSAR was docketed in November 1977, it became the prime licensing document superseding the design commitments contained in the PSAR. Therefore, it is not valid to compare a PSAR commitment to a current design document, implementing procedure, or as-built condition. It is valid to compare these design documents against the licensing commitments contained in the FSAR. PSAR design commitments were incorporated into the FSAR when the FSAR was written. Attachment 1-1 to the Question 1, Part b response shows that the following documents were considered as input in the preparation of each FSAR subsection:

1. Regulatory Guide 1.70, Revision 2

2. NRC Standard Review Plans and Branch Technical Positions

3. DRL Safety Evaluation

RESPONSE TO QUESTION 23, PART 2 [50.54(f)]

4. Midland PSAR

5. Unincorporated SAR Change Notices

6. Regulatory Guides and Results of Regulatory Guide Review Program

7. Supplemental Environmental Report

8. Final Environmental Report

9. Design Documents

10. BESSAR

Attachment 23-1 compares the soils area to other areas with respect to the preparation, initial review, and rereview of the FSAR. The root cause of the inconsistencies that occurred in the soils area are addressed in Part (1), Subsection 3.3 of this response. Mitigating circumstances that contributed to the inconsistencies were the change in level of detail required in licensing documents, the multiple display of technical information contained in the FSAR, and the lack of change or question activity in the soils area.

Additional inconsistencies (other than the soils area) that may exist in the FSAR are being corrected by the total rereview program that has been undertaken as described in Parts (2)b and c of this response. An additional benefit of the FSAR rereview program is that an education process is occurring within all design disciplines, making them more aware of the level of design detail contained in the FSAR.

Control document revisions that have been instituted to preclude design contradictions are described in Part (1), Subsection 3.3.

RESPONSE TO QUESTION 23, PART (2) [50.54(f)]

SECTION 3.0, RESPONSE TO PART (2)b

3.1 Review of the PSAR Commitment List

Original PSAR commitments are contained in the PSAR Commitment List. This List includes the PSAR section, a statement of the commitment, the PSAR page containing the commitment, the revision number of that PSAR page, the company responsible for the commitment, the status of the commitment, and the commitment disposition document. Each PSAR commitment is either attached to an FSAR section for review or, if not applicable to any specific section, distributed for review as an individual rereview package so that all PSAR commitments are included in the FSAR rereview program. The review of the PSAR Commitment List items is described in the sequence of the rereview program activities discussed in this response. As part of the rereview program, the PSAR Commitment List will be updated by completing the columns titled "Status" and "Disposition Document" to ensure that they contain current information.

Our April 24, 1979, response to Question 1, part b, stated, "To assure that the PSAR design commitments were properly dispositioned through incorporation into a project design document or the FSAR, a final review and update of the PSAR Commitment List will be completed by January 1, 1980." It was determined that a review of the PSAR Commitment List, in lieu of reviewing the PSAR itself, was sufficient for this purpose for the following reasons.

a. When the PSAR Commitment List was prepared, the following steps were taken:

   1. Initial preparation by an engineer in the Mechanical discipline; (The Mechanical discipline at that time was responsible for the preparation of the SAR.)

   2. Complete review of the Commitment List versus the PSAR commitments by the Project SAR Coordinator;

   3. Review of the Commitment List by the Nuclear Group Leader, Mechanical Group Supervisor (Licensing Engineer), and Project Engineer.

These reviews were documented by reviewers initials each time the List was revised and reissued. Thus, the PSAR Commitment List received the same level of review as other project "design documents."

b. The PSAR and related documents were used in the preparation of the FSAR. There are existing documentation forms for the preparation of the FSAR sections that identify the PSAR sections reviewed in preparing that FSAR section. Thus, the PSAR Commitment List was not the primary document used in the preparation of the FSAR. Significant changes that have been made in plant design since the issuance of the construction permit are identified in FSAR Table 1.3-2.

c. The FSAR is a complete document which does not rely on the PSAR previously submitted. Therefore, a rereview of the FSAR against project design documents is sufficient in itself to ensure that areas of contradiction do not exist.

3.2 Rereview of the FSAR

3.2.1 Organization

Personnel and organizations participating in the FSAR rereview program are as follows:

a. The FSAR rereview program involves various disciplines within the organizations of CPCo, B&W, and Bechtel.

b. Each company has developed or utilizes existing procedures for the conduct of this rereview as follows:

Company	Procedure No.	Procedure Title
CPCo	MPPM-19	"Conduct of Final Safety Analysis Report Review Program"; Revision 0
Bechtel	IOM, R.L. Castleberry to File LF 9.0, June 1979	"FSAR Review Procedure - Midland Project"
B&W	NPG-0414-13	"Processing Contract Engineering Licensing Documents," Revision 3

c. The rereview program is managed by the Bechtel Licensing Group (composed of engineers), which distributes the applicable rereview documents to various disciplines within Bechtel and also forwards applicable rereview documents to CPCo and B&W. These rereview packages are reviewed by engineers within these organizations having cognizance in the subject matter of the rereview package, and these rereview results are evaluated by supervisory engineers, as described in the sequence of rereview activities and rereview documentation given in this response.

d. The engineers, as well as the cognizant supervisory engineers in all three organizations, involved in this rereview are the same engineers currently involved in design activities.

RESPONSE TO QUESTION 23, PART (2) !50.54(f)1

3.2.2 Rereview Procedure

The FSAR rereview process, as summarized in Attachment 23-2, is more fully described in the following sequence of activities.

a. The Bechtel Licensing Group prepares an FSAR rereview package for each subsection or group of consecutive subsections addressing the same subject, including FSAR NRC questions pertaining to that subsection and associated PSAR commitments from the PSAR Commitment List. Also PSAR commitments which are not specifically related to any FSAR section are distributed as separate rereview packages. Prior to distributing the rereview packages, the Bechtel Licensing Group completes Blocks 1 through 7 on the documentation form shown in Attachment 23-3.

b. After receiving an FSAR rereview package, the Primary Rereviewer establishes which documents (e.g., P&IDs, flow diagrams, single-line meter and relay diagrams, control logic diagrams, and various other documents in which licensing commitments are contained) the package must be rereviewed against and notes these in Block 8 of Attachment 23-3.

c. The Primary Rereviewer then systematically rereviews each document noted in Block 8 and indicates whether any conflicts exist between the document and the FSAR section. The rereviewer makes any corrections arising from a conflict and notes these in the resolution column of Block 8. The rereviewer also rereviews the package for consistency of cross-referenced FSAR sections, figures, and tables, chapter references, NRC questions, and PSAR commitments and makes appropriate corrections. Following this, the Primary Rereviewer indicates any required interface review by a check in Block 11. The Primary Rereviewer and the Group Supervisor (or other specified individuals, depending upon the company procedure) then sign the form in Block 9.

d. The signature of the Group Supervisor indicates agreement with the quality and quantity of the review by the Primary Rereviewer. The Supervisor checks to ensure that the applicable documents are included in the review package and that all applicable interface rereviews have been designated. The rereview package is then transmitted to the Bechtel Licensing Group.

e. The Bechtel Licensing Group makes a copy of the original rereview package to correspond to each interface rereview designated in Block 11 of Attachment 23-3. Prior to distributing the interface rereview packages, the Bechtel Licensing Group completes Block 10 on the documentation form to signify the date scheduled for the completion of the interface rereview. The original rereview package is retained in the Licensing Group files.

f. After receiving an FSAR rereview package for interface rereview, the Interface Rereviewer determines which, if any, additional documents the package must be reviewed against and adds those to the list in Block 8 of Attachment 23-3 beneath those listed by the Primary Rereviewer. The Interface Rereviewer then systematically rereviews each of the documents added to Block 8 to determine if any conflicts exist betweens these documents and the FSAR section. For his areas of responsibility, the Interface Rereviewer also rereviews the package for consistency with cross-referenced FSAR sections, figures, tables, chapter references, NRC questions, and PSAR commitments. Following completion of the rereview, the Interface Rereviewer and Group Supervisor (or other specified individuals, depending upon the company procedure) then initial the form in Block 11. The interface rereview package is then transmitted to the Bechtel Licensing Group.

g. The Bechtel Licensing Group forwards the original rereview package and all interface rereview packages with comments to the Primary Rereviewer. Prior to distributing the packages for resolution of comments, the Bechtel Licensing Group completes Block 12 on the documentation form to schedule the completion of the resolutions.

h. After receiving the original rereview package and all interface rereview packages with comments, the Primary Rereviewer resolves all interface comments which have outstanding questions with the respective Interface Rereviewer. The Primary Rereviewer clearly indicates whether an interface comment is to be incorporated into an FSAR change. The Primary Rereviewer is responsible for determining if any recent changes to the FSAR affect any of the comments. The Primary Rereviewer indicates in

Block 13 of Attachment 23-3 if an FSAR change is required for the package and then signs, along with the Group Supervisor (or other specified individuals, depending upon the company procedure), in Block 13 to indicate completion of the rereview. The entire package is then transmitted to the Bechtel Licensing Group.

i. Upon completion of the resolution of comments by the Primary Rereviewer, the Bechtel Licensing Group initiates an FSAR change (if required) in accordance with Engineering Department Project Instruction 4.23.1. They obtain final approval (following review) from CPCo, B&W (if required), and Bechtel and then prepare the input for FSAR revision typing, printing, and distribution.

j. The original rereview packages and interface rereview packages are retained in the Bechtel Licensing Group files.

k. Changes to the FSAR identified during the rereview process are incorporated into the FSAR during future revisions. Changes to design documents identified during the rereview process are identified in the "Resolution" column of Attachment 23-3 and are tracked by the Bechtel Licensing Group in accordance with the rereview procedure until a change to the design document has been executed.

RESPONSE TO QUESTION 23, PART (2) [50.54(f)]

3.2.3 Processing Resulting Changes

a. The revised design documents are routed to Field Engineers in accordance with the requirements of FPD-1.000, "Design Document and Correspondence Control." The Field Engineers, in accordance with FIG-3.200, "Field Engineer Responsibilities," are required to review the design documents and their resultant effect on construction with respect to 1) interferences and conflicts, 2) incorporation of change addenda, 3) correlation of references and interfacing documents, 4) clear, concise, and adequate details and notes, 5) technical clarity, 6) legibility, 7) changes affecting completed work and current construction planning, 8) other pertinent features. Any deficiencies or discrepancies are resolved.

b. In accordance with Project Special Provision G-6.1, "Quality Control Inspection Plans," changes in design documents will be reflected in revisions to the activity descriptions, inspection criteria, supplementary records, and inspection activity codes in the Project Quality Control Instructions and Inspection Records.

c. Open Inspection Records which are affected by revisions to Project Quality Control Instructions will be revised to incorporate the changes. These revisions will be controlled by a revision to the Quality Control Inspection Record number.

d. A design document change which physically affects completed work will require the initiation of a new Inspection Record. The new Inspection Record will be developed to cover the inspection of the work required to accomplish the design change. Each new Inspection Record will be identified with the number of the record for the original work plus an alpha suffix (a, b, c, etc). Each new Inspection Record, when it is completed, will be attached to the original Inspection Record. The new Inspection Record will specify the design change that brought about the additional inspection work.

e. Design changes to completed work are addressed in Project Special Provision G-3.2, "Control of Nonconforming Items." Completed work which has been inspected and found to be satisfactory is classified as conforming.

3.3 Review of Engineering Department Procedure 4.22

The following sequence of events took place relative to the review of Engineering Department Procedure 4.22, "Preparation and Control of SAR."

a. Review of Engineering Department Procedure 4.22 was by the Project Quality Engineering, and included coordination with the Project SAR Coordinator.

b. Primary consideration was given as to whether the originator of a SAR section had sufficient guidelines in which to prepare a SAR section. | 8

c. The results of the review were affirmative; the engineer had sufficient direction in the procedure. This was documented in an IOM dated July 23, 1979, R.L. Castleberry to L.A. Dreisbach.

d. Subsequent to the completion of Item c, above, it was decided during a series of meetings to revise Engineering Department Procedure 4.22 for clarification. (The requirements of Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," were moved from Section 2.0, "Scope" to Section 5.0, "Engineering and Administrative effort." This revision has been completed.) | 8

RESPONSE TO QUESTION 23, PART (2) [50.54(f)]

SECTION 4.0, RESPONSE TO PART (2)c

The FSAR rereview program has been extended from the original plan to include the entire FSAR, with certain exceptions as follows:

a. Appendixes 2A, 2B, and 2C contain only test data for which a rereview would be meaningless.

b. The Security Plan (referenced in Section 13.6) is currently under review and will be completely revised when it is resubmitted.

c. The Technical Specifications (Chapter 16) will be extensively reviewed and updated prior to NRC final review 6 months to 1 year in advance of the issuance of an operating license.

d. The Fire Protection Evaluation Report (Appendix 9A) will be completely reviewed and revised upon receipt of fire protection questions from the NRC. 8

e. The Site Emergency Plan (referenced in Section 13.3) was extensively revised in Revision 18 (February 1979) to the FSAR and will be revised as necessary to meet new, additional requirements.

f. The environmental qualification of mechanical and electrical equipment (Section 3.11) will be completely rereviewed. However, the results of the rereview will not be fully incorporated into the FSAR until this section is revised in response to the NRC letter to operating license applicants, dated February 21, 1980, concerning "Qualification of Safety-Related Electrical Equipment".

g. The soils-related portions of the FSAR are identified in a table entitled "FSAR Sections Subject to Change" immediately following the Preface in Volume 1. These subsections/tables/figures/Q&Rs/appendixes will be completely rereviewed but the results of this review will not be incorporated into the FSAR until final resolution of the plant fill issue.

The entire rereview program was completed during September 1980. All resulting changes will either be incorporated into the FSAR as of Revision 32 or tracked to conclusion (for those unresolved engineering issues which remained unresolved in September 1980). 10

RESPONSE TO QUESTION 23, PART (2) [50.54(f)]

SECTION 5.0, RESPONSE TO PART (2)d

The purpose of the audit committed to in Item 4 of the eighth paragraph of Question 1, Part b, is to verify the effectiveness of the rereview. The audit will cover two aspects as follows:

a. Degree of compliance with rereview procedures.

b. Technical correctness of rereview dispositions.

