

(1) Warnick
(2) File - updated testimony

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))

TESTIMONY OF JAMES G. KEPPLER
WITH RESPECT TO QUALITY ASSURANCE

Q.1 Please state your name and position.

A.1 My name is James G. Keppler. I am the Regional Administrator of the NRC's Region III office. My professional qualifications have been previously submitted in this proceeding.

Q.2 Please state the purpose of your testimony.

A.2 In my testimony to the Board in July, 1981, I testified on the more significant quality assurance problems that had been experienced in connection with the Midland project and the corrective actions taken by Consumers Power Company and its contractors. I stated that, while many significant quality assurance deficiencies have been identified, it was our conclusion that the problems experienced were not indicative of a breakdown in the implementation of the overall quality assurance program. I also noted that while deficiencies have occurred which should have been identified earlier, the licensee's QA program had been effective in the ultimate identification and subsequent correction of these deficiencies. Furthermore, I discuss

the results of Region III's special quality assurance inspection of May 18-22, 1981, which reflected favorably on the effectiveness of the Midland Project Quality Assurance Department --- implemented in August 1980. The thrust of my testimony was that I had confidence that the licensee's overall QA program for the remedial soils work and the remainder of construction would be implemented effectively.

It wasn't until April 1982 that I was made aware of additional problems with the effectiveness of implementation of the QA program. The problems came to my attention as a result of the April 1982 meeting between NRC and Consumers Power Company to discuss the Systematic Assessment of Licensee Performance (SALP) report for Midland and the discussions held within the Staff in preparation for that meeting. The SALP report addressed the Midland site activities for the period July 1, 1980 through June 30, 1981. During this period, the soils work activities were rated Category III, the lowest acceptable rating given by the SALP review process.

During the April, 1982 public meeting on the SALP findings, Mr. Ronald J. Cook, Midland Senior Resident Inspector, stated that as of that date he would rate Consumers Power Company soils work Category III, the same rating as it received for the SALP period. He had similar comments on other work activities. Based on my July, 1981 testimony, I expected Consumers Power Company would be rated a Category I or II in the soils area, as well as other areas, by April, 1982, and I was certain that my 1981 testimony had left that impression with the Board.

On the basis of the above, I decided it was appropriate to supplement my July, 1981 testimony.

Q.3 What actions have been taken by Region III in response to the information contained in your previous answer?

A.3 I met with the NRC supervisors and inspectors who had been closely involved with Midland during the past year to get a better understanding of their concerns. As a result of these meetings, I concluded that the problems being experienced were ones of program implementation rather than problems with the QA program itself.

Because of my concerns, I requested the Region III Division Directors most actively involved with the Midland inspection effort to try to identify the fundamental problems and their causes, and to provide me with their recommendations to resolve these problems. They provided me with an assessment of technical and communications problems experienced by the licensee and made recommendations with respect to the licensee's workload, institution of independent verification programs, and QA organization realignments. This response is included as Attachment A. (Memorandum from Norelius and Spessard to Keppler, dated June 21, 1982.)

In July 1982 I recognized that more NRC resources were going to have to be provided in overseeing activities at Midland and created the Office of

Special Cases (OSC) to manage NRC field activities at Midland (and Zimmer). Mr. Robert Warnick was assigned Acting Director. A Midland Section was formed comprised of a Section Chief, two regional based inspectors, and two resident inspectors (the second resident inspector reported onsite in August 1982).

Before meeting with representatives of the Office of Nuclear Reactor Regulation (NRR) to discuss options for NRC action in connection with Midland, Mr. Warnick requested Senior Resident Inspector Cook to provide a summary of the indicators of questionable licensee performance. Mr. Cook provided a memorandum documenting a number of problems and concerns, which is included in Attachment B. (Memorandum R. J. Cook to R. F. Warnick, dated July 23, 1982.)

Mr. Warnick and I met with representatives of NRR on July 26, 1982 to discuss Consumers Power Company's performance. This meeting resulted in recommended actions concerning third party reviews of past work and ongoing work which are described in Attachment C. (Memorandum, Warnick to Files, dated August 18, 1982.)

Following the meeting with NRR, Mr. Warnick discussed with members of the Midland Section positions concerning third party reviews developed at the meeting with NRR. The members of the Midland Section were not convinced the recommended actions were the best solution, since the causes of the problems had not been clearly identified. Instead, they proposed a somewhat different approach consisting of an augmented NRC inspection effort coupled

with other actions to strengthen the licensee's QA/QC organization and management. This proposal is documented in Attachment D. (Memorandum, Warnick to Keppler, dated August 18, 1982.)

In response to these suggestions, Mr. Darrell Eisenhut, Director - Division of Licensing, NRR, and I met with top corporate management representatives from Consumers Power Company on August 26, 1982 and again on September 2, 1982, to discuss NRC's concerns and possible recommended solutions. Because it was not clear to the NRC staff why Consumers Power was having difficulty implementing their QA program, we requested them to develop and submit to the NRC actions which would be implemented to improve the QA program implementation and, at the same time, provide confidence that the program was being implemented properly.

Consumers Power subsequently presented its proposal for resolution of the identified problems in two letters dated September 17, 1982, which are included as Attachments E and F. (Letters Cook to Keppler and Denton, dated September 17, 1982.)

These proposals were lacking in detail, particularly with respect to the plant independent review programs. Following a meeting between NRC staff members and Consumers Power Company in Midland on September 29, 1982, Consumers Power submitted a detailed plan to NRC on October 5, 1982 concerning the planned third party activities (Attachment G). Consumers Power Company's proposals (Attachments E, F and G) are currently under review by NRC.

Q.4 Do you believe that construction of the Midland Plant should be permitted to continue?

A.4 Yes. This portion of my testimony discusses what has been accomplished and what will be accomplished in the near future to provide a basis for continued construction of the Midland plant.

Consumers Power Company will have independent third party assessments of the Midland construction project. These assessments will include reviews of safety related work in progress and of completed work activities. Stone and Webster has been selected by Consumers Power Company to perform the assessment of the remedial soils work. The scope of, and contractors for, the remaining assessments are presently under review by the NRC staff.

Along with the independent third party reviews, the Office of Special Cases, Midland Section, has expanded its inspection effort and has taken actions to assure compliance with the Licensing Board's April 30, 1982 requirement that the remedial soils work activities receive prior staff approval. Specifically, the Midland Section has established a procedure for staff authorization of work activities proposed by Consumers Power Company (Attachment H, Work Authorization Procedure, dated August 12, 1982); and has caused a stop of the remedial soils work on two occasions: August, 1982 and September, 1982 (Attachments I and J, Confirmatory Action Letters dated August 12, 1982, and September 24, 1982, respectively). The Section has also started an inspection of the work activities which have been accomplished by Consumers Power Company in the last twelve months in

the diesel generator building, the service water building, and other safety related areas. This inspection was started during October 1982 and is continuing as of the filing date of this testimony.

Based upon (1) the third party assessments of the plant which will be performed, (2) the increased NRC inspection effort, and (3) the work authorization controls by the NRC, I believe that work on the Midland Plant may continue. As demonstrated by the previous stop-work effected in the remedial soils area, the staff will take whatever action is necessary to assure that construction is in accordance with applicable requirements and standards.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

Attachment A

(K-1)

June 21, 1982

MEMORANDUM FOR: James G. Keppler, Regional Administrator

FROM: C. E. Norelius, Director, Division of Engineering
and Technical Programs
R. L. Spessard, Director, Division of Project and
Resident Programs

SUBJECT: SUGGESTED CHANGES FOR THE MIDLAND PROJECT

Historically, the Midland Project has had periods of questionable quality assurance as related to construction activities and has had commensurate regulatory attention in the form of special inspections, special meetings, and orders. These problems have been given higher public visibility than most other construction sites in Region III. As questions arise regarding the adequacy of construction or the assurance of adequate construction, we are faced with determining what regulatory action we should take. We are again faced with such a situation.

Current Problem

The current problem was caused by a major breakdown in the adequacy of soils work during the late 1970's. Because of the increased regulatory attention given the site, we expect that exceptional attention would be given to this activity and that licensee performance would be better than other sites or areas which have not had such significant problems and therefore have not attracted this level of regulatory attention. However, that does not appear to be the case and Midland seems to continually have more than its share of regulatory problems. The following are some of the specific items which are troublesome to the staff.

Technical Issues

1. In the remedial soils area, the licensee has conducted safety related activities in an inadequate manner in several instances - removal of dirt around safety related structures, pulling of electrical cable, drilling into safety related utilities.

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2. In the electrical area, in trying to resolve a problem of the adequacy of selected QC inspectors' work conducted in 1980, the licensee completed only part of the reinspection even when problems were identified, and appears inclined to accept that 5% of electrical cables may be misrouted (their characterization of "misrouting" may imply greater significance than we would attach to similar findings).
3. In the pipe support area, in trying to resolve a problem of the adequacy of QC inspections conducted in 1980, the licensee has portrayed only a small percentage of defects of "characteristics" identified and has not addressed the findings in terms of a large percentage of snubbers which may be defective because of the characteristics within each snubber that may be defective (e.g., if only one characteristic was defective out of 50 reviewed on a single hanger, the percentage is small; but if the one defective characteristic makes the hanger defective the result would have a much greater significance level). The licensee had done a detailed statistical analysis in an attempt to show that the small percentage of characteristics were found rather than broadly approaching the problem with significant reinspections to determine whether or not construction was adequate.

Communications

Multiple misunderstandings, meetings, discussions, and communications seem to result in dealing with the Midland Project. Some examples are:

1. NRC staff attending a meeting in Washington on March 10, 1982, heard the Consumers Power Company staff say that electrical cable pulling related to soils remedial work was completed. It was determined to be ongoing the next day at the site.
2. When Region III attempted to issue a Confirmatory Action Letter, J. Cook informed W. Little of his understanding that both J. Keppler and H. Denton had agreed that the subject of the CAL was not a safety related item subject to NRC regulatory jurisdiction. Such agreements had not in fact occurred and following a meeting, Consumers Power Company issued their commitments in a letter to Region III.
3. In reviewing a licensee May 10, 1982 letter, responding to the Board Order, the NRR staff had an unsigned letter and Region III had a signed copy both dated the same date but differing in content.
4. Recently a Region III inspector in closing out and exiting from his inspection described the exit meeting as being the most hostile he had ever participated in.