The audit committed to in our response to Question 1, Part b and described in the preceeding paragraphs was conducted once during the course of the FSAR rereview (commencing March 17, 1980) and again after completion of the rereview (commencing November 3, 1980). | 8 | 10

The audit plan was consistent with the CPCo, Bechtel, and B&W policies and procedures governing audits. CPCo served as the audit team leader. The audit team comprised personnel from each of the three organizations. | 10

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

SECTION 1.0, NRC QUESTION

SUPPLEMENTAL REQUEST FOR ADDITIONAL SOILS SETTLEMENT INFORMATION

23. We have reviewed your response to question 1 of our March 21, 1979 letter, "10 CFR 50.54 Request Regarding Plant Fill," including related amendments or supplements in your letters dated May 31, July 9, and August 10, 1979. We find that the information provided is not sufficent for completion of our review. Accordingly, provide the following additional information:

(3) Question 1c requested that other activities be investigated to determine whether programmatic quality assurance deficiencies exist in view of the apparent breakdown or certain quality assurance controls, and that the activities investigated and the results be identified. Your response addressed certain specifications and instructions that received a review of 1977; providing for more in-depth verification; increasing management audits from one to two per year; increasing the staff of Bechtel's QA engineers at the site from five to eight; instituting an overinspection program on certain Q-listed construction activities; assigning resident engineers at the site to aid in the interpretation of drawings and increasing their number from one to twenty-two; and initiating a trend analysis program.

a. According to your response, most of these actions were initiated in 1977. Describe your rationale for assuming that these actions provide confidence that quality assurance deficiencies do not exist in other areas. In order to determine if other areas have deficiencies, work already accomplished in these areas should be investigated. This includes the review of completed documentation, including inspection results, to verify consistency with design and SAR requirements. Also, representative sample inspections of completed work would seem appropriate to determine the acceptability of this work. Accordingly, describe a program in detail to accomplish the above or provide rationale as to why it is not necessary.

b. Your use of generalized statements such as "the review of"," increased audits," "overinspection," "identifying trends," and "increase of staff" does not provide sufficient specificity regarding the detail and extent these actions will take place and the effect they will have in assuring other areas are not deficient. Accordingly, in each of these areas provide a clearer description of these actions relative to the full impact they will have in assuring an effective QA program and in sufficient detail to assure that other areas are not deficient. In those cases where credit is taken for actions already accomplished (such as review, inspections, and audits), provide a summary of the results of these actions such that the success or failure of the actions can be determined.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

SECTION 2.0, INTRODUCTION

In Subpart a of Part (3) of the question, it was requested that we provide our rationale for our confidence that quality assurance deficiencies do not (or will not) exist in other areas. | 8

Our confidence stems from three factors, as follows:

a. The recognition of the differences between soils and other work, as described in Section 3.0.

b. The fact that, from the outset, a Quality Assurance Program has been implemented which meets regulatory requirements and national standards and which has been improved significantly from the time of its initial implementation. | 8

Subsection 4.1 provides a list of Quality Assurance Program improvements. Subsection 4.2 provides more detail as to the extent and results of selected improvements as requested in Subpart b of Part (3) of the question.

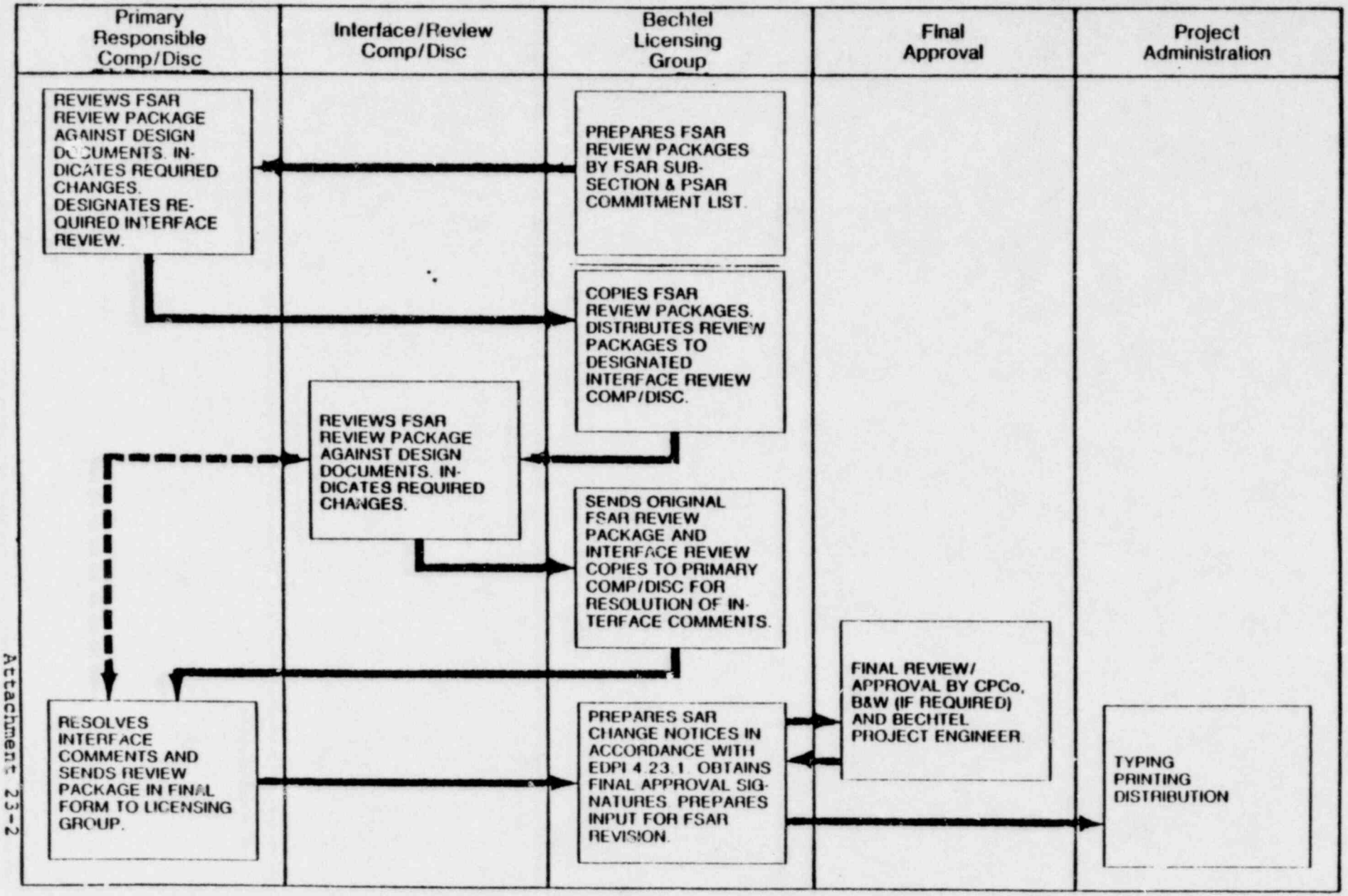
c. The programmatic and generic corrective actions which have been taken, or will be taken, as described in our response to Parts (1) and (2) of the question and as summarized in Section 5.0.

A COMPARISON OF REVIEW AND CHANGE ACTIVITY FOR THE SOILS FSAR SECTION AND FOR OTHER FSAR SECTIONS

TIME PERIOD	SOILS	OTHER AREAS
ORIGINATION 1977	• PREPARED BY GEO/TECH • REVIEWED PRIOR TO SUBMITTAL BY DISCIPLINE	• PREPARED BY FSAR ORGANIZATION • REVIEWED PRIOR TO SUBMITTAL BY DISCIPLINES • (NOT ALL SPECS AVAILABLE)
REVIEW 1977 to PRESENT	• INACTIVE • NO NRC QUESTIONS • NO CHANGE NOTICES	• ACTIVE • 1600 CHANGE NOTICES • REVIEWED BY DISCIPLINES
		• METHOD: • EDP 4.23 • ELEMENT REVIEW • DEGREE OF REVIEW BASED ON DEGREE OF ACTIVITY
RE-REVIEW JUNE 1979 THRU SEPTEMBER 1980	• SPECIAL PROCEDURE • SYSTEM/SUBSYSTEM RE-REVIEW • RE-REVIEW BY DISCIPLINE & GEO/TECH • TOTAL RE-RE[illegible]	• SPECIAL PROCEDURE • SYSTEM/SUBSYSTEM RE-REVIEW • RE-REVIEW BY DISCIPLINES • TOTAL RE-REVIEW

FSAR REVIEW FLOW CHART

Midland Plant Units 1 & 2
Consumers Power Company
Bechtel Job 7220



Attachment 23-2

G 0633

FSAR REVIEW DOCUMENTATION FORM
MIDLAND PROJECT
JOB 7220

1. REVIEW LOG NO. _____

2 COMPANY
☐ CPCo ☐ BECHTEL ☐ B&W

3. PRIMARY REVIEW DISCIPLINE.

4 FSAR SUBSECTION.	5. NRC QUESTIONS:	6. PSAR COMMITMENT LIST ITEMS

8. PHASE I: DESIGN DOCUMENT REVIEW

7. RETURN TO BECHTEL LICENSING BY:

DESIGN DOCUMENT	CONFLICT	RESOLUTION
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____
_____	YES / NO	_____

9 INITIAL REVIEW APPROVAL (INDICATE REQUIRED INTERFACE REVIEW IN BLOCK 11.)

_____ (PRIMARY REVIEWER) (DATE) _____ (SUPERVISOR) (DATE)

11. PHASE II: INTERFACE REVIEW

10. RETURN TO BECHTEL LICENSING BY

☐ BECHTEL

BECHTEL DISCIPLINE INTERFACE REVIEW:

☐ ARCH _____ ☐ PLANT DSN _____
☐ CIVIL _____ ☐ PQAE _____
☐ CONTROL SYS _____ ☐ STRESS _____
☐ ELEC _____ ☐ OTHER _____
☐ MECH/NUCLEAR _____

INTERFACING STAFF REVIEW:

☐ ARCH _____ ☐ M & QS _____
☐ CIVIL _____ ☐ MECH _____
☐ CONTROL SYSTEM _____ ☐ NUCLEAR _____
☐ ELEC _____ ☐ PLANT DSN _____
☐ GEOTECH _____ ☐ STRESS _____

☐ CPCo

_____ _____
_____ _____
_____ _____
_____ _____

☐ B & W

_____ _____
_____ _____
_____ _____
_____ _____

13. PHASE III: RESOLUTION OF COMMENTS

12. RETURN TO BECHTEL LICENSING BY:

FSAR CHANGE REQUIRED YES / NO

All Interface Comments Resolved. Licensing Group Is Authorized To Initiate A FSAR Change Without Additional Interface Review.

_____ (PRIMARY REVIEWER) (DATE) _____ (SUPERVISOR) (DATE)

G-0648

Attachment 23-3

RESPONSE TO QUESTION 23, PART (2) [50.54(f)]

ATTACHMENT 1 TO ATTACHMENT 23-3

The form illustrated in Attachment 23-3 is used to document the various phases and steps of the rereview of the Midland plant FSAR. Thirteen numbered blocks are completed for each rereview package.

a. The first block, "Review Log No," identifies each rereview package by a unique number assigned by the Bechtel Licensing Group.

b. The second block, "Company," designates the primary rereview company for the rereview package as assigned by the Bechtel Licensing Group.

c. The third block, "Primary Review Discipline," is used to designate the discipline assigned primary rereview responsibility by the Bechtel Licensing Group.

d. The fourth block, "FSAR Subsection," is completed by the Bechtel Licensing Group to designate the FSAR subsections included in the rereview package.

e. The fifth block, "NRC Questions," is completed by the Bechtel Licensing Group to indicate any FSAR phase NRC questions pertaining to the subsections identified in Block 4 included in the rereview package.

f. The sixth block, "PSAR Commitment List Items," is completed by the Bechtel Licensing Group to indicate any PSAR Commitment List items pertaining to the subsections identified in Block 4 included in the rereview package.

g. The seventh block, "Return to Bechtel Licensing by," is completed by the Bechtel Licensing Group to indicate the date when the completed Phase rereview package is to be received by the Bechtel Licensing Group.

h. The eighth block, "Phase I: Design Document Review," is completed by the Primary Rereviewer to indicate all documents against which the rereview package is rereviewed, to indicate whether conflicts exist between the rereview FSAR section and the other documents, and to indicate the necessary resolution of any conflict, as appropriate. For NRC Questions and PSAR Commitment List items, the Primary Rereviewer verifies that no conflicts exist with the FSAR text, and that the FSAR text corresponds to the commitments in the FSAR questions and PSAR Commitment List and is complete and correct.

i. The ninth block, "Initial Review Approval," is completed by the Primary Rereviewer and the Group Supervisor (or by other specified individuals, depending upon the company procedure). Prior to signing for rereview approval, the Primary Rereviewer designates all required interface rereview by checking the appropriate boxes in Block 11. The signature by the Group Supervisor indicates agreement with the quantity and quality of the review by the Primary Rereviewer. The Supervisor checks to ensure that the documents used by the Primary Rereviewer cover all applicable interfaces. The rereview package is then returned to Bechtel Licensing.

j. The tenth block, "Return to Bechtel Licensing by," is completed by the Bechtel Licensing Group to indicate the date when the completed Phase II rereview package is to be received by the Bechtel Licensing Group following an interface rereview.

k. The eleventh block, "Phase II: Interface Review," is completed by the individual performing the interface rereview as designated by the Primary Rereviewer (see Block 9 above). If additional documents are used by the Interface Rereviewer, these documents are listed in Block 8 in accordance with the procedures described therefor. Following satisfactory completion of the interface rereview, the Primary Reviewer and the Group Supervisor or other specified individuals (depending upon the company procedures) initial this block. The Supervisor's initialsindicates approval of the rereview performed by the Interface Rereviewer as discussed under Block 9, above. The interface rereview package is then returned to the Bechtel Licensing Group.

l. The twelfth block, "Return to Bechtel Licensing by," is completed by the Bechtel Licensing Group to indicate the date when the completed Phase II rereview package is to be received by the Bechtel Licensing Group following resolution of the comments.

m. The thirteen block, "Phase III: Resolution of Comments," is completed by the Primary Rereviewer following the resolution of all interface comments resulting from the interface review. The Primary Rereviewer indicates whether each interface comment is to be incorporated into the FSAR. The Primary Rereviewer indicates whether an FSAR change is required by designating "yes" or "no" and, following resolution of all interface comments, signs the form along with the Group Supervisor or

other specified individuals (depending upon the company procedures) to indicate completion of the rereview package. The Supervisor's signature indicates approval of the resolution of comments by the Primary Rereviewer consistent with the original rereview discussed under Block 9, above.

RESPONSE TO QUESTION 23, PART (3)

Revision 4
11/79

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

SECTION 2.0, INTRODUCTION

In Subpart a of Part (3) of the question, it was requested that we provide our rationale for our conficence that quality assurance deficiencies do not (or will not) exist in other areas.

Our confidence stems from three factors, as follows:

a. The recognition of the differences between soils and other work, as described in Section 3.0.

b. The fact that, from the outset, a Quality Assurance implementation.

   Subsection 4.1 provides a list of Quality Assurance Program improvements. Subsection 4.2 provides more detail as to the extent and results of selected improvements as requested in Subpart b of Part (3) of the question.

c. The programmatic and generic corrective actions which have been taken, or will be taken, as described in our response to Parts (1) and (2) of the question and as summarized in Section 5.0.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

SECTION 3.0, DIFFERENCES BETWEEN SOILS WORK AND OTHER WORK | 8

Prior to 1977, the major site construction activities were in the civil and structural areas. The major specific activities were soils, rebar and embeds, concrete, cadwelding, structural steel erection, and liner plate erection. In 1977, electrical and mechanical installation activities became significant.

Soils and concrete are similar bulk installation activities which rely, in large part, upon the tests at a given point representative of the quantity of material placed. Additional confidence in the quality of the concrete is achieved through several factors that are not available to soils work. Concrete work is more scientific than soils placement and compaction and the variables of concrete work are more quantifiable and measurable. The physical testing of concrete (cyliner breaks) provides acceptable or unacceptable results on a short-term basis. With soils, the only verification, subsequent to the initial acceptance test, is the long-term monitoring program for settlement of structures supported in the fill.

The inspection and controls for the construction activities for cadwelding, rebar, and embeds provide high confidence in the quality of these items. Rebar has had a 100% overinspection by CPCo QA from April 1976 to September 1978 and embeds have had a 100% overinspection by CPCo QA from June 1972 to September 1978.

Structural steel erection and other civil activities, including welding and liner plate erection, are activities for which there are characteristics accessible to inspection and reinspection, allowing for independent subsequent verifications of the quality of these items.