5. The responses to any Region III enforcement letters issued to Midland are more lengthy and ^{more}are argumentative than are any other responses from any other licensee in Region III. This point was made in the SALP response provided by Midland, and the SALP response in itself from Midland is an example of the type of response which we commonly receive from the site. The length of the response is at least as long as the initial SALP report.
6. Multiple requests for briefing meetings and other statements by the utility to the effect that we should review procedures in developmental stages imply that Midland wants the NRC to be a part of their construction program rather than having us perform our normal regulatory function.

Staff Observations

1. With regard to corrective actions of identified noncompliances, the Midland response seems to lean towards doing a partial job and then writing up a detailed study to explain why what they have done is sufficient rather than doing a more complete job and assuring 100% corrective action has occurred. In the detailed writeups that are prepared, it is the staff's view that the licensee does not always represent the significance properly, and the analyses and studies often raise more questions than they solve; thus time appears to have been wasted in writing an analysis rather than in fixing the problem.
2. Midland site appears to be overly conscious with regard to whether or not something is an item of noncompliance and spends a lot of effort on defending whether or not something should be noncompliance as opposed to focussing on the issue being identified and taking corrective action. This appears in part to be due to their sensitivity of what appears in the public record as official items of noncompliance. This sensitivity may have resulted from the extended public visibility which has attended construction of the facility. The staff's view is that the Midland site would look better from the public standpoint and be more defensible from NRC's standpoint, if they concentrated on fixing identified problems rather than arguing as to the validity of citations. This type of view was expressed by the utility during a recent effort to clarify in detail that certain construction items on the soils remedial work should not be subject to NRC's regulatory action.
3. The Midland project is one of the most complex and complicated ever undertaken within Region III. The reason is that they are building two units of the site simultaneously and additionally have an underpinning construction effort which in itself is probably the equivalent of building a third reactor site. The massive construction effort and the various stages of construction activity which are involved make the site extremely complicated to manage. This activity appears to cause a lot of pressure on the licensee management.

4. Mr. J. Cook, the Vice President responsible for the Midland site is an extremely capable and dynamic individual. However, these characteristics in conjunction with the complexity and immenseness of operation as set forth in 3, above, may actually be contributing to some of the confusion which seems to exist. The staff views that (1) he is too much involved in detail of plant operations and there are times when the working level staff appears to agree and be ready to take action where Mr. Cook may argue details as to the necessity for such action or may argue as to the specific meaning of detailed work procedures, (2) this kind of push may lead to such things as letters both signed and unsigned appearing in NRR and causing confusion, (3) this push may lead to some animosity at the licensee's staff level if NRC activities are looked on as slowing progress of construction at the site.

Recommendations

It appears essential that some action be taken by NRC to improve the regulatory performance of the Midland facility. The following specific suggestions are made.

1. The company must be made aware and have emphasized to them again that their focus should be on correcting identified problems in a complete and timely manner.
2. We should question whether or not it is possible to adequately manage a construction program which is as complex and diverse as that which currently exists at Midland. We would suggest specifically that the following activities be considered:
 - a. That the licensee cut back work and dedicate their efforts to getting one of the units on line in conjunction with doing the soils remedial work.
 - b. That they have a separate management group all the way to a possible new Vice President level, one of which would manage the construction of the reactor to get it operational and the second to look solely after the remedial soils and underpinning activities.
3. Consumers Power Company should develop a design and construction verification program by an independent contractor. This would provide an important additional measure of credibility to the design and construction adequacy of the Midland facility.

James G. Keppler

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We would be happy to discuss this with you.

C. E. Norelius

C. E. Norelius, Director
Division of Engineering and
Technical Programs

R. L. Spessard

R. L. Spessard, Director
Division of Project and
Resident Programs



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
795 ROOSEVELT ROAD
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Attachment B

(K-2)

July 23, 1982

MEMORANDUM FOR: R. F. Warnick, Director, Enforcement and Investigations Staff

FROM: R. J. Cook, Senior Resident Inspector, Midland Site

SUBJECT: INDICATORS OF QUESTIONABLE LICENSEE PERFORMANCE - MIDLAND SITE

As per our conversation of July 21, 1982, the following is a list of those items that various inspectors consider to be indicative of questionable licensee performance:

1. One of the leading items is the over-inspection performed on electrical QC inspectors which was done in response to NRC concerns identified in the May 1981 team inspection. The licensee found weaknesses in the inspections performed by some electrical QC inspectors pertaining to not identifying the mis-routing of cables. This item culminated in an item of noncompliance. The licensee did not expand the overview activity to a degree necessary for an acceptable resolution to the identified weakness - even after a meeting in RIII. This item has not been resolved to the satisfaction of the NRC although our position has been clearly defined. ;

As a partial response to the team inspection concern, the licensee presented the NRC with an audit report which would demonstrate a response to our concern of questionable electrical QC inspections. However, the audit report stated that it (the audit report) did not address the NRC concerns.