The above is also true of most aspects of mechanical and electrical construction activities. The major instruments with regard to specifications and QCIs were made prior to significant construction activities in the Mechanical and Electrical disciplines.

These systems will be subject to overinspections and walkdown inspections by CPCo QA at the time of turnover, which will provide additional detailed evaluation of these systems. Subsequent to the construction acceptance, a system verification is accomplished through the checkout and preoperational testing activities.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

SECTION 4.0, QUALITY ASSURANCE PROGRAM IMPROVEMENTS | 8

4.1 History and Chronology of Improvements, In General

1970

1. CPCo QA Program as presented in the Midland Plant PSAR was approved by the AEC Staff in the Safety Evaluation Report.

1973

1. The Bechtel Quality Control Organization at the site was reorganized to be independent of the Bechtel Construction Organization at the site.

2. The CPCo Quality Assurance organization was formed with a staff of five persons.

1974

1. The review and approval by CPCo Quality Assurance of Bechtel Quality Control administrative procedures and inspection instructions was initiated.

2. The number of CPCo Quality Assurance professional personnel overviewing the Bechtel Quality Assurance Program was increased from five to six.

3. The CPCo Quality Assurance program policies and procedures were significantly improved.

1975

1. CPCo Quality Assurance inspection of stored materials was instituted.

2. The number of CPCo Quality Assurance professional personnel overviewing the Bechtel Quality Assurance Program was increased from six to seven.

1976

1. Bechtel quality trending was instituted.

2. The CPCo Quality Assurance Program (Topical Report) was approved by NRC.

3. CPCo Quality Assurance overinspection of rebar installation was instituted.

4. The Bechtel Quality Control Notices Manual was prepared specifically for the Midland Project and the Bechtel Field Inspection Manual was phased out.

5. Major biennial audits of the Quality Assurance Program, utilizing outside consultants, were initiated by CPCo Quality Assurance.

6. The number of CPCo Quality Assurance professional personnel (excluding auditors) overviewing the Bechtel Quality Assurance Program was increased from seven to nine.

7. Bechtel Resident Engineering was established at the jobsite.

1977

1. CPCo Quality Assurance overinspection of embeds was instituted.

2. CPCo Quality Assurance Program Procedures dealing with nonconformance reporting, audit, and personnel certification were significantly improved.

3. CPCo Quality Assurance Program Procedures dealing with reporting to NRC and turnover were originated.

4. The Bechtel quality trending activity was significantly improved.

5. CPCo Quality Assurance was reorganized to form the Quality Assurance Engineering Section and the Inspection, Examination and Test Verification Section, the latter having emphasis on hardware evaluation.

6. The following five additional Regulatory Guides were implemented: 1.38, dealing with the quality requirements for packaging, shipping, receiving, storage, and handling; 1.39, dealing with housekeeping; 1.55, dealing with concrete placement for Category I structures; 1.58, dealing with the qualification of inspection, examination and testing personnel; and 1.94, dealing with the quality assurance requirements for the installation, inspection, and testing of structural concrete and structural steel.

7. An extensive training activity was implemented for CPCo Quality Assurance personnel.

8. CPCo Quality Assurance became the overinspection organization for Q-listed pressure tests.

9. NRC implemented an "increased inspection" program.

10. The number of CPCo Quality Assurance professional personnel (excluding auditors) overviewing the Bechtel Quality Assurance Program was increased from nine to twenty-two.

11. Bechtel and CPCo reviewed specifications to improve specificity.

12. Bechtel QC and CPCo QA reviewed Quality Control Instructions (QCIs) to improve inspection callouts in the QCIs.

13. The Bechtel monitoring activity was improved to conduct more product-related monitors.

14. Bechtel QA management audits were increased from one to two per year.

15. The ASME Code Stamp Authorizations were extended to Bechtel for another three years.

1978

1. CPCo Quality Assurance overinspection of all other areas, in addition to the civil area, was instituted.

2. Approximately 30 CPCo Quality Assurance overinspection plans were prepared and implemented.

3. One hundred percent CPCo Quality Assurance review of supplier radiographs being received with new deliveries was instituted.

4. Fifteen CPCo Quality Assurance Department Procedures were completed, revised or originated dealing with department procedures; organization; personnel training, qualification and certification; processing procurement documents; source and receiving inspection planning and inspections; nonconformance reporting, corrective actions and statusing; periodic reporting; review of quality-related regulations, codes, standards, specifications, and other external documents; procurement quality assurance requirements; inspection stamp control; qualification and certification

of quality assurance audit team leaders; qualification and certification of quality assurance audit team members; qualification, training and certification of inspection and test personnel; analysis and resolution of significant quality problems; overinspection and primary inspection.

5. The primary responsibility for the overview of tne B&W NSSS installation was given to CPCo Quality Assurance.

6. The number of CPCo Quality Assurance audits performed was doubled from tne previous year.

7. Resident inspection was instituted by NRC.

8. The number of CPCo Quality Assurance professional personnel (excluding auditors) overviewing the Bechtel Quality Assurance Program was increased from twenty-two to twenty-three.

1979

1. The rereview of qualification test data for Bechtel procured items was completed.

2. The rereview of qualification test data for B&W procured items was initiated.

3. The rereview of quality documentation for B&W procured items was completed.

4. The rereview of quality documentation for Bechtel procured items was initiated.

5. "Surveillance" was eliminated as a Bechtel final inspection technique.

6. Nonscientific sampling was eliminated (with minor exceptions) as a Bechtel final inspection technique.

7. ASME Code Stamp Authorizations were granted for B&W site installation work.

8. A CPCo Quality Assurance Program Procedure was originated and implemented for processing NRC Bulletins, Circulars, and Information Notices.

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

9. CPCo Quality Assurance Department Procedures were originated and implemented dealing with turnover, forms, requests for information, and oral communications.

10. "Midterm Inspection" was performed by NRC.

11. LCVIP Inspection of the Bechtel Ann Arbor Office was performed by Region IV.

12. Review and revision of the CPCo Quality Assurance Program Procedures was completed by the Senior Vice President and his staff.

13. The number of CPCo Quality Assurance professional personnel (excluding auditors) overviewing the Bechtel Quality Assurance Program was increased from twenty-three to twenty-six.

4.2 Specifics of Selected Improvements

4.2.1 Review of Specifications

In September 1977, a review of specifications was initiated by Bechtel Engineering and CPCo Quality Assurance. This review was performed in association with the review of Quality Control Instructions (QCIs) as described in Subsection 4.2.2.

The specifications reviewed were selected specifications for Q-listed equipment and activities. Reviewers (Quality Assurance Engineers, Quality Engineers, and cognizant discipline engineers) were to determine any areas where the specifications lacked clarity, conflicted with other project criteria, or lacked necessary criteria, including dimensions or tolerances.

A total of 50 specifications, as follows, were reviewed by CPCo Quality Assurance, and 23 of these 50 specifications were also reviewed by Bechtel Project Engineering: 5 architectural, 25 civil, 11 mechanical, 1 control systems, and 8 general specifications. At that time, there was a total of 189 Q-listed specifications issued for use on the Midland project.

As a result of this review, specification revisions were made in 12 instances to provide specific tolerances or further clarity, or correction of editorial comments.

A review of those specifications being used for construction and not included in the reviews described above was initiated on May 8, 1979, and was completed by Project Engineering on July 13, 1979, resulting in revision to three specifications.

In addition to the above specification reviews, the Bechtel Chief Engineering Staff, and CPCo QA, performed a dimensional tolerancing review of a portion of the containment spray system from November 2 to December 13, 1977. This was a review to determine if there were any problems associated with tolerancing for specified dimensions. As a result of the dimensional tolerancing review, there were approximately eight revisions to specifications to provide tolerances or more clarity.

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

In March 1978, 95 Field Change Requests (FCRs) issued in January 1978 were reviewed to determine whether project personnel were demonstrating a concern for specificity. Eleven FCRs provided positive demonstration of project concern for specificity and improved awareness in this area.

An example of revisions that were made as a result of these specificity reviews is provided by the following comment and response.

Comment: It should be noted here that Specification 7220-C-42 is incomplete in that the tolerances required for fabrication are not included in this specification. Blank spaces have been inserted in the specification where these tolerances are to be inserted at a later date.

Response: The current revision of Specification 7220-C-42 is Revision 2, dated July 21, 1978, "issued for purchase." This revision is now complete and up-to-date.

This review resulted in some project specifications being revised and emphasized the need for specificity to a broad spectrum of project personnel.

The specification changes were processed utilizing the change control system described in the response to Part 2 to ensure consideration of impact on completed work.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

4.2.2 Bechtel QC and CPCo QA Review of Quality Control Instructions

From April 1977 to August 1977, a review of all issued Quality Control Instructions (QCIs) was conducted jointly by Bechtel Quality Control (QC) and CPCo Quality Assurance. The purpose of this review was to improve the specificity of the inspection callouts in the QCIs. 52 QCIs were reviewed in their entirety, resulting in all QCIs being revised to incorporate agreed upon changes. As a result of this QCI review, it was considered necessary to revise SF/PSP G-6.1 "Quality Control Inspection Plan". This revision added requirements to provide improved clarity of inspection callouts.

As committed by the April 24, 1979, response to Question 1, Part a, Section D, Page I-18, a further review of the QCIs was completed by Bechtel in June 1979 to identify those QCIs which call for "Surveillances" and which call for supplementary records documentation reviews. As a result of this identification, revisions were initiated: (a) to require the utilization of "Inspection" activity for inspections of record, and to limit the utilization of "Surveillance" for defect prevention activity only and (b) to clarify the "Review" activity of supplementary records. |8

The following additional actions are planned as described in Part (1) Subsection 3.8.

A. SF/PSP G-6.1, "Quality Control Inspection Plans," has been revised to provide requirements for inspection planning specificity and for the utilization of scientific sampling rather than percentage sampling. |10 |10

B. QCIs in use will be reviewed to ascertain that provisions have been included consistent with the revised control document. This action and any required revisions are scheduled to be completed by September 1, 1980. |8

C. The impact of B (above) on completed work will be evaluated, and appropriate actions will be taken as necessary. This action is scheduled to be completed by November 1, 1980. |8

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

4.2.3 CPCo QA Review and Approval of Bechtel QC Administrative Procedures

Since January 1974 CPCo QA has reviewed and approved the administrative procedures in the Bechtel Field Inspection Manual and Quality Control Notices Manual. The controlling documents have varied, but all have been CPCo QA department procedures or Midland Project QA Procedures. This activity is continuing today.

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

4.2.4 Bechtel Resident Engineers

The Resident Engineering activity, an extension of Project Engineering, was established at the Midland jobsite in 1976 to provide a closer liaison between the Ann Arbor Office Project Engineering and Project Field Engineering; to provide, as needed, interpretations of design specifications and drawings; to expedite disposition of design changes resulting from Field Change Requests, Field Change Notices and Design Change Notices; to provide approvals of construction activities as required by specifications; and to expedite resolution of design and construction problems. These Resident Engineering activities allow for in-situ determinations of the root causes of design and construction interface problems and provide for timely, hands-on solutions which are backed up by Project Engineering reviews.

The Resident Engineering activities are described in Engineering Department Project Instruction (EDPI) 2.14.2, Rev. 6. This EDPI, in addition to prescribing the boundaries of the authority of the Resident Engineers, establishes the channels for control and review of the actions of the Resident Engineers, and the follow-up activities of Ann Arbor Office Project Engineering. All Engineering Department Procedures are applicable to any design functions which may be performed by the Resident Engineers.

As their benefits became apparent and their activities increased, the Resident Engineering Group was increased to the present level of 22 persons, which includes an experienced Assistant Project Engineer. As the nature of activity shifts during the construction phase (e.g., civil work to mechanical to electrical), the mix of disciplines in the Resident Engineering Group has been shifted correspondingly.

The timeliness of Resident Engineering interpretations, responses to Field Change Requests, design changes, dispositions for Nonconformance Reports, and approvals of Field Change Notices reduces the probability of deficiencies in construction. The physical presence and availability of Resident Engineering at the site invites and encourages consultation and discussion

during construction. The Resident Engineers thus serve as the focal point and channel for the exchange of information between Construction and Engineering, thereby improving the level of confidence that SAR and design requirements are met.

It is the intent of the Project Management to continue the supportive and beneficial activities of the Resident Engineers at a level commensurate with the construction activities.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

4.2.5 Bechtel Monitoring Activity Improvements

The standard monitoring activity, as described in Quality Assurance Department Procedure C-1, was amended September 15, 1977, to provide a more representative assessment of Quality Assurance Program effectiveness. The amended monitoring procedure was structured to use systematic auditing techniques to assess the conformance of a product to the essential requirements of project documents specifying quality.

The effect of the amended procedure was to increase the number of design office documents (drawings, specifications, calculations, etc) that were to be monitored. It caused additional effort to be applied to completed work, as well as to inprocess work. It required preparation of a list of potential monitoring subjects to be developed from the Quality Assurance Program elements and it required the preparation of checklists which were extracted from the various project procedures and manuals. | 8

The revised monitoring activity has enabled a more thorough assessment of the Quality Assurance Program, and permitted the early identification and correction of potential problems before they could become repetitive. The first year of activity following the amended procedure resulted in the performance of over 300 combined monitoring and project audit activities with 76 findings, as compared to the performance of approximately 100 combined monitoring and project audit activities with 42 findings performed during the previous year.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

4.2.6 Quality Assurance Engineering Staffing Levels

The site Bechtel Quality Assurance staffing level was increased from five to eight during 1977 to 1979 to accomodate the increase in the number of aforementioned monitors and to be responsive in resolving CPCo overview findings.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

4.2.7 Bechtel Quality Assurance Management Audits

In an effort to better assess the effectiveness of the Quality Assurance Program requirements, the number of Quality Assurance management audits was increased from one to two per year.

4.2.8 Bechtel Quality Trending Activity

The Bechtel quality trending activity, as described in Procedure C-101, was put into effect in July 1976 as a Quality Assurance Program improvement. Trending provides a working tool for Quality Assurance Engineering and its output is used to identify repetitive nonconformances requiring more effective corrective action. Repetitive nonconformances warranting corrective action are processed to the responsible organizations via a Quality Action Request, corrective actions are negotiated, and Quality Assurance follows up to assure the adequacy and timeliness of the actions. Publishing of quality trend data was initiated in July 1976 in the Monthly Project Quality Assurance Activity Report addressed to Bechtel and CPCo key project personnel.

In April 1978, Bechtel Quality Assurance initiated supplementary guidelines for the trending. These guidelines provided criteria for initiating graphic trend charts. Prior to this time, trends were identified and charted based upon the judgement of the reviewer.

The nonconformances for approximately 120 repetitive construction processes or portions thereof, are tracked monthly and issued to CPCo and Bechtel Quality Assurance Management. Since April 1978, 14 Quality Action Requests have been issued.

As a result of a suggestion made during the NRC's Midterm Inspection of the Midland Project in May 1979, a revision was made to group certain construction activity and nonconformance categories to provide increased sensitivity. | 8 | 8

4.2.9 Bechtel Topical Report, BQ-TOP-1A | 8

In November 1976, in order to update the QA Program from that which was committed to in the PSAR, the Bechtel QA Program was revised to incorporate the Bechtel Topical Report, which committed the project to the following ANSI Standards and Regulatory Guides: (Only those marked with an asterisk were a carry over from the PSAR.)

ANSI Standard	Regulatory Guide-Revision Date
*N45.2-1971 "Quality Assurance Program Requirements for Nuclear Facilities"	1.28 - June 7, 1972
N45.2.4-1972 "Installation, Inspection and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations"	1.30 - August 11, 1972
N45.2.1-1972 "Cleaning of Fluid Systems and Associated Components During the Construction Phase of Nuclear Power Plants"	1.37 - March 16, 1973
N45.2.2-1972 "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants During the Construction Phase"	1.38 - March 16, 1973
N45.2.3-1973 "Housekeeping During the Construction Phase of Nuclear Power Plants"	1.39 - March 16, 1973
N101.4-1972 "Quality Assurance for Protective Coatings Applied to Nuclear Facilities"	1.54 - June 1973

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

N/A	1.55 - June 1973
N45.2.6-1973 "Qualifications of Inspection, Examination and Testing Personnel for Nuclear Power Plants"	1.58 - August 1973
N45.2.11-1974 "Quality Assurance Requirements for the Design of Nuclear Power Plants"	1.64 - Rev. ., Feb. 1973
N45.2.10-1973 "Quality Assurance Terms and Definitions"	1.74 - February 1974
N45.2.9-1974 "Requirements for Collection, Storage and Maintenance of Quality Assurance Records for Nuclear Power Plants"	1.88 - August 1974
N45.2.5-1974 "Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants"	1.94 - April 1975
N45.2.8-Draft 3, Rev 4 "Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants."	N/A
N45.2.12-Draft 4, Rev 1 "Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants"	N/A

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

N45.2.13-Draft 3, Rev 3 "Quality Assurance requirements for Control of Procurement of Items and Services for Nuclear Power Plants" — N/A

Examples of implementing procedures that were either originated or revised in response to these QA Program improvements were:

MED 2.13	"Project Engineering Team Organization Responsibilities"
EDPI 4.55.1	"Project Material Requisitions, Midland Project"
FPG-4.00	"Storage and Storage Maintenance of Equipment and Materials"
FPG-7.000	"Housekeeping and Cleanliness Control During Construction"
PSP-G-7.1	"Documentation, Records and Correspondence Control"

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

4.2.10 CPCo QA Inspection of Stored Materials

As a result of the construction slowdown in 1975, CPCo QA began the inspection of stored materials to assure that those materials were not degraded. Items inspected included NSSS components, miscellaneous mechanical and electrical equipment, cadweld materials, tendon sheathing and trumplates, reactor building liner plate, carbon steel and stainless steel pipe, rebar, and structural steel. After resumption of normal work activities, these operations were phased out with the exception of surveillance of NSSS storage which continued until August 1977. Inspection was done in accordance with Midland Project QA Procedure M-2, "Surveillance of Material During Prolonged Storage at the Midland Site." (This procedure no longer exists.)

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

4.2.11 CPCo Biennial QA Audits

CPCo Biennial Audits were instituted in 1976. Audits were performed of the CPCo Design and Construction Nuclear Quality Assurance Program.

In 1976, the Biennial Quality Assurance Audit included 24 man-days of audit effort. The audit involved 15 man-days of auditing for adequacy and implementation of the CPCo Quality Assurance Program Procedures (QAPPs) at the CPCo General Office in Jackson, Michigan; and 9 man-days of auditing for the adequacy and implementation of the CPCo QAPPs and Bechtel Nuclear Quality Assurance Manual (NQAM) at the Midland Site.

The 1978 Biennial Audit included 70 man-days of audit effort. The audit included: 20 man-days of auditing for adequacy and implementation of the CPCo QAPPS, CPCo QA Department Procedures and the Midland Testing Program Manual Procedures at the CPCo General Office in Jackson, Michigan; 20 man-days of auditing for adequacy and implementation of the Bechtel NQAM, Bechtel Field Procedures and Bechtel QC Notices Manual at Bechtel in Ann Arbor, Michigan; 5 man-days of auditing for adequacy and implementation of CPCo Department Procedures, including the Midland Management Organization and Service Departments; and 25 man-days of auditing for implementation of these procedures by CPCo, Bechtel, and B&W at the Midland Site.

All 1976 and 1978 Biennial Audit Findings have been closed.

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

4.2.12 CPCo QA Overview

The CPCo QA overview activities started in April 1976 for rebar and in June 1977 for embeds. For all other civil, mechanical, welding, NDE, electrical, and instrumentation and controls, the overview activities started at the end of June 1978 and was fully implemented by the end of March 1979 for activities then in progress. The overview activities implemented between June 1978 and March 1979 was improved over that which was utilized in 1976 and 1977. The improvement consisted of review of Bechtel drawings, specifications, field procedures, and quality control instruction for specificity, and of CPCo QA's utilization of specific overinspection plans. | 8

CPCo QA performed overinspection of rebar installation in accordance with Midland Project Quality Assurance Procedure M-8, "Inspection of Rebar Placement." From its inception thru December 1978, this overinspection was performed on a 100% basis for Q-listed concrete placements and, thereafter, on less than a 100% basis. Based on CPCo QA records of Bechtel's inspection results and the simplicity of the remaining concrete pours, there was sufficient confidence that 100% overinspection was no longer necessary.

CPCo QA performed overinspection of embed installation in Q-listed concrete placements in accordance with Midland Project Quality Assurance Procedure M-12, "Inspection of Embedded Items." From its inception through September 1978, this overinspection was performed on a 100% basis. Based on CPCo QA records of Bechtel's inspection results, there was sufficient confidence to warrant the discontinuance of the overinspection at that time.

With regard to mechanical activities, from November 1978 to October 19, 1979, Bechtel completed 1,382 Quality Control inspections, whereas in the same time period CPCo QA performed 57 overinspections. Bechtel inspection in the mechanical area was well underway when the CPCo QA overview activity was started; therefore, there was little opportunity for a corresponding CPCo QA overinspection. Thus, there is not a direct correlation between the 1,382 inspections completed by Bechtel from November 1978 to November 1979 and the 57 CPCo QA over- | 8
inspections performed during the same period. Further-

more, the most significant aspects of the mechanical work are the hydrostatic and pneumatic tests. Since October 1977, all of the hydrostatic and pneumatic tests have been witnessed by QA-PE&C. The majority of this effort is not reflected in the CPCo QA overinspection figure of 57 because CPCO Quality Assurance's overinspection of hydrostatic and pneumatic tests are accomplished as a witness point in the Bechtel procedures.

With regard to welding, from November 1978 to November 1979, Bechtel completed 5,253 inspections, whereas in the same period CPCo QA performed 56 overinspections. The preceeding discussion regarding the correlation between Bechtel inspection and CPCo overinspection equally applies to the welding area. Furthermore, for all of Class 1 and Class 2 component and piping welds, radiographic examination is required with minor exceptions and the CPCo QA review of the radiographs has been extensive as indicated below. | 8

From June 1978 to November 1979, Bechtel originated 4951 field radiographs and CPCo QA reviewed 902. For the same period, B&W originated 304 primary system field radiographs and CPCo QA reviewed 100%. CPCo QA will continue to review 100% of B&W's field radiographs. As of November 1979, 1,045 B&W nonprimary system radiographs were made and 670 reviewed. For all other vendors, over 1,560 vendor radiographs received between December 1978 and November 1979 were reviewed by CPCo QA. | 8 | 8 | 8

The electrical area can be further categorized as indicated in the following paragraphs.

For cable tray supports, Bechtel has completed approximately 200 inspections, whereas CPCo QA has performed 13 overinspections.

For cable tray installations, Bechtel has completed approximately 200 inspections, whereas CPCo QA has performed 26 overinspections.

For conduit, junction boxes, and their supports, Bechtel has completed approximately 500 inspections, whereas CPCo QA has performed 26 overinspections.

RESPONSE TO QUESTION 23, PART (3)[50.54(f)]

For electrical penetration assemblies, Bechtel has completed 5 inspections, whereas CPCo QA has performed 1 overinspection.

For the pulling of power cables, control cables, and instrumentation cables, Bechtel has completed approximately 200 inspections, whereas CPCo QA has performed 114 corresponding overinspections (including 20 overinspections which were accomplished as part of audits). Of the 114 CPCo QA cable pulling overinspections, 14 were for instrumentation cables.

For cable terminations, Bechtel has completed approximately 200 inspections, whereas CPCo QA has performed 153 corresponding overinspections.

The higher CPCo QA emphasis on cable pulling in comparison to cable termination is attributable to the recognition that the cables essentially become inaccessible after the pulling, whereas the cable terminations are accessible and any defects are more detectable during checkout and preoperational testing.

For equipment installation, Bechtel has completed approximately 24 inspections, whereas CPCo QA has performed 24 overinspections.

For the electrical aspects of I&C, Bechtel has not completed any inspections. Nevertheless, CPCo QA has performed 14 overinspections (the same 14 cable pulling overinspections mentioned above) and 5 instrument overinspections (motor-operated valves that are already included in the 24 overinspections for electrical equipment installation mentioned above). For the mechanical aspects of I&C, the figures are included in the mechanical overinspection figures.

RESPONSE TO QUESTION 23, PART (3) [50.54(f)]

SECTION 5.0, ACTION ITEM FOLOW-UP

In this table, the action items which provide programmatic and generic corrective actions are arrayed chronologically by scheduled completion dates.

The following abbreviations are used in the table:

NA - Not Applicable
PE - Project Engineering
FE - Field Engineering
QC - Quality Control
QA - Quality Assurance
GT - Geotechnical Service

ACTION ITEMS

PROGRAMMATIC AND GENERIC CORRECTIVE ACTIONS COMMITTED TO IN THE RESPONSE TO QUESTION 1, PART (a) AND IN THE RESPONSE TO QUESTION 23, PARTS (1) AND (2)

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	8
1	Consultant reports other than Dames & Moore were considered in accordance with the guidelines provided in NRC Regulatory Guide 1.70, Revision 2. Consultant reports were not attached to the FSAR, but portions of consultant reports were extracted and incorporated into the FSAR text itself. Those portions incorporated into the FSAR become commitments. Therefore, disposition of recommendations in consulting reports has been adequately accounted for in the preparation of the FSAR. Verification that those portions of consultant reports determined to be commitments and incorporated into the FSAR have been adequately reflected in project design documents is being accomplished via the FSAR rereview program described in the response to Question 23, Part (2). The two Bechtel QA audit findings reported in our April 24, 1979, response (Paragraph D.1, Page I-8) have been closed out. The results of this audit are being utilized in the FSAR control system study committed to in Subsection 3.3 of this response to Part (1). (Question 1, Appendix I, Section D.1, Page I-8 Question 23, Subsection 3.1, Page 7)	PE	–	Complete	

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
2	On April 3, 1979, Midland Project Engineering Group Supervisors in all disciplines were reinstructed that the only procedurally correct methods of implementing specification changes are through the use of specification revisions or Specification Change Notices. This was followed by an interoffice memorandum from the Project Engineer to all Engineering Group Supervisors on April 12, 1979. (Question 23, Subsection 3.2, Page 8; and Subsection 3.9, Page 24)	PE	-	Complete	
3	Engineering Department Project Instruction 4.4.1 was revised in Revision 2 to state, "Under no circumstances will interoffice memoranda, memoranda, telexes, TWXs, etc be used to change the requirements of a specification." (Question 1, Appendix I, Section 0.2.d, Page I-8 Question23, Subsection 3.2, Page 9, and Subsection 3.9,. Page 24)	PE	-	Complete	8

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
4	A review of interoffice memoranda, memoranda, telexes, TWXs, and other correspondence relating to specifications for construction and selected procurements of Q-listed items will be initiated. The purpose of the review will be to identify any clarifications which might reasonably have been interpreted as modifying a specification requirement and for which the specification itself was not formally changed. An evaluation will be made to determine the effect on the technical acceptability, safety implications of the potential specification modification, and any work that has been or may be affected. If it is determined that the interpretation may have affected any completed work or future work, a formal change will be issued and remedial action necessary for product quality will be taken in accordance with approved procedures. The foregoing procedure will be followed for all specifications applying to construction of Q-Listed items. For specifications concerning the procurement of Q-Listed items, the foregoing procedure will be implemented on a random sampling basis. The sample size has been established and the specification selection has been made.	PE	-	Complete	8
(21)	Review and acceptance criteria for the specifications have been defined.	PE	-	Complete	8
					10
					10

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
4 (cont'd)	The review of the initially selected procurement specifications indicated that the acceptance criteria were not met in one discipline. The review was expanded to 100% of the specifications in that discipline (both construction and procurement specifications), and for the other disciplines the sample of procurement specifications was increased to permit each discipline's review to be evaluated separately.				
(47)	This expanded review is scheduled to be completed by June 5, 1981. (Question 23, Subsection 3.2, Page 9, and Subsection 3.9, Page 25)				5
5	A study was completed which examined current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes have been initiated by the revision of or addition to the Engineering Department Procedures. (Question 23, Subsection 3.3, Page 11)	PE	-	Complete	8 8 8
6	An interoffice memorandum dated April 12, 1979, was issued by Geotechnical Services to alert personnel of the need to revise or annotate calculations to reflect current design status. (Question 23, Subsection 3.4, Page 13)	GT	-	Complete	

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status
7	Field Instruction FIC 1.100, "Q-Listed Soils Placement Job Responsibilities Matrix," has been prepared and establishes responsibilities for performing soils placement and compaction. (Question 23, Subsection 3.6, Page 18; Subsection 3.7, Page 20; and Subsection 3.11, Page 30)	FE	-	Complete

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
7A	Review Field Procedure FPG-3.000 to ensure clarity and completeness (Question 1, Appendix I, Section 0.2, Page I-11)	FE	-	Complete	8 8
8	Construction specifications, instructions, and procedures were reviewed to identify any other equipment requiring qualification which had not yet been qualified. No such equipment was identified. (Question 1, Appendix I, Section D.1, Page I-11 Question 23, Subsection 3.6, Page 18)	FE	-	Complete	5
9	A dimensional tolerance study was completed using the reactor building spray pump and ancillary system as the study mechanism. (Question 1, Appendix I, Section D.2.b, Page I-8)	PE	-	Complete	
10	Engineering reviewed specifications not previously reviewed for the specificity or tolerance studies. (Question 1, Appendix I, Section D.2.c, Page I-8)	PE	-	Complete	
11	A specific review of the FSAR and specification requirements for the qualification of electrical and mechanical components has been made as part of the corrective action relating to CPCo's 50.55(e) report on component qualification. (Question 1, Appendix I, Section D.2.e, Page I-8)	PE	-	Complete	
12	Quality Assurance will schedule yearly audits of the design calculational process for techniques and actual analysis in each of the design disciplines. (Question 1, Appendix I, Section D.4, Page I-8)	QA	-	Complete	

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	8
13	Audits of ITT Grinnell hanger design and CPCo relay setting calculation have been conducted. (Question 1, Appendix I, Section D.4, Page I-8)	QA	-	Complete	
14	Bechtel Project Engineering will review design drawings for cases where ducts penetrate vertically through foundations. The possibility of the duct being enlarged over the design requirements and the effect this enlargement may have upon the structure's behavior will be evaluated by June 1, 1979. Proper remedial measures will be taken if the investigation shows potential problems. (Question 1, Appendix I, Section C.5.b, Page I-7)	PE	-	Complete	
15	An in-depth audit of U.S. Testing operations, covering testing and implementation of their QA program will be conducted in late April or early May 1979, by Bechtel Project QA and Engineering. (Question 1, Appendix I, Section C.4.b, Page I-18; and Section D.3.c, Page I-18)	QA	-	Complete	
16	An in-depth training session will be given to Midland QA Engineers covering the settlement problem and methods to identify similar conditions in the future. (Question 1, Appendix I, Section D.1.b, Page I-22)	QA	-	Complete	