2. During the dialogue for the underpinning and remedial soils work, a large amount of emphasis has been placed on the settling data for the structures involved. During a meeting in HQ on March 10, 1982, the need for QC requirements on remedial soils instrumentation were explicitly delineated. However, one week later, the NRC inspectors found soils work instrumentation installation was started the day after the March 10, 1982 meeting without a QC/QA umbrella; that the licensee's QA Auditor and QA Engineering personnel were not approached pertaining to the need for QA coverage for this soils settlement instrumentation; that there were strong indications that the licensee had mislead the NRC in relating that the work was essentially complete when indeed it was not; and presently, the licensee management informs our inspector that items are ready for his review when in actuality they are not. Our conversations with licensee personnel - other than management - confirm that the items are not ready for review.

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3. Historically, one of the NRC questions has been, "Who is running the job - Bechtel or Consumers?" The following example would allow one to believe it is Bechtel: As a part of the resolution to our findings in the soils settlement instrumentation installation, the NRC insisted that the licensee generate a Coordination/Installation Form to cover interface between different evolutions of instrumentation installation. The licensee would call our inspector for his concurrence on the adequacy of the form - the inspector would approve Consumers Power Company's form, but then would find out that Bechtel did not want to work to Consumer's form - the form that was generated to resolve regulatory concerns. This event has occurred twice and was considered as a deviation during a more recent inspection. The opinion of the staff is that if Consumers generates a form that will aid them in not incurring regulatory difficulty, and which has had NRC input, the licensee should demand that the contractor comply with these policies instead of the contractor dictating the regulatory environment under which they will work.
4. Deficiencies in material storage conditions has continually been a concern to the NRC and has resulted in items of noncompliance. To the inspectors, the ability to maintain quality storage is indicative of how rigorous or slipshod the constructor's attitude is towards construction. The licensee has attempted to entice the constructor to do better in maintaining the material storage conditions, but still the licensee's auditors and the NRC have negative findings in material storage conditions and negative discussions with the contractor about the validity of the finding.
5. At periodic intervals, the support of cables, particularly in the control room area, which are awaiting further routing or termination, has met with the disapproval of the NRC inspectors. These discrepancies also include cables without covered ends being on the floor in walk areas that are in a partially installed status. This is also another indicator of slipshod workmanship which has been brought to the constructor's attention at various times, but was last noted during a recent inspection.
6. In the area of instrumentation impulse line installation and marking, the licensee has had separability violations which has required removal of all installed impulse lines. Also, the NRC, because of this and significant adverse operational conditions, insisted that the installed impulse lines be identified. Although the licensee plans to mark the impulse lines, there was an inordinate amount of resistance to marking the lines - even though there had been instances of mis-matched channels because of identification confusion.

7. An example of reluctance in placing the responsibility for quality workmanship at the foreman and/or worker level has recently been identified. The NRC inspectors noted that some drop-in anchors were improperly installed and obviously did not adhere to the installation procedures. The licensee's attitude indicated this was not a valid finding because QC had not inspected the item. The NRC inspectors treat this as indicative that slipshod workmanship is tolerated in the hopes that QC will find the mistakes.
8. Late in 1981, the licensee decided to move the QA Site Superintendent into another position and cover this site function by sharing the site time between the QA Director and the QA Manager. After a January 1982 meeting with the NRC at RIII, the licensee opted to fill the QA Superintendent spot with another person. In the spring of the year, the NRC inspectors were following up on welding allegations and approached the QA Superintendent. The QA Superintendent was familiar with the alleged poor welding and had established what the NRC inspectors determined to be a responsive plan to resolve the questionable QC welding inspections. At the Exit Interview, the QA Director did not appear to back the QA Site Superintendent's proposed plan which had tacit NRC approval. The NRC inspector classified in writing and with just cause that the Exit Interview was the most hostile exit interview he had ever encountered.
9. During a recent inspection, it was noted by the NRC inspector that fill dirt was piled and being covered with a mud mat at a nominal 1:1 $\frac{1}{4}$ horizontal to vertical slope when the specification called for a 1 $\frac{1}{4}$:1 horizontal to vertical slope. A constructor Field Engineer witnessed the wrong slope being installed and justified and defended the slope after being informed of the specification requirement. This is another example of the constructor having an attitude which precludes quality workmanship.
10. At different times, NRC inspectors have experienced difficulty in getting information which is controlled by the contractor, such as supporting calculations and qualifying information to justify a given installation. A recent example is: the NRC inspector informed the licensee and the contractor he wanted to see resumes of persons involved in the remedial soils work. There is an obligation to the NRC to supply a precise number of "qualified" persons on the soils work. The inspector was informed he could not get these records as they were personal. The inspector ultimately did get the information after bringing it to the attention of licensee upper management. However, this indicates an implied unwillingness of the constructor to share information with the NRC and sometimes with the licensee.

July 23, 1982

11. The licensee oftentimes does not demonstrate a "heads up" approach to their activities. The following are examples of the licensee operating in an environment using tunnel vision - "blindness".