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	8
17	An in-depth training session will be given to all CPCo and Bechtel QA Engineers and Auditors to increase their awareness of the settlement problem and to discuss auditing and monitoring techniques to increase audit effectiveness. (Question 1, Appendix I, Section D.2, Page I-22)	QA	-	Complete	
18	An in-depth review of the Bechtel trend program data will be undertaken by Bechtel QA management to ensure the identification of any other similar areas that were not analyzed in sufficient depth in the past reviews. (Question 1, Appendix I, Section D.1.a, Page I-22)	QA	-	Complete	
19	Quality Control Instructions have been evaluated to ensure that the documentation characteristics which are to be inspected (i.e., surveillance and review callouts) are clearly specified.	QC	-	Complete	10 8
19A	(This action modified to include necessary revision to QCIs resulting from evaluation of surveillance and review callouts.) (Question 1, Appendix I, Section D.3.a, Page I-18 and Section D.1, Page I-18)	QC	04/17/81		10
20	Field Instruction 1.100 has been supplemented by establishing requirements for demonstrating equipment capability, including responsibility for equipment approval, and providing records identifying this capability. (Question 23, Subsection 3.6, Page 18)	FE	-	Complete	8
21	See Action Item Number 4 (21)	PE	-	Complete	10

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
22	Guidelines for surveillance of testing operations have been developed and included in Field Instructions for the onsite Soils Engineer. Engineering/Geotechnical Services has developed the guidelines. (Question 23, Subsection 3.10, Page 27)	PE/GT	-	Complete	| 8 | 8 | 8
23	Engineering has revised Engineering Department Procedure 4.22 to clarify that Engineering personnel preparing the FSAR will follow the requirements of Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" (September 1975). Specifically, Regulatory Guide 1.70 (Pages iv and v of the Introduction) requires that such consultant reports only be referenced with the applicable commitments and supporting information included in the test (third paragraph, Page v). Such a requirement precludes repetition of this circumstance. (Question 23, Subsection 3.1, Page 7 and Subsection 3.3d, Page 46)	PE	-	Complete	| 8 | 8
24	To preclude any future inconsistencies between the FSAR and specifications, Engineering Department Project Instruction 4.1.1 has been revised to state that all specification changes, rather than just "major changes," will be reviewed for consistency with the FSAR. (Question 23, Subsection 3.3, Page 11)	PE	-	Complete	| 8 | 8

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
25	Quality Assurance has issued a Nuclear Quality Assurance Manual amendment to clarify the requirement that procedures include measures for qualifying equipment under specified conditions. (Question 23, Subsection 3.6, Page 18)	QA	-	Complete	8 10 8
26	In view of Action Item 6, Geotechnical Services has revised Procedure FP-6437 to require that calculations be annotated to reflect current design status. (Question 23, Subsection 3.4, Page 13)	GT	-	Complete	8
27	Engineering Department Procedure 4.37 has also been revised to require that calculations be annotated to reflect current design status. (Question 23, Subsection 3.4, Page 13)	PE	-	Complete	5 8
28	Civil/Structural Design Criteria 7220-C-501 has been modified to contain the requirements that a duct bank penetration shall be designed to eliminate the possibility of the nonspecific size duct interacting with the structures. (Question 23, Subsection 3.5, Page 15)	PE	-	Complete	5 10
29	The civil standard detail drawings have been revised to include a detail showing horizontal and vertical clearance requirements for duct bank penetrations. The detail addresses any mud mat restrictions. (Question 23, Subsection 3.5, Page 15)	PE	-	Complete	5 8 8

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	8
30 (39)	Engineering clarified specifications and Construction prepared procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Action Item 25. (Question 23, Subsection 3.6, Page 18)	PE	-	Complete	10 8
31	Design documents, instructions, and procedures for those activities requiring inprocess controls have been reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed. (Question 1, Appendix I, Section D.2, Page I-11; and Question 23, Subsection 3.7, Page 20; and Subsection 3.11, Page 30)	PE	-	Complete	10 8 10 10 8
32	Guidelines for surveillance of testing operations have been developed and included in Field Instructions for the onsite Soils Engineer. Engineering/ Geotechnical Services has developed the guidelines and Field Engineering has prepared the instructions. (Question 23, Subsection 3.10, Page 27)	FE	-	Complete	8
33	The Quality Assurance audit and monitoring program will be revised to emphasize and increase attention to the need for evaluating policy and procedural adequacy and assessment of product quality. A specialized audit training program will be developed and implemented to ensure guidance for this revised approach. (Question 23, Subsection 3.13, Page 35)	QA	9/12/80		8

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
34	Control Document SF/PSP G-6.1 has been revised to provide requirements for inspection planning specificity and for the utilization of scientific sampling rather than percentage sampling. (Question 1, Appendix I, Section D.5.f, Page I-20; and Question 23, Subsection 3.8, Page 22; Subsection 3.9, Page 24; Subsection 4.2.2, Page 59)	QC	-	Complete	10 8 8
35	Control Documents SF/PSP G-3.2, "Control of Nonconforming Items," and	QC	-	Complete	10 8
36	QADP C-101, "Project Quality Assurance Trend Analysis" have been revised to provide an improved definition of implementing requirements for identifying repetitive nonconforming conditions. (Question 23, Subsection 3.12, Page 33)	QA	-	Complete	10 8
37	Consistent with the intent of Action Item Numbers 35 and 36, Quality Assurance will review nonconformance reports which were open as of November 13, 1979, or became open prior to implementation of the improved Project Quality Assurance Trend Analysis program as stated in Action Item 36. This review will be to identify any repetitive nonconforming conditions pertaining to product type or activity, or pertaining to nonconformance cause. (Question 23, Subsection 3.12, Page 33)	QA	12/31/80		8 8

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	8
38	A study was completed which examined current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes have been initiated by the revision of or addition to the Engineering Department Procedures. (Question 23, Subsection 3.3, Page 11)	PE	-	Complete	8 5 8
39 (30)	Engineering clarified specifications and Construction prepared procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Action Item 25. (Question 23, Subsection 3.6, Page 18)	FE	-	Complete	10 8
40 (31)	Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed, and Field Engineering and quality control review is scheduled for completion by February 27, 1981. (Question 1, Appendix I, Section D.2, Page I-11; Question 23, Subsection 3.7, Page 20, and Subsection 3.11, Page 30)	FE & QC	02/27/81		10

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
41	QCIs in use will be reviewed to ascertain that provisions have been included consistent with the revised control document, SF/PSP G-6.1, "Quality Control Inspection Plans." (Question 1, Appendix I, Section D.1, Page I-18; Question 23, Subsection 3.8, Page 22; and Subsection 3.9, Page 24)	QC	04/17/81		10 8 8
42 (31) (40)	Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed, and Field Engineering and quality control review is scheduled for completion by February 27, 1981. Any revisions required will be completed by April 17, 1981. (Question 1, Appendix I, Section D.2, Page I-11; Question 23, Subsection 3.7, Page 20; and Subsection 3.11, Page 30)	PE, FE & QC	04/17/81		10
43	The impact of Action Item 41 on completed work will be evaluated, and appropriate actions will be taken as necessary. (Question 23, Subsection 3.8, Page 22; and Subsection 3.9, Page 25)	QC	04/17/81		10
44	FSAR sections have been rereviewed as discussed in the Response to Question 23, Part (2). (Question 23, Subsection 3.1, Page 7; Subsection 3.3, Page 11; Subsection 3.2, Page 41; and Section 4.0, Page 47)	PE	-	Complete	10 10

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
44A	The audit committed to in our response to Question 1, Part b, and described in Part (2), Section 5.0 was conducted once during the course of the FSAR rereview (commencing March 17, 1980) and again after completion of the rereview (commencing November 3, 1980). (Question 23, Part (2), Section 5.0, Page 48)	QA	12/31/80		8 10 8 10 8

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	
45	U.S. Testing was required to demonstrate to cognizant Engineering Representatives that testing procedures, equipment, and personnel used for quality verification testing (for other than NDE and soils) were capable of providing accurate test results in accordance with the requirements of applicable design documents. (Question 1, Appendix I, Section D.3.b, Page I-18; Question 23, Subsection 3.10, Page 27; and Subsection 3.11, Page 31)	PE	-	Complete	10 8 10 8
46	A sampling of U.S. Testing's test reports (for other than NDE and soils) were reviewed by cognizant Engineering Representatives to ascertain that results evidence conformance to testing requirements and design document limits. (Question 23, Subsection 3.10, Page 28; and Subsection 3.11, Page 31)	PE	-	Complete	10
47	See Action Item Number 4 (47)	PE	06/05/81		10
48	CPCo performs overinspection for soils placement, utilizing a specific overinspection plan. (Question 1, Appendix I, Section C.2.b, Page I-11; and Section C.1.c, Page I-16)	CPCo-QA	-	Complete	
49	CPCo performs overinspection of the U.S. Testing soils testing activities and reports, utilizing a specific overinspection plan. (Question 1, Appendix I, Section C.3.c, Page I-17)	CPCo-QA	-	Complete	10

Action Item Number	Action Item Description and Reference	Responsible Organization	Scheduled Completion Date	Completion Status	8
50	CPCo Project Management and QA review field procedures (new and revised) and CPCo QA reviews QCIs (new and revised) in line with Bechtel before release. (Question 1, Appendix I, Section D.5.b, Page I-19)	QC	-	Complete	10
51	In 1978, CPCo implemented an overinspection plan to independently verify the adequacy of construction and the Bechtel inspection process, with the exception of civil activities. Reinforcing steel and embeds were covered in the overinspection. (Question 1, Appendix I, Section D.5.c, Page I-19)	CPCo-QA	-	Complete	10
52	CPCo reviews onsite subcontractor QA manuals and covers their work in the audit process. (Question 1, Appendix I, Section D.5.d, Page I-19)	CPCo-QA	-	Complete	10
53	An ongoing effort is improving the "surveillance" mode called for in the QCIs by causing more specific accountability as to what characteristics are inspected on what specific hardware and in some cases changing "surveillance" to "inspection." (Question 1, Appendix I, Section D.5.e, Page I-19)	QC	-	Complete	10

RESPONSE TO QUESTION 23, PART (4)

Revision 4
11/79

RESPONSE TO QUESTION 23, PART (4) [50.54(f)]

SECTION 1.0, NRC QUESTION

SUPPLEMENTAL REQUEST FOR ADDITIONAL SOILS SETTLEMENT INFORMATION

23. We have reviewed your response to question 1 of our March 21, 1979 letter, "10 CFR 50.54 Request Regarding Plant Fill," including related amendments or supplements in your letters dated May 31, July 9, and August 10, 1979. We find that the information provided is not sufficient for completion of our review. Accordingly, provide the following additional information:

    (4) Considering the results of your investigation requested in our question 1c, question 1d asked that you describe your position as to the overall effectiveness of the QA program for the Midland Plant. Your overall assessment of the effectiveness of your program should be based on your revised response to our question 1c (see above question 23(3)). The results of this assessment, including a description of the scope and extent of the assessment effort and the identification and qualifications of the individuals involved in this assessment, should be reported to us.

2

8004 20 14 '81

Bechtel Power Corporation

026927

777 East Eisenhower Parkway
Ann Arbor, Michigan
Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48106

April 10, 1981

BLC-10659

Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Attention: Mr. J.W. Cook
Vice President
Projects, Engineering and Construction

Subject: Midland Plant Units 1 and 2
Consumers Power Company
Bechtel Job 7220
50.54(f) March Status Report

Attached is the March Status Report giving the status of commitments made in the responses to NRC 50.54(f) questions and supplementary commitments from letters, meetings, etc. The following summary has been grouped by subject or vintage and the status codes summarize the complete versus outstanding items:

Code(1)	1 & 23	2 - 22	24 - 35	36 - 38	39 - 53	Supp.
1	60	44	1	---	0	0
2	10	11	9	---	6	13
3	12	18	0	---	3	3
4	1	11	2	---	20	4
5	0	1	0	---	0	1
Total	83	85	12	0	29	21

(1) See first page of status report for code definitions.

MARGUGLIO EXHIBIT 11

No January or February status reports were distributed. The next status report will be issued by June 1, 1981.

Very truly yours,

For John A. Rutgers
Project Manager

JAR/RLR/ksc
4/9/4s

Attachment: 50.54(f) March Status Report

cc: W.R. Bird w/a
J.E. Brunner w/a
W.J. Cloutier w/a
G.R. Eagle (CPCo/AA) w/a
D.E. Horn w/a
G.S. Keeley w/a
B.W. Marguglio w/a

Written Response Requested: No

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES

LEGEND

Status Codes:

1	Complete, verified by quality assurance
2	Reported complete, not yet verified
3	Due, but not complete. Due dates are shown, reforecast dates are in parentheses.
4	Not yet due
5	Insufficient documentation in 50.54(f) files to establish or verify status

Responsible Organizations:

PD	Plant design	CPCo	Consumers Power Company
PS	Pipe stress	CPCo QA	Consumers Power Company Quality Assurance
LS	Licensing		
GT	Geotechnical services	CPCo PMO	Consumers Power Company Project Management Organization
CE	Civil engineering		
C/S	Civil structural		
S/R	Soils remedial		
FE	Field engineering		
QE	Quality engineering		
QA	Quality assurance		

Notes:

1.a. Commitment dates for action items indicated by asterisks (*) have been transmitted to the NRC. These dates will not be changed without a formal transmittal to the NRC.

b. Asterisk (*) adjacent to status code indicates NRC considers this item closed.

2.a. Part I - "Page" entry is the page of the response upon which the described commitment will be found.

b. Part II - "Page" entry is used to identify the reference document in which the described commitment was made (see listing of "References" below). The initial letter is the reference itself; any subsequent alphanumeric indicators will be an attempt to further define where in the referenced document the commitment can be found.

3. Questions 1 through 22 action item numbers are basically the same as those used by the diesel generator building task group, but have been modified to acknowledge action items/commitments made in all revisions of the responses.

4. Question 23 action item numbering is based on the Response to Question 23 submitted to Consumers Power Company via BLC-8460, J.A. Rutgers to G.S. Keeley, dated November 14, 1979. These action item numbers have been modified to acknowledge action items/commitments made in all revisions of the responses.

5. Question 24 through 35 action items were identified for the first time in the April issue of this status report and will be referred to by the action item numbers established in that issue.

6. Question 36 through 53 action items were identified for the first time in the December issue of this status report and will be referred to by the action item numbers established in that issue.

References (applicable to Part II only):

A. Letter from G.S. Keeley to J.A. Rutgers, CPCo Serial 8548, 3/27/80

B. Letter from T.C. Cooke to File, CPCo Serial CSC-4882, 3/13/80, summarizing commitments made in February 1980 meeting with NRC, Midland, Michigan

C. Letter from T.C. Cooke to M.O. Rothwell, CPCo Serial CSC-4763, 1/25/80, summarizing commitments made in January 16, 1980, meeting with NRC, Bethesda, Maryland (All actions complete)

D. Letter from T.C. Cooke to File, CPCo Serial CSC-4660, 12/11/79, summarizing actions assigned in December 5, 1979 meeting, Midland, Michigan (All actions complete)

E. Attachment 1 to I&E Inspection Reports 50-329/80-32 and 50-330/80-33 (Chron. No. 20347) for inspection conducted 12/8-11/80, Ann Arbor, Michigan

F. Letter from J.A. Rutgers to W.R. Bird, BLC-10323, 2-5-81 (Chron. No. 21521) responding to CPCo Serial 11014 (Chron. No. 20347)

G. Letter from J.A. Rutgers to J.W. Cook, BLC-10460, 3-4-81 (Chron. No. 23539) responding to CPCo Serial 11186 (Chron. No. 21719)

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES

PART I: COMMITMENTS FROM QUESTIONS 1 to 53

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
1-1*	Perform a final review and update of PSAR commitment list	1-3	1	LS		800101	1	See Item 23-44 NRC did not study FSAR rereview in sufficient detail to verify this
1-2*	Review sections of the FSAR determined to be inactive	1-4	1	LS		800101	1	Superseded by Item 23-44 NRC concern re: FSAR rereview
1-3*	Review EDP 4.22	1-4	0	QE		790629	1*	See Item 23-23
1-4	Audit action items 1-3	1-4	0	QA		801101	1	Superseded by Item 23-44A NRC concern re: FSAR rereview
1-5*	Review specifications not included in the specificity study initially	1-5 1-8	0 0	QE		790629	1*	See Item 23-10
1-6*	Complete review of the Dames and Moore report	1-6		GT	L. Kendall	790629 (810401)	3	Geotech provided input 3-26. Need PE review by 4-15-81
1-7*	Complete review of pertinent portions of FSAR Sections 2.5 and 3.8	1-6		GT, CE		790629	1*	
1-8	Correct settlement calculations	1-6		GT		791101	1*	FSAR Rev needed
1-9	Schedule audits of the geotech sections on a 6-month basis	1-7		QA	G. Eagle	790504 (810415)	3*	Add to MPQAD program BLC-10528, 3-16-81
1-10*	Review drawings for possible effect of vertical duct bank restrictions	1-7		CE		790106	1*	See Item 23-14
1-11*	Complete actions in response to DRVCL audit	1-7/8		QE		790518	1*	See Item 23-1
1-12*	Revise EDP 4-49 to incorporate clarifications and instructions for use of SCN	1-8		QE		790504	1*	See Items 23-2, and 23-3
1-13	Schedule audits of each design discipline calculations on a yearly basis	1-8/9		QA	G. Eagle	790504 (810415)	3	See Item 23-12 Add to MPQAD program BLC-10528, 3-16-81
1-14	Reevaluate construction equipment used for compaction	1-11		FE		791204	1*	See Item 23-20

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
1-15	Assign field soils engineer and soils engineer from design section	I-11		FE		790501	1*	See Item 23-7
1-16*	Review construction specifications and procedures to identify equipment requiring qualification	I-11		FE	J. Betts	790629 (810201)	2	See Item 23-8 Need details of review
1-17*	Review field procedure FPG-3.000 to ensure clarity and completeness	I-11		FE		790531	1*	See Item 23-7A
1-18	Revise PQCI C-1.02 to provide inspection rather than surveillance and to record inspections	I-16, I-17		QC		800801	1*	
1-19*	Complete in-depth review of soil test results	I-17		GT	J.Wanzeck	790731	2*	
1-20*	Perform in-depth audit of U.S. Testing	I-18		QA		790531	1*	See Item 23-15
1-21*	Review all active QCIs for surveillance callouts	I-18		QC		790629	1*	See Item 23-19
1-21A	Modify QCIs based on Item 1-21	NA		QC		810417 (800901)	1	Superseded by Item 23-19A. See Items 23-34 and 23-41
1-22*	Evaluate documentation (review) call-outs on QCIs	I-18	1	QC		790629	1*	Superseded by Item 23-19.
1-23	Incorporate scientific sampling plans for inspection	I-20		QC		810417	1*	Superseded by Item 23-41. See Item 23-34
1-24*	Complete in-depth review of the Bechtel trend program	I-22		QA		790601	1*	Superseded by Item 23-18. See Items 23-35 and 23-36
1-25*	Conduct QA training	I-22		QA		790601	1	Superseded by Items 23-16 and 23-17
2-0	No Action Item							
3-1*	Clarify the Response to Question 362.12 in FSAR Revision 18	3-1	0	LS		790531	1	
4-1*	Provide criteria for permissible residual settlement	4-1	3	GT CE		791231	1	
4-2*	Provide details of treatment of loose sands	4-2	0	GT CE		790831	1	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
4-3	Take dynamic modulus measurements upon removal of preloads for diesel generator building and other buildings	4-3	3	GT		791031	1	
4-4	Use data of Item 4-3 to evaluate the seismic response of the structures	4-3	3	CE		791130	1	Partial Requirement of Items 13-6, 13-11, 13-16
4-5	Prepare additional response to NRC for Items 4-1 and 4-2	NA		CE		790831	1	
4-6	Monitor the non-Seismic Category I condensate storage tanks	4-4	5	GT CE (S/R)	J. Wanzeck S. Rao	810630	4	Load test ongoing. Results will be evaluated by geotech and civil.
4-7	Remove unsuitable material in the tank farm and replace by compacted fill	4-3	3	GT CE (S/R)	J. Wanzeck S. Rao	791130	2	See Item 6-7 Obtain copies of NCRs 2294, 2307, M01-5-9-012
4-8	Fill the BWST with water to perform a full-scale test of subsurface material	4-3	3	GT CE (S/R)	J. Wanzeck S. Rao	810630	4	See Items 6-1, 6-2, 6-3, 6-6, 14-1, and 31-1. Dwg C-1148 issued for construction. Load test started 10/80.
4-9	Fill the diesel fuel oil tank with water to perform a full-scale test of the foundation soil	4-2	0	GT			1	See Item 6-4 and Ques. 33
5-1	Monitor the settlement of the structures (which were subjected to preload) during the life of the plant to provide a record of performance	5-1	0	GT CE (C/S)			1	Ongoing activity. Requirements in Dwg C-994, Spec C-76
6-1	Construct and fill the borated water tank to make a full-scale test of the foundation soils	6-1	0	GT CE (S/R)			1	Tracked by Item 4-8
6-2	Delay the piping connections to the BWST until most of the settlement has taken place under the test load	6-1	0				1	Superseded by Item 6-5 See Items 4-8, 17-4, and 31-1.
6-3	Use settlement data from BWST to allow conservative piping connection design		0	NA			1	Tracked by Item 4-8
6-4	Evaluate the load test result of the diesel fuel oil tank and provide precise corrective measures if required	6-2	0	GT			1	See Item 4-9 and Ques. 33

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
6-5	Monitor the piping between the BWST and the auxiliary building	6-1	1	CE	J. Betts		2	Superseded by Item 17-4
6-6	Evaluate the settlement from Item 6-3 in accordance with the procedure described in Question 17	6-1	1	PS			1	Tracked by Item 4-8
6-7	Remove all unsuitable material in the tank farm area and replace with suitable compacted fill	6-1	3	GT			1	Tracked by Item 4-7
6-8	Monitor the non-Seismic Category I condensate storage tanks	6-2	3	GT			1	Tracked by Item 4-6
6-9	Determine long-term settlement based on the measured settlement of the loaded tanks	6-2	3	GT	S. Afifi	810831	4	Geotech to review load and predict long-term settlement based on Items 4-6, 4-8, and 4-9
7-1*	Perform continuity check on duct banks after completion of preload program	7-3	3	FE		791130	1	See Item 12-7 for ongoing activity
7-2	Make results of continuity checks and settlement surveys available	7-3	3	FE	B. Matthews		2	See Item 7-1
7-3	If further corrective action is required, determine corrective measures	7-3	3	FE	B. Matthews		2	See Item 7-1
8-1	Establish a requirement to realign diesel generators if manufacturer's tolerance for pitch and roll are exceeded	8-2	0	CE (S/R)		[illegible]0304	1	Requirement shown in Dwg C-1011, Note 4
8-2	Monitor the diesel generator pedestal markers on a 60-day cycle throughout the construction phase.	8-2	0	CE (S/R)		NA	1	Ongoing activity. Requirements in Dwg C-994 and Spec C-76. Included in Item 5-1
8-3	Review and modify the monitoring frequency for the diesel generator pedestal markers after 1 year of operation	8-2	0	CPCo		850101	4	
9-0	No Action Item	NA						
10-0	No Action Item	NA						
11-0	No Action Item	NA						

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
12-1	Complete one additional boring in the middle of diesel fuel oil tank area	12-1	0	GT		790423	1	
12-2	Complete three additional borings in the auxiliary building control tower area	12-1	0	GT		790531	1	
12-3	Complete Table 12-1 for soils investigation and planned remedial measures; respond to NRC	Tbl 12-1	1	CE (S/R)		790531	1	
12-4	Provide supporting soil condition for Seismic Category I utilities	Tbl 12-1	0	CE (S/R)		790531	1	
12-5	Pressure grouting of void below the mud mat of the control tower as required	Tbl 12-1	0	FE CE (S/R)	J. Betts S. Lo	801231 (810430)	3	Define "as required"
12-6	Provide a detailed description of planned corrective actions in Interim Report 6 of MCAR 24	Tbl 12-1	1	CE (S/R)		790630	1	
12-7	Perform a continuity check on one conduit in each duct bank made with a hard-fiber rabbit prior to cable pulling	Tbl 12-1 Pg 4	1	FE		800630	1	See Item 7-1. Ongoing activity. See field procedure FIE 4.500
12-8	Measure the gaps between embedded sleeves and pipes entering the service water valve pits when the surcharge is removed	Tbl 12-1 Pg 5	3	CE (S/R)			1	
13-1	Complete seismic reanalysis of diesel generator building to account for current lack of compaction	13-1	0	CE (C/S)		791031	1	Superseded by Items 13-6 and 13-7
13-2	Review diesel generator building design and Seismic Category I equipment piping, and electrical systems to the enveloped seismic responses	13-2	0	CE (C/S, S/R)		791231	1	Superseded by Items 13-8 through 13-10
13-3A	Conduct a seismic reanalysis to account for revised soil structure interaction of service water pump structure	13-2	0	CE (C/S)		791231	1	Superseded by Items 13-11 through 13-15

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
13-3B	Review structural design and Seismic Category I equipment, piping, and electrical systems and incorporate the seismic responses of the reanalysis for the service water pump structure	13-2	0	CE (C/S, S/R)		791231	1	Superseded by Items 13-11 through 13-15
13-4A	If significant change of foundation properties of the auxiliary building result, conduct a seismic reanalysis;	13-2	0	CE		791231	1	Superseded by Items 13-16 through 13-20
13-4B	Review structural design and Seismic Category I equipment, piping, and electrical systems and incorporate the seismic response of the reanalysis for the auxiliary building	13-2	0	CE		791231	1	Superseded by Items 13-16 through 13-20
13-5	Underground utilities - Investigate the change in differential displacement separately for buildings founded on fill pending results of seismic reanalysis	13-5	0	CE PD		791231	1	Superseded by Item 13-21
13-6 (13-1)	Conduct a seismic reanalysis for the diesel generator building	13-2	0	CE (C/S)	B. McConnel	801115	2	See Item 25-1
13-7 (13-1)	Review structural design for seismic response from Item 13-6	13-2	0	CE (S/R)	S. Lo	810331	2	Initially completed review 10-80. Reopened because of commitments in Rev 10 (See Item 40-1) and CPCo direction.
13-8 (13-2)	Review Seismic Category I equipment for seismic response from Item 13-6	13-2	0	CE (C/S)	B. McConnel	810201 (HOLD)	3	Hold in accordance with CPCo direction
13-9 (13-2)	Review piping system for seismic response from Item 13-6	13-2	0	PD	R. Mack	(HOLD)	3	Hold in accordance with CPCo direction
13-10 (13-2)	Review electrical system for seismic response from Item 13-6	13-2	0	CE (C/S)	B. McConnel	810201 (HOLD)	3	Hold in accordance with CPCo direction
13-11 (13-3)	Conduct a seismic reanalysis for the service water pump structure	13-2	0	CE (C/S)	B. McConnel	801031 (810915)	2	See Items 14-8 and 25-3
13-12 (13-3)	Review structural design for seismic response from Item 13-11	13-2	0	CE (S/R)	R. Zao	801231 (811115)	3	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
13-13 (13-3)	Review Seismic Category I equipment for seismic response from Item 13-11	13-2	0	CE (C/S)	B. McConnel	810201 (HOLD)	3	Hold in accordance with CPCo direction
13-14 (13-3)	Review piping system for seismic response from Item 13-11	13-2	0	PD	R. Mack	810201 (HOLD)	3	Hold in accordance with CPCo direction
13-15 (13-3)	Review electrical system for seismic response from Item 13-11	13-2	0	CE (C/S)	B. McConnel	810201 (HOLD)	3	Hold in accordance with CPCo direction
13-16 (13-4)	Conduct a seismic reanalysis for the auxiliary building	13-3	0	CE (C/S)	B. McConnel	801215 (810430)	3	See Item 25-2
13-17 (13-4)	Review structural design for seismic response from Item 13-16	13-3	0	CE (S/R)	R. Zac	801130 (810630)	3	
13-18 (13-4)	Review Seismic Category I equipment for seismic response from Item 13-16	13-3	0	CE (C/S)	B. McConnel	801231 (HOLD)	3	Hold in accordance with CPCo direction
13-19 (13-4)	Review piping system for seismic response from Item 13-16	13-3	0	PD	R. Mack	(HOLD)	3	Hold in accordance with CPCo direction
13-20 (13-4)	Review electrical system for seismic response from Item 13-16	13-3	0	CE (C/S)	B. McConnel	801231 (HOLD)	3	Hold in accordance with CPCo direction
13-21 (13-5)	Investigate the effect on underground utilities for differential building displacement resulting from Items 13-6, 13-11, 13-16	13-5	0	PD CE (S/R)	R. Mack B. McConnel	810131 (811015)	3	
14-1	Review the estimated settlement upon completion of the load test program of the BWST	14-1	0	GT		810131	1	Tracked by Item 4-8
14-2	Analyze flexible buildings for differential settlement based on stiffness at the time of distortion. Evaluate forces due to arching or distortion according to Question 15	14-2	0	CE			1	Superseded by Item 14-6. See Items 14-4 and 26-1
14-3*	Map significant cracks in auxiliary building, feedwater isolation valve pits, and ring foundation for the BWSTs	14-3	0	CE (S/R)		790630	1	See Items S-3 and S-4
14-4*	Analyze buildings affected by differential settlement for observed differential settlement plus predicted differential settlement	14-4	0	CE		790831	1	Superseded by Item 14-6 and 14-7. See Items 14-2 and 26-1.