- a) During a recent NRC inspection, the inspector challenged the ability to maintain the proper mix ratio on high pressure grout. This was done after the inspector noted that the operator could never maintain the proper mix ratio without continual manual control - which was not available when the grout is applied. The licensee's apathetic attitude did not allow them to stop the grout application until the next day when this became an issue at the exit interview.
- b) At one point in time, the company doing drilling on site for the remedial soils work cut into a safety related duct bank between the diesel generator building and the service water building. The Consumers Power Site Manager's Office (the production people) stopped work because - from a quality standpoint conditions were so deplorable. However, the Site Manager's Office did not have responsibility in this area - the Midland Project QA Department had this responsibility and did not invoke their authority to prevent the drilling work from getting out of control - or to bring it back into control.
- c) The NRC inspector recently witnessed the licensee setting up to drill a well hole in safety related dirt using a technique which was not authorized. If the inspector had not brought this to the licensee's attention, the licensee would have violated an Order addressing remedial soils work and also the Construction Permit. When the licensee was queried as to the availability of the QC/QA personnel who would prevent such activity from happening, the NRC inspector was informed that this was (another) misunderstanding.

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The NRC inspectors have been informed by our contacts on site that there are memos written to the effect that "peripheral vision" should be curtailed and communication with the NRC stifled. The NRC has not read these memos yet - but plans to in the near future, provided they really exist and infer what we have been informed.

12. The licensee seems to possess the unique ability to search all factions of the NRC until they have found one that is sympathetic to their point of view - irregardless of the impact on plant integrity. Some examples of this are:

- a) The NRC soils inspector informs the licensee that soils stabilization grout comes under the Q program. The licensee is not particularly happy with this position. Unknown to the inspector, the licensee argues his point with NRR to have the grout non-Q - using only those arguments which support his (the licensee's) position. The licensee

has the advantage of the NRC inspector's technical and regulatory basis for supporting his (the inspector's) position, and therefore avoids mention of this during the discussions with NRR. However, the licensee's QA program, which has already been approved by NRR, states that all the remedial soils work is Q unless RIII approves a relaxation on a case by case basis. It appears the licensee does not wish to acknowledge the prior agreements with the NRC.

- b) Since the failure of auxiliary feedwater headers in B&W steam generators, discussions have transpired between the NRC inspectors and the site personnel. These discussions have indicated that the licensee was maintaining a conservative approach and were entertaining the concerns expressed by the NRC which were stimulated primarily by gross mistakes in attempting the modification at operating B&W plants. The licensee's corporate personnel were annoyed that the NRC inspectors would not give approval to start the modification until all the preparatory work had been accomplished as this would tend to impact the schedule and the modification to the steam generators could become a scheduling nuisance. The licensee corporate personnel contacted the NRC inspectors involved to "reason with them". However, the corporate personnel, (including a representative from B&W) were unable to answer the concerns of the NRC inspectors but did mention that the NRR Operational Project Manager indicated that it was alright to proceed with the modification. The licensee corporate personnel could not state what the position of the NRR Construction Project Manager was on this issue - only that they had found some form of approval from someone in the NRC.
- c) At times, when Immediate Action Letters or other forms of escalated enforcement become imminent, the licensee attempts to "appeal" their case with individuals in the regional management who are removed from the particulars of the tentative enforcement action. The licensee attempts to get these persons to agree to specific portions of the issue which would indicate that the licensee is "really not all that bad". However, the "real" issues, as identified by the NRC inspectors are being masked.
- d) During inspections of the remedial soils work, the NRC inspector has been informed by the licensee that certain findings and areas of inspection were not within the purview of his (the inspector's) inspection program because they were in essence considered non-Q and that by virtue of prior agreement with the Regional Administrator were excluded from enforcement action. However, the NRC inspectors would subsequently find that there was no such agreement between the Regional Administrator and the licensee - only a philosophical discussion as to what, in general terms, constituted an item of noncompliance.

- The above indicators support the reputation the licensee has for being argumentative. Their apparent inability to accept an NRC position without diligently searching to find a "softened" position results in numerous hours of frustrated conversations between all parties involved to resubstantiate (usually the original position) a position based on technical and regulatory prudence.
13. The licensee has been classified publicly by the NRC as being argumentative. The licensee continues to exhibit this trend, as evidenced by the following examples:
- a) Essentially every item of noncompliance receives an argumentative answer which addresses only the specificity of the item of noncompliance and selectively avoids any concept which would support the essence for the item of noncompliance. For example - in the instance of the improperly installed drop-in anchor mentioned above, it was the fact that QC had not inspected the installation of the bolt which was important to the licensee. However, the real enforcement issue was that components were being improperly installed.
 - b) The Cycle II SALP made critical evaluations of the licensee's performance in several areas. The licensee's response to this SALP report was argumentative over specific details and did not seem to acknowledge that the consensus of opinion of the NRC inspection staff was that there were areas where the licensee's performance was weak. The licensee's argumentative position is in the form of "we really are not all that bad" when the records, findings and observations of the NRC inspectors support just the opposite position.
 - c) The "Q-ness" of the remedial soils work has continually been an argumentative topic of discussion which ultimately resulted in a HQ meeting on March 10, 1982. At this meeting, the "Q-ness" of the remedial soils work was specified and later documented with the meeting minutes. However, the licensee did not wish to abide by this position and a subsequent meeting was held in RIII to further clarify the NRC position. Still, the topic of "Q-ness" is being argued by the licensee, even though the ASLE has issued an Order further defining the "Q-ness" of the soils work. It might be noted that a hearing is in process over this soils issue and the NRC's position on "Q-ness" has been expressed during these testimonies.
14. During a recent episode, the licensee wanted to continue excavation of soils in proximity to the Feedwater Isolation Valve Pit (FIVP). However, the licensee wanted to perform this evolution without determining that the temporary supports of the FIVP were adequate. Making this determination would have an impact on scheduling, as stated by the licensee. The FIVP supports were installed without a Q umbrella and subsequent inspections did reveal several discrepancies in the installation of the support structure.

15. During the limited remedial soils work which has transpired, the licensee has managed to penetrate Q-electrical duct banks, a condenser header drain line, an abandoned sewer line, a non-Q electrical duct bank and a 72-inch circulating water line. All of these occurrences have happened because of a lack of control and attention to details. Whenever approached by the NRC as to the adequacy of review prior to attempting to drill, the NRC receives responses which strongly suggest that the time was not taken to perform these reviews - perhaps taking this time would impact on the schedule.
16. By virtue of an earlier ALAB Order, the licensee is required to perform trend analyses for nonconforming conditions. These trend analyses have, in the past, masked the data such that obvious trends are not obvious and has resulted in negative findings by the NRC. This was addressed in one of the earlier SALP meetings. Recently, while performing a review of hanger welding data, the NRC inspector found that the statistical data had been diluted to the point that the number of unsatisfactory hangers could not be determined from the trend analyses or the type and degree of non-conforming conditions which were being identified pertinent to the hanger fabrication.
17. The licensee continually would use the NRC staff as consultants and classifies a regulatory and enforcement position as counter productive. This is reflected by the licensee not wishing to perform Q-work without obtaining NRC prior approval and then addressing only those areas where the NRC has voiced a regulatory concern - provided it is convenient to the licensee. This attitude has particularly prevailed in the remedial soils issue and to a lesser degree in the electrical installation areas. The preferred NRC inspector mode would be for the licensee to generate his program to establish quality and then the NRC would approve or disapprove. However, the licensee requires consultation with the NRC to establish his level of quality requirements.

The above is not intended to be a complete list of all discrepancies which indicate questionable licensee performance as this would require a more extensive review of the records and inspection personnel involved than time permits. Also, there has been no attempt to systematically document the enforcement and unresolved items list as these are contained in other information sources. However, the listing is rather comprehensive of the types of situations and attitudes which prevail at the Midland Site as observed by the NRC inspector staff.

When considering the above listing of questionable licensee performance attributes, the most damning concept is the fact that the NRC inspection effort at Midland has been purely reactive in nature for approximately the last year, and that these indicators are what have been observed in approximately the last six months. If

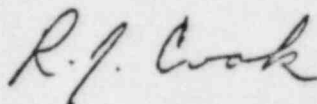
R. F. Warnick

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July 23, 1982

these are the types of items that have become an NRC nuisance under a reactive inspection program, one can only wonder at what would be disclosed under a rigorous routine inspection and audit program.

Sincerely,



R. J. Cook
Senior Resident Inspector
Midland Site Resident Office

cc: W. D. Shafer
D. C. Boyd
R. N. Gardner
R. B. Landsman
B. L. Burgess



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NUCLEAR REGULATORY COMMISSION
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Enclosure 3

Attachment C.
(K-3)

August 18, 1982

MEMORANDUM FOR: Region III Files

FROM: Robert F. Warnick, Acting Director, Office of Special Cases

SUBJECT: MEETING BETWEEN NRR AND REGION III RE CONSUMERS POWER COMPANY PERFORMANCE AT MIDLAND (DN 50-329; 50-330)

On July 26, 1982, R. F. Warnick and James G. Keppler met with E. G. Case, D. G. Eisenhut, R. H. Vollmer, R. O. Tedesco, T. H. Novak, W. D. Paton, and J. Rutberg to discuss the performance of Consumers Power Company at the Midland site.

During the meeting reference was made to information contained in two memos from the RIII staff. The first memo dated June 21, 1982 is from C. E. Norelius and R. L. Spessard and concerns suggested changes for the Midland Project. The second memo dated July 23, 1982 is from R. J. Cook and concerns the licensee's performance at Midland. Copies of the memos are attached.

The meeting resulted in the following recommendations:

- (1) Region III should obtain the results of the recent audit by KMC.
- (2) Schedule a public meeting between NRC and CPC management in Midland, Michigan, to obtain licensee commitment to accomplish (3) and (4) below.
- (3) The licensee should obtain an independent design review. (A vertical slice from design thru completion of construction.)
- (4) The licensee should obtain an independent third party to continuously monitor the site QA implementation and provide periodic reports to the NRC. Region III is to provide a suggested outline for the continuous monitoring function.