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
14-5	Prepare additional response to the NRC	14-1 14-3 14-5	5	CE (S/R)		790831 (HOLD)	3	Provide responses for Items 14-1, 14-7, and 14-8.
14-6*	Analyze the diesel generator building for variable foundation properties by finite element model	14-2	3	CE (S/R)		791231	1	See Items 14-2, 14-4, 26-1, and S-10.
14-7	Analyze the BWST foundation for variable foundation properties	14-3	5	CE (S/R)	R. Pierce	801231	2	Analysis ongoing. See Items 14-4 and S-11.
14-8	Compare allowable versus calculated forces and moments at critical sections for auxiliary building electrical penetration area and service water pump structure	14-5	5	CE (S/R)	S. Lo (Aux) L. McElwee (SWPS)	801231 (HOLD)	3	See Items 13-12 and 25-3. Hold in accordance with CPCo direction for site-specific earthquake.
15-1*	Evaluate the differential settlements in accordance with provisions of ACI 318-71 for Seismic Category I structures founded partially upon natural soil and partially upon fill material	15-1	0	CE (S/R)	R. Zao	791231	2	
15-2	Expand the Midland project structural design criteria for Seismic Category I structures to include the differential settlement effect.	15-2	0	CE (C/S)		801130	1	See Item 26-2. Rev 11 issued 10/29/80
15-3	Prepare additional response to the NRC	15-2	0	CE (S/R)		791231	1	Provided in Rev 3. See Item 15-1.
16-1*	Perform soil borings in areas of buried pipes	16-1	0	GT CE (S/R)		790831	1	Deleted in Rev 5. Requirement to perform borings is in Dwg C-1146
17-1*	Evaluate impact of the failure of buried non-Seismic Category I piping on safety-related structures, foundations, and equipment	17-1	0	CE		790629	1	Deleted in Rev 2. Evaluation was not requested by NRC.
17-2	If future profiles show any extreme conditions, analyze the piping system and make necessary repairs	17-3	0	CE		790901	1	Superseded by Item 17-5
17-3	Prepare additional response to the NRC					790629	1	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
17-4	Profile the borated water lines by optical means	17-1	2	FE	J. Betts		5	See Item 6-5. Ongoing activity. Closure dependent upon completion of Item 17-5.
17-5	Analyze buried piping considering the probable ultimate settlement. Provide unique resolution for any unacceptable stress conditions for the portion of the system	17-3	5	PD	R. Mack	810131 (810630)	3	Report on method for analysis being reviewed. See Item 19-3
17-6	Investigate the excess rounding of profile data	Tbl 17-2	2	PD	R. Mack	810131	2	See Figures 17-2 and 19-1, Rev 10
18-1	Perform reexamination of the stresses in all Seismic Category I connecting piping between buildings as a normal iteration of design. Consider stresses induced by differential settlement after connecting pipe and anticipated future settlement	18-1	0	PD	R. Mack	810630	4	
18-2	Perform final analyses to demonstrate the margin of acceptability for additional differential settlement beyond that expected for the life of the plant	18-2	5	PD	R. Mack	810630	4	Same as Item 17-5
18-3	Design piping connecting from the diesel generator building to the pedestals which will accommodate the expected future settlement	18-2	5	PD	R. Mack	810630	4	Dependent on Item 17-5
19-1	Profile pipes in the vicinity of diesel generator building after removal of preload and evaluate as described in the Response to Question 17	19-1	0	PD	R. Mack	810131	2	Superseded by Item 17-5
19-2	Take additional gap measurements between embedded sleeves and pipes when surcharge is removed. Coordinate this information with the profile data	19-2	0	CE (S/R)			2	Closed by Rev 5
19-3*	Perform a complete evaluation of safety-related piping after completion of the preload program	19-3	0	PD		790801	1	Deleted in Rev 5 and tracked by Item 17-5

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
20-1	Analytically check the Seismic Category I systems affected by settlement for pump and nozzle loadings and verify that they are within specified or vendor-accepted limits	20-1	0	PD	R. Mack	810630	4	Dependent on Item 18-1
20-2	Verify piping support loads for systems subjected to settlement-induced loads	20-1	0	PD	R. Mack	810630	4	Dependent on Item 18-1
20-3	Prepare additional response to the NRC	20-1	5	PD	R. Mack	810730	4	Rev 2 fulfilled Rev 0 commitment. Response Rev needed upon completion of Items 20-1, 20-2, and 20-4.
20-4	Evaluate active valves affected by settlement for imposed loads and reactions; compare to the allowable for operability	20-1	5	PD	R. Mack	810630	4	Dependent on Item 18-1
21-0	No Action Item						-	
22-0	No Action Item						-	
23-1*	The two Bechtel QA audit findings reported in our April 24, 1979, response (Paragraph D.1, Page I-8) have been closed.	I-8, 23-7	4	PE		790518	1*	Tracked by Item 1-11
23-2*	On April 3, 1979, Midland project engineering group supervisors in all disciplines were reinstructed that the only procedurally correct methods of implementing specification changes are through the use of specification revisions or specification change notices. This was followed by an interoffice memorandum from the project engineer to all engineering group supervisors on April 12, 1979.	23-8, 23-24	4	PE		790312	1*	See Item 1-12
23-3*	Engineering Department Project Instruction 4.49.1 was revised in Revision 2 to state, "Under no circumstances will interoffice memoranda, memoranda, telexes, TWXs, etc be used to change the requirements of a specification."	I-8, 23-9, 23-24	4	PE			1*	See Item 1-12

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-4*	A review of interoffice memoranda, memoranda, telexes, TWXs, and other correspondence relating to specifications for construction and selected procurements of Q-listed items will be initiated. The purpose of the review will be to identify any clarifications which might reasonably have been interpreted as modifying a specification requirement and for which the specification itself was not formally changed. An evaluation will be made to determine the effect on the technical acceptability, safety implications of the potential specification modification, and any work that has been or may be affected. If it is determined that the interpretation may have affected any completed work or future work, a formal change will be issued and remedial action necessary for product quality will be taken in accordance with approved procedures. The foregoing procedure will be followed for all specifications applying to construction of Q-listed items. For specifications concerning the procurement of Q-listed items, the foregoing procedure will be implemented on a random sampling basis. The sample size has been established and the specification selection has been made.	23-9, 23-25	4	PE			1*	
(21)	Review and acceptance criteria for the specifications have been defined.							
(47)	The review of construction and selected procurement specifications is scheduled to be completed by April 1, 1981. If the acceptance criteria are not met, the review will be expanded to include other specifications for Q-listed items. At that time, a revised completion date will be established.							

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-5*	A study was completed which examined current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes will be initiated by the revision of or addition to the engineering department procedures. This action is scheduled to be completed by January 31, 1980.	23-11	5	LS		800131	1	See Item 23-38. NRC concerned about revised procedures reverting back to unacceptable requirements
23-6*	An interoffice memorandum dated April 12, 1979, was issued by geotechnical services to alert personnel of the need to revise or annotate calculations to reflect current design status.	1-7, 23-13	4	GT		790312	1*	
23-7*	Field Instruction FIC 1.100, Q-listed Soils Placement Job Responsibilities Matrix, has been prepared and establishes responsibilities for performing soils placement and compaction.	1-11, 23-18, 23-20, 23-24, 23-30		FE			1*	See Item 1-15
23-7A*	Review Field Procedure FPG 3.000 to ensure clarity and completeness	1-11		FE			1*	See Item 1-17
23-8*	Construction specifications, instructions, and procedures were reviewed to identify any other equipment requiring qualification which had not yet been qualified. No such equipment was identified.	1-11, 23-18	5	FE			1	Tracked by Item 1-16
23-9*	A dimensional tolerance study was completed using the reactor building spray pump and ancillary system as the study mechanism.	1-8	4	PE			2*	QA to provide copy for 50-54(f) files
23-10*	Engineering reviewed specifications not previously reviewed for the specificity or tolerance studies.	1-8		PE			1*	Tracked by Item 1-5

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-11*	A specific review of the FSAR and specification requirements for the qualification of electrical and mechanical components has been made as part of the corrective action relating to CPCo's 50.55(e) report on component qualification.	1-8		PE			1*	
23-12*	Quality assurance will schedule yearly audits of the design calculational process for techniques and actual analysis in each of the design disciplines.	1-8		QA			1	Tracked by Item 1-13
23-13*	Audits of ITT Grinnell hanger design and CPCo relay setting calculation have been conducted.	1-8		QA			1*	See Item 1-13
23-14*	Bechtel project engineering will review design drawings for cases where ducts penetrate vertically through foundations. The possibility of the duct being enlarged over the design requirements and the effect this enlargement may have upon the structure's behavior will be evaluated by June 1, 1979. Proper remedial measures will be taken if the investigation shows potential problems.	1-7, 23-15		CE			1*	See Item 1-10
23-15*	An in-depth audit of U.S. Testing operations, covering testing and implementation of its QA program, will be conducted in late April or early May 1979, by Bechtel project QA and engineering.	1-18		QA			1*	See Item 1-20
23-16*	An in-depth training session will be given to Midland QA engineers covering the settlement problem and methods to identify similar conditions in the future.	1-22	4	QA	G. Richardson	791130	2	See Items 1-25, and 23-17. Need documentary evidence of topics covered
23-17*	An in-depth training session will be given to all CPCo and Bechtel QA engineers and auditors to increase their awareness of the settlement problem and discuss auditing and monitoring techniques to increase audit effectiveness.	1-22	4	QA	C. Richardson	800229	2	See Item 1-25 and 23-16. Need documentary evidence of topics covered

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-18*	An in-depth review of the Bechtel trend program data will be undertaken by Bechtel QA management to assure the identification of any other similar areas that were not analyzed in sufficient depth in the past reviews.	I-22	4	QA	D. Horn	790601 (810301)	2	Supercedes Item 1-24. Need to review documentary evidence
23-19*	Quality control instructions have been evaluated to ensure that the documentation characteristics which are to be inspected (i.e., surveillance and review callouts) are clearly specified.	I-18	4	QC			1*	See Items 1-21 and 22
23-19A*	This action modified to include necessary revision to QCIs resulting from evaluation of surveillance and review callouts	I-18		QC	E. Smith	801115 (810417)	3	Supercedes Item 1-21A. See Item 23-53. Field instruction revised. To be completed when Item 23-41 is completed and QC Procedure G-6.1 is approved by CPCo.
23-20*	Field Instruction 1.100 will be supplemented by establishing requirements for demonstrating equipment capability, including responsibility for equipment approval, and providing records identifying this capability.	23-18	5	GT	J. Wanzeck	Complete (801231)	2	Final Report Rev 1 issued Oct. '80
23-21*	See Item 23-4(21)	23-9, 23-25	4	PE		800314	1	
23-22*	Guidelines for surveillance of testing operations will be developed and included in field instructions for the onsite soils engineer. Engineering/geotechnical services will develop the guidelines by November 30, 1979.	23-27	5	GT		791130	1*	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-23*	Engineering will revise Engineering Department Procedure 4.22 by December 1, 1979, to clarify that engineering personnel preparing the FSAR will follow the requirements of Regulatory Guide 1.70, Revision 2, Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (September 1975). Specifically, Regulatory Guide 1.70 (Pages iv and v of the Introduction) requires that such consultant reports only be referenced with the applicable commitments and supporting information included in the text (third paragraph, Page v). Such a requirement would preclude repetition of this circumstance.	23-7, 23-46	5	PE		791130	1*	See Item 1-3
23-24*	To preclude any future inconsistencies between the FSAR and specifications, Engineering Department Project Instruction 4.1.1 will be revised to state that all specification changes, rather than just "major changes," will be reviewed for consistency with the FSAR.	23-11	5	PE		791130	1*	
23-25*	Quality assurance has issued a Nuclear Quality Assurance Manual amendment to clarify the requirement that procedures include measures for qualifying equipment under specified conditions.	23-18	4	QA		800902	1*	
23-26*	In view of Item 6, geotechnical services will revise Procedure FP-6437 by December 31, 1979, to require that calculations be annotated to reflect current design status.	23-17	5	GT		800328	1*	
23-27*	Engineering Department Procedure 4.37 will also be revised by December 31, 1979, to require that calculations be annotated to reflect current design status.	23-13	5	QA		791227	1*	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-28*	Civil/Structural Design Criteria 7220-C-501 has been modified to contain the requirements that a duct bank penetration shall be designed to eliminate the possibility of the nonspecific size duct interacting with the structures.	23-15	5	CE (C/S)		800831	1*	C-501, Rev 11 issued 10/29/80
23-29*	The civil standard detail drawings will be revised to include a detail showing horizontal and vertical clearance requirements for duct bank penetrations. The detail will address any mud mat restrictions.	23-15	5	CE (C/S)		791231	1*	Shown in Dwg C-141
23-30* (39)	Engineering clarified specifications and construction prepared procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Item 25	23-18	5	CE (C/S)		800912	1*	See Items 23-25 and 23-39
23-31*	Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed.	I-11, 23-20, 23-30	5	PE	R. Hollar	801024	2	See Item 23-40. Review completed 11/13/80. Revisions to design documents being tracked by Item 23-42.
23-32*	Guidelines for surveillance of testing operations will be developed and included in field instructions for the onsite soils engineer. Engineering/geotechnical services will develop the guidelines by November 30, 1979, and field engineering will prepare the instructions by February 29, 1980.	23-27	5	FE		800229	1*	
23-33*	The quality assurance audit and monitoring program will be revised to emphasize and increase attention to the need for evaluating policy and procedural adequacy and assessment of product quality. A specialized audit training program will be developed and implemented to ensure guidance for this revised approach.	23-35	5	QA	L. Grant	800912 (810415)	3	Action completed except developing audit training program

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENT FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-34*	Control Document SF/PSP G-6.1 has been revised to provide requirements for inspection planning specificity and for the utilization of scientific sampling rather than percentage sampling.	1-20, 23-22, 23-24, 23-59	5	QC		800915	1*	See Items 1-23 and 23-41
23-35*	Control Document SF/PSP G-3.2, Control of Nonconforming Items, has been revised to improve the definition of implementing requirements for identifying repetitive nonconforming conditions.	23-33	5	QC		800915	1*	See Item 1-24. PSP G-3.2 Rev. 6 issued 6/10/80
23-36*	Control Document QADP C-101, Project Quality Assurance Trend Analysis, has been revised to improve the definition of implementing requirements for identifying repetitive nonconforming conditions.	23-33	5	QA		800124	1*	See Item 1-24
23-37*	Consistent with the intent of Items 23-35 and 23-36, QA will review nonconformance reports which were open as of November 13, 1979, or became open prior to implementation of the improved Project Quality Assurance Trend Analysis program as stated in Item 36.	23-33	5	QA	D. Horn	801231	2	
23-38*	A study was completed which examined current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes will be initiated by the revision of or addition to the engineering department procedures.	23-11	5	LS		791130	1	Tracked by Item 23-5
23-39* (30)	Engineering clarified specifications and construction prepared procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Item 25.	23-18	5	FE		801017	1*	See Item 23-30

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESP (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-40*	Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction.	I-11, 23-20, 23-30	4	FE, QC	J. Gilmartin, E. Smith	810227 ( )	3	See Item 23-31. To be done based on PE finish of 23-42 by 12/31/80 Delayed due to Item 23-42 from PE.
(31)	Engineering review has been completed and field engineering and quality control review is scheduled for completion by February 27, 1981.							
23-41*	QCIs in use will be reviewed to ascertain that provisions have been included consistent with the revised control document, SF/PSP G-6.1, Quality Control Inspection Plans.	I-18, I-20, 23-22, 23-25	5	QC	E. Smith	801115 (810417)	3	Supersedes Item 1-23. See Items 23-19A and 23-34. Commitments in Item 1-23 not yet complied with.
23-42*	Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction.	I-11, 23-20, 23-30	4	PE	R. Hollar	801231 ( )	3	Design documents to be revised by 12/31/80
				FE, QC	J. Gilmartin, E. Smith	810417	4	Procedures and instructions to be revised by 4/17/81
(31)	Engineering review has been completed, and field engineering and quality control review is scheduled for completion							
(40)	by February 27, 1981. Any revisions required will be completed by April 17, 1981.							
23-43*	The impact of Item 41 on completed work will be evaluated, and appropriate actions will be taken as necessary.	23-22, 23-25	4	QC	E. Smith	810115 (910417)	3	See Item 23-41
23-44*	FSAR sections have been rereviewed as discussed in the Response to Question 23, Part 2.	23-7, 23-11, 23-41, 23-47	4	PE		800931	1	Supersedes Item 1-2. See Items 1-1 and 1-3
23-44A*	The audit committed to in our response to Question 1, Part b and described in Part 2, Section 5.0 was conducted once during the course of the FSAR rereview (commencing March 17, 1980) and again after completion of the rereview (commencing November 3, 1980).	23-48	4	QA	R. Rixford	801231	2	See Item 1-4