Robert F Warnick
Robert F. Warnick, Acting Director
Office of Special Cases

Attachments: As stated

cc w/attachments: Meeting
participants

83032/0295

August 18, 1982

Attachment D
(K-4)

MEMORANDUM FOR: James G. Keppler, Regional Administrator
FROM: Robert F. Warnick, Acting Director, Office of Special Cases
SUBJECT: CONSUMERS POWER-MIDLAND (DN 50-329; 50-330)

When you created the Office of Special Cases and a special Midland Section staffed with individuals assigned solely to that project, you indicated your concern with the Midland Project. You did this in spite of the favorable findings of the special team inspection conducted in May, 1981, and the favorable testimony you gave before the Atomic Safety and Licensing Board on July 13, 1981. You indicated your concern was based on the Systematic Assessment of Licensee Performance (SALP) report for the period July 1, 1980 to June 30, 1981, the inspection findings since those dates, and the memo of June 21, 1982, by C. E. Norelius and R. L. Spessard suggesting certain changes be made at the Midland Project (copy attached as Enclosure 1).

At my request R. J. Cook prepared a summary of indicators of questionable license performance at Midland. A copy of Cook's memo dated July 23, 1982 is attached as Enclosure 2.

Because of your expressed concerns, you and I met with representatives from NRR on July 26, 1982 to discuss Midland and Consumers Power Company (CPCo) performance. That meeting also resulted in recommended actions. A summary of the meeting is attached as Enclosure 3.

Following the meeting with NRR, I discussed the recommendations of that meeting with our Senior Resident Inspector, other members of the new Midland Section, and former Section and Branch Chiefs who are intimately familiar with Midland.

Later that week (July 30) I spent a day at the Midland site. I attended the exit meeting following Landsman's and Gardner's inspection, met with CPCo and Bechtel management to get acquainted with them, and toured the plant site.

On July 31, 1982, I expressed my opposition to the recommendations we had come up with in the NRR meeting. My opposition was based on (1) opinions expressed by the Senior Resident Inspector, a Region III Branch Chief formerly responsible for the NRC inspection of Midland, and a Construction Section Chief who has been intimately associated with inspections of Midland regarding the proposed actions; (2) my visit to the site; and (3) the inability of Region III to articulate the problem(s) at Midland which the above referenced recommendations were supposed to solve. I indicated that we needed to better identify our concerns and the prescribe actions that would resolve these concerns.

OFFICE	RIII	RIII	RIII	RIII			
SURNAME	Gardner	Landsman	Shafer	Warnick			
DATE							

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On August 3, 1982, members of the Midland Section met with you to discuss my opposition to the recommendations coming from the meeting with NRR. The pros and cons of the recommendations together with other alternatives were discussed. The meeting concluded with you agreeing to give the Section until August 11 to determine a better proposed course of action to resolve NRC concerns about Midland.

To this end the Midland Section met together on August 4 and again on August 5 following our public meeting with CPCo on the SALP II report. Several alternatives were discussed including stopping all work on one unit, have an independent third party monitor all past and current construction work, stopping work in selected areas, performing a construction appraisal team inspection, placing all site QC work under CPCo, and establishing an augmented NRC inspection effort.

Although some members of the Midland Section thought that stronger actions should be taken, all members of the Section agreed they could support an augmented NRC inspection effort coupled with other actions to strengthen the licensee's QC/QA organization and management. These recommended actions are attached as Enclosure 4.

It is recommended the proposed actions to improve the licensee's performance be discussed with NRR and then the licensee.

Robert F. Warnick, Acting Director
Office of Special Cases

Attachments: As stated

OFFICE ▶						
SURNAME ▶						
DATE ▶						

"MIDLAND-ACTIONS RECOMMENDED BY THE MIDLAND SECTION, OFFICE OF SPECIAL CASES"

1. Establish an augmented inspection effort by the NRC.
 - a. Inspections should be concentrated in the following ten areas:
 - (1) Soils
 - (2) Electrical
 - (3) I&C
 - (4) High Pressure Piping
 - (5) Hangers and Supports
 - (6) Corrective Action System - including identification documentation, resolution, and prevention of future events.
 - (7) Receipt, Storage, and Handling
 - (8) Structural Steel
 - (9) Subcontractor Welder Qualification
 - (10) Management Overview System
 - b. The effort as initially conceived will last from 6 to 12 months but it could last longer.
 - c. It is proposed that the inspections be performed by the Midland Section and 5 contract inspectors assigned fulltime to the Midland Section and located onsite. The Midland Section would be as follows:
 - (1) W. D. Shafer, Chief, Midland Section
 - (2) R. N. Gardner, Project Manager
 - (3) R. B. Landsman, Inspector
 - (4) R. J. Cook, Senior Resident Inspector
 - (5) B. L. Burgess, Resident Inspector
 - (6) Welding & NDT-Contracted
 - (7) Mechanical-Contracted
 - (8) Electrical-Contracted
 - (9) I & C - Contracted
 - (10) Startup & Test-Contracted
 - (11) Secretary (Fulltime)
2. Require the licensee to have an independent third party look at a vertical slice of a safety-related system from design through completion of construction.
3. Require that all QC inspectors be independent of Bechtel, reporting only to CPCo.
4. Conduct NRC exits with Construction Manager.
5. NRC should get commitments in writing and should give release on hold points in writing.
6. It is proposed that Mr. Keppler and Mr. Denton meet with Consumers Power Company and Bechtel top management to ensure that steps are taken to correct the following:

- a. The Site QA Superintendent is not being given the latitude and senior management support needed to perform his job effectively.
- b. Senior management is not being made aware of or is not dealing with QA problems.
- c. We are convinced that Bechtel has cost and scheduling as their foremost consideration. Quality is taking a back-seat with management.