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-45*	U.S. Testing was required to demonstrate to cognizant engineering representatives that testing procedures, equipment, and personnel used for quality verification testing (for other than NDE and soils) were capable of providing accurate test results in accordance with the requirements of applicable design documents.	I-18, 23-27, 23-31	5	CE (C/S)	V. Patankar	801001 (810501)	3	Awaiting QA comments
23-46*	A sampling of U.S. Testing's test reports (for other than NDE and soils) were reviewed by cognizant engineering representatives to ascertain that results evidence conformance to testing requirements and design document limits.	23-28, 23-31	5	CE (C/S)	V. Patankar	801001 (810501)	3	Awaiting QA comments
23-47*	See Item 23 4(47)	23-9, 23-25	4	PE	R. Hollar	810401	3	
23-48*	CPCo performs overinspection for soils p[illegible]ment, utilizing a specific overinspection plan.	I-11, I-16, I-17	4	CPCo-QA		NA	1*	Ongoing activity
23 49*	CPCo performs overinspection of the U.S. Testing soils testing activities and reports, utilizing a specific overinspection plan.	I-17	4	CPCo-QA		NA	1*	Ongoing activity
23-50*	CPCo project management and QA review field procedures (new and revised) and CPCo QA reviews QC's (new and revised) in line with Bechtel before release.	I-19	4	CPCo-QA, CPCo-PMO		NA	1*	Ongoing activity
23-51*	In 1978, CPCo implemented an overinspection plan to independently verify the adequacy of construction and the Bechtel inspection process, with the exception of civil activities. Reinforcing steel and embeds were covered in the overinspection.	I-19	4	CPCo-QA		NA	1*	Ongoing activity
23-52*	CPCo reviews onsite subcontractor QA manuals and covers their work in the audit process.	I-19	4	CPCo-QA		NA	1*	Ongoing activity

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-53*	An ongoing effort is improving the "surveillance" mode called for in the QCIs by causing more specific accountability as to what characteristics are inspected on what specific hardware and in some cases changing "surveillance" to "inspection."	I-19	4	QC		NA	1*	See Item 23-19A
24-1	Determine final number of observation wells	24-21	5	GT		811031	2	Ongoing activity
24-2	Develop frequency for monitoring the observation wells	24-21	5	GT		810131	2	Ongoing activity
24-3	Develop system and schedule for monitoring sand removal	24-22	5	GT		810131	2	Ongoing activity
24-4	Evaluate results of temporary dewatering system to verify design bases	24-8	5	GT		810601	4	Ongoing activity
25-1	Revise seismic analysis for diesel generator building using the soil properties determined by the recent investigation and any foundation modifications	25-3	5	CE (C/S)			2	Tracked by Item 13-6
25-2	Revise seismic analysis for auxiliary building using the soil properties determined by the recent investigation and any foundation modifications	25-3	5	CE (C/S)			2	Tracked by Item 13-16
25-3	Revise seismic analysis for service water pump structure using soil properties determined by the recent investigation and any foundation modification	25-5	5	CE (C/S)			2	Tracked by Item 13-11 See Item 14-8
26-1	Analyze the effect of differential settlement of the diesel generator building in accordance with ACI 349 as supplemented by Regulatory Guide 1.142	26-2	5	CE (S/R)	R. Zao	801031	2	See Item 14-6
26-2	Incorporate in the Midland project structural design criteria the effect of differential settlement on structures which are founded partially or totally on fill	26-1	5	CE			2	Tracked by Item 15-2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
27-1	Prohibit final piping connection to the diesel generator building before 12/31/81	Fig 27-9	5	PD	R. Tulloch	800731	2	
28-0	No Action Item						-	
29-0	No Action Item						-	
30-0	No Action Item						-	
31-1	Perform full-scale load test by filling the BWST with water	31-2	5	GT CE (S/R)		801130	1	Tracked by Item 4-8
32-0	No Action Item						-	
33-1	Fill the diesel fuel oil tanks with oil prior to preoperational testing	33-2	5	CPCo		810831	4	See Items 4-9 and 6-4. Will be accomplished just prior to preoperational testing
34-0	No Action Item						-	
35-0	No Action Item						-	
36-0	No Action Item						-	
37-0	No Action Item						-	This question addressed by letter (Serial 10112, 11-21-80) transmitting Amendment 05
38-0	No Action Item						-	
39-1	Activate the construction dewatering system for Unit 1 underpinning work (electrical penetration area - see response to Question 42)	39-1	10	FE	J. Betts	801131	2	See Item 42-4
39-2	Install and operate additional (dewatering) wells south of the diesel generator building	39-1	10	GT	W. Paris	810630	4	
39-3	Assess the ultimate settlement associated with dewatering	39-1	10	GT	S. Afifi	810630	4	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART 1: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
40-1	For the structural evaluation of the diesel generator building committed to in the response to Question 13, rebar stress will be based on crack width. For uncracked areas a 4 ksi tensile stress in the rebar will be assumed	40-12	10	CE (S/R)	S. Lo	810331	2	See Item 13-7
41-1	A preproduction load test program will be conducted	41-4	10	FE/ CE (S/R)	J. Betts T. Speck	810228	2	Pile concept deleted in CPCo letter to NRC (025218)
41-2	Pile load test data will be used to determine if additional piles are required	41-4	10	CE (S/R)	R. Zao	810331	2	Pile concept deleted in CPCo letter to NRC (025218)
41-3	Each pile will be tested after installation	41-4	10	FE	J. Betts	811130	2	Pile concept deleted in CPCo letter to NRC (025218)
41-4	After completion of pile installation, load and deformation data will be provided. If the values obtained fall outside those included in the parametric study, the need for a new seismic analysis will be considered	41-9	10	GT/ CE (S/R, C/S)	S. Afifi/ B. McConnel	811231	2	Pile concept deleted in CPCo letter to NRC (025218)
42-1	Underpin the electrical penetration room of the auxiliary building.	42-2	10	CE (S/R)	S. Lo	830430	4	
42-2	The calculated ultimate bearing capacity values and corresponding factors of safety for seismic effects (OBE and SSE) will be furnished at a later date	42-10	10	GT	S. Afifi	830430	4	
42-3	The feedwater isolation valve pit will be supported by concrete fill	42-10	10	CE (S/R)	S. Lo	830430	4	
42-4	Reevaluate settlement of electrical penetration area and feedwater isolation valve pit based on direct measurement of settlement due to dewatering	42-10	10	GT	S. Afifi	810630	4	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
42-5	At the completion of the underpinning operation (for both electircal penetration areas and feedwater isolation valve pits) a written report will be submitted that will summarize construction activities, field inspection records, results of field load tests on the caissons, and an evaluation of the completed fix	42-11	10	CE (S/R)	S. Lo	830420	4	
43-1	Measure the settlement of the BWST from a full-scale load test	43-1	10	FE	J. Betts	810630	4	
43-2	Based on long-term residual settlement predicted from load test data, verify design of BWST	43-1	10	CE (S/R)	S. Lo	810630	4	
44-0	No Action Item						-	
45-1	Response on underground piping (part 1C) to be provided after discussion with NRC staff	45-5	10	PD	R. Mack	810331	3	
45-2	Pipe sleeve in the west borated tank pit will be cut flush with the wall	45-5	10	FE	J. Betts	810630	4	
45-3	During excavation for foundation work to the service water structure, the pipes will be exposed and at that time will be reset to their original design elevations where they leave the structure	45-5	10	FE	J. Betts	830430	4	
45-4	Upon completion of seismic reanalysis of auxiliary building, values for building displacement to pipe (minimum rattlespace) need to be provided in Table 45-1	45-15	10	PD	R. Mack	810430	4	
46-0	No Action Item						-	
47-1	Prepare operational technical specification to provide procedures to be followed for rising water level	47-4	10	GT	W. Paris	830430	4	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 53 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
47-2	A full scale test will be performed by shutting off the entire construction dewatering system after the groundwater levels have been lowered to el 595'	47-7	10	GT	W. Paris	810630	4	
47-3	Remove and examine a representative number of the construction dewatering well screens	47-15	10	GT	W. Paris	830430	4	
48-1	Summarize results of auxiliary building seismic reanalysis and provide revision to Question 25 response	48-2	10	CE (C/S)	B. McConnel		4	See Items 13-16 and 25-2
48-2	Perform an analysis of BWST foundation using soil structure interaction techniques described in BC-TOP-4A, Rev 3	48-3	10	CE (C/S)	B. McConnel	801231 (810731)	3	
48-3	Summarize results of diesel generator building seismic reanalysis and provide revision to Question 25 response	48-3	10	CE (C/S)	B. McConnel		4	See Items 13-6 and 25-1
48-4	The Seismic Category I structures will be analyzed for their adequacy to resist the loadings derived from the new seismic analysis	48-6	10	CE (S/R)	S. Lo	810331	3	See Items 13-7,13-12, 13-17, 25-1, 25-2, and 25-3
48-5	Reevaluate equipment and piping based on the envelope of the original and the new response spectra	48-7	10	CE (C/S)	B. McConnel	811231	4	
49-1	Verify the permeability analysis by the full-scale construction dewatering test	49-3	10	GT	W. Paris	810831	4	See response to Question 24 and Item 47-2
49-2	Demonstrate by the full-scale construction dewatering test that sufficient time exists to install a replacement well system	49-7	10	GT	W. Paris	810831	4	See Item 47-2
50-0	No Action Item						-	
51-0	No Action Item						-	
52-0	No Action Item						-	
53-0	No Action Item						-	

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

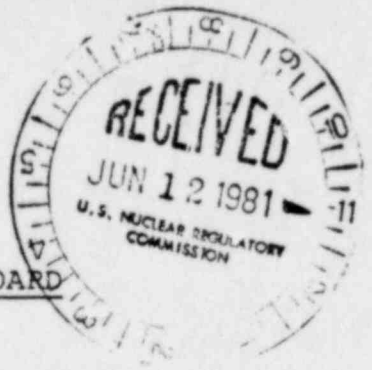
PART II: SUPPLEMENTARY COMMITMENTS

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
S-1	Advise Bechtel to commence dewatering and underpinning activities	A		CPCo		810915	4	
S-2	Develop settlement time rate criteria for all Seismic Category I structures	A		GT		810331	3	
S-3	Monitor concrete cracks for service water pump structure and auxiliary building electrical penetration areas and the feedwater isolation valve pits before and after installation of piles and caissons	B		CE (S/R)		821231	4	Engineering to issue drawing to incorporate this requirement by 3-1-81
S-4	Monitor concrete cracks in the BWST valve pits and repair any observed crack exceeding the ACI code limits	B		CE (S/R)		810630	4	Engineering to revise Dwg C-1148 to incorporate requirement for crack repair
S-5	Grout the local gaps between diesel generator building footing and mud mat	B		CE (S/R)		800407	2	Grouting requirement in Dwg C-1147
S-6	Continue involvement of CPCo/Bechtel consultants for reviewing remedial actions	B					5	
S-7	Monitor service water pump structure and pile displacement during jacking operation to verify pile dynamic stiffness used in seismic analysis	B		GT CE (C/S)	B. McConnel	810301	2	Pile concept deleted in CPCo letter to NRC (025218)
S-8	Envelope pile stiffness for the seismic analysis of service water pump structure	B		CE (C/S)	B. McConnel		2	Completed seismic model. See Item 13-11. Pile concept deleted in CPCo letter to NRC (025218)
S-9	Check the limited clearance between the service water pipe at the building penetration	B		PD CE (S/R)	R. Tulloch	800731	2	Superseded by Question 45
S-10	The spring stiffness for the diesel generator building will be varied such that the predicted 40-year settlement will be simulated. The structure will be reanalyzed to show all the design criteria have been met.	B		CE	B. McConnel		2	Tracked by Item 14-6

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART II: SUPPLEMENTARY COMMITMENTS

Item	Description	Page Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
S-11	In the structural analysis of the BWST ring foundation, the stiffness of springs will be adjusted to simulate differential settlements predicted by the soils group. The foundation will be reanalyzed to show it meets all requirements of the design criteria.	B	CE	B. McConnel		2	Tracked by Item 14-7
S-12	Pages I-6 and 23-8 stated that, "Specifications C-210 and C-211 were revised to incorporate interpretations that affected specification requirements."	E (Sht 21)	CE	S. Rao	810415	4	No documentation of interpretations identified, no evidence of incorporation
S-13	The Response to Question 23, Page 23-30, Remedial Action 2 will be revised to read, "...each field density test for cohesive material (unless otherwise directed by the onsite geotechnical soils engineer) will be accompanied by a separate laboratory standard which will provide a direct comparison."	F (Att. 1, Sht 5)	QA	R. Rixford	810227	2	To be incorporated in Rev 11 of Responses
S-14	Specification 7220-C-208, Table 9-1 will be revised to require a laboratory compaction test for each field density test for cohesive material, unless otherwise directed by the onsite geotechnical soils engineer.	F (Att. 1, Sht. 5)	CE	S. Rao	810331	2	
S-15	EDPI 4.25.1 will be revised to state, "It is the responsibility of the originator of a design change to effect coordination of the change (whether technical or editorial) with all groups which are affected by, or involved with, the revised portion of the document."	F (Att. 1, Sht. 6)	QE	J. McBride	810320	2	
S-16	Specification C-208, Section 9.1.3 (first paragraph) will be revised to read, "Field density tests for sands and fine material shall be in accordance with ASTM D 1556. Field density tests for gravels (with particle size more than 2 inches) shall be done in accordance with USBR E-24 (USBR Earth Manual), unless otherwise directed by the onsite geotechnical soils engineer."	F (Att. 2, Sht. 2)	CE	S. Rao	810331	2	



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

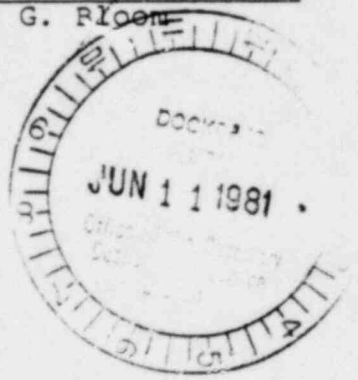
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	
CONSUMERS POWER COMPANY	Docket Nos. 50-329 OM & OL 50-330 OM & OL
(Midland Plant, Units 1 and 2)	

CERTIFICATE OF SERVICE

I, JoAnne G. Bloom, hereby certify that a copy of the direct testimonies of Stepher H. Howell and James W. Cook, for Consumers Power Company in the above captioned matter was served upon all persons shown in the attached service list by deposit in the United States mail, first class, this 5th day of June, 1981. In addition, a copy was sent by Federal Express to Judge Bechhoefer.

JoAnne G. Bloom



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