Renumber as Attachment E.

Independent Verification - Total Project

Consumers Power proposes a new and expanded approach for verifying the overall quality of the project. This approach will give a broader overview than the assessments currently being recommended by the NRC for other NTOL plants. The assessment which is suggested for Midland is to combine an INPO type construction project evaluation, which is a broad "horizontal" type review of many aspects of current project operations with the detailed "vertical slice" review of all aspects, current and historical of a critical plant system or subsystem. The entire review will be performed by one or more independent contractors who are currently being selected. With the assistance of the selected contractors, the detailed plans for this extensive independent assessment will be finalized and presented to NRC management shortly for their concurrence prior to initiating the major work activities.

The INPO portion of the program will be initiated immediately at least through the planning phase to comply with the INPO schedule and industry commitments to the NRC. The INPO construction program evaluation for Midland will differ from the majority of the industry's self-initiated evaluations in that an independent contractor rather than utility personnel will carry out the INPO evaluation. The results will then be overviewed by the INPO staff to assure adequacy and consistency with other evaluations.

Additional Assessment Programs

In addition to the above, Consumers Power has proposed to retain a qualified third party for an assessment of the underpinning activities as detailed in the referenced letter.

Consumers Power Company has also initiated other appraisals to assess the adequacy of the Quality Assurance Program. Two major recent examples of this practice that have occurred are as follows.

In 1981, Management Analysis Company (MAC) conducted an assessment which focused on performance in three major areas as follows:

1. Adequacy and timeliness of both part and process corrective actions taken on a sample of the historical hardware problems that have been identified at Midland over its lifetime.
2. The degree to which the physical characteristics of selected supplied components and parts meet their respective quality requirements.
3. The overall adequacy of the Quality Assurance Program with particular emphasis in corrective actions, effectiveness of the supplier documentation review efforts and personnel qualifications.

This assessment has been completed, the results were positive and all open items have been resolved and closed. The final report has been previously submitted to the NRC.

A Bechtel Corporate Staff project evaluation was initiated in April 1982. A report on the results of this assessment is being finalized at this time. The

purpose of this evaluation was to review the Midland engineering activities to determine if design criteria have been implemented and if the design assumptions, design methods, and the design processes are satisfactory. Bechtel Corporate Management was asked to initiate this assessment in order to certify that the Midland project met all the standards expected of any Bechtel project. To carry out this assignment the assessment team was specifically chosen to be independent from the Bechtel Ann Arbor Power Division. The team consisted of senior experienced personnel with appropriate expertise having previously performed similar work on other projects. A Consumers Power representative was a direct participant on the assessment team. The final report will be sent to the NRC upon completion and whatever other documentation or discussion as may be requested will be provided.

Conclusion

Based on the discussion outlined above and in the reference letter, Consumers Power believes that steps have been taken to insure both the successful implementation of the remaining work to complete the plant and a verification program, including quality records, test program results, and third party assessments, that will certify the adequacy of the plant as constructed.

James W. Cook

JWC/JAM/bjw

CC Atomic Safety and Licensing Appeal Board
CBechhoefer, ASLB
MMCherry, Esq
FPCowan, ASLB
RJCook, Midland Resident Inspector
RSDecker, ASLB
SGadler
JHarbour, ASLB
GHarstead, Harstead Engineering
DSHood, NRC (2)
DFJudd, B&W
JDKane, NRC
FJKelley, Esq
RBLandsman, NRC Region III
WHMarshall
JPMatra, Naval Surface Weapons Center
WOtto, Army Corps of Engineers
WDPatton, Esq
SJPoulos, Geotechnical Engineers
FRinaldi, NRC
HSingh, Army Corps of Engineers
BStamiris

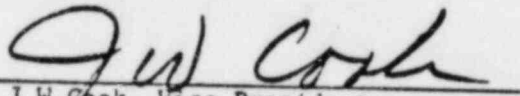
CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 18850 Dated September 17, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits information regarding the implementation of the Consumers Power Company Quality Program for the Midland Plant.

CONSUMERS POWER COMPANY

By



J W Cook, Vice President

Projects, Engineering and Construction

Sworn and subscribed before me this 17 day of September.

Notary Public
Bay County, Michigan

My Commission Expires 7-11-82

Renumber as Attachment F.



**Consumers
Power
Company**

Attachment E2
(K-6)

James W Cook
Vice President - Projects, Engineering
and Construction

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

September 17, 1982

Harold R Denton, Director
Office of Nuclear Reactor Regulation
Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

J G Keppler
Administrator, Region III
US Nuclear Regulatory Commission
799 Roosevelt Road
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PRINCIPAL STAFF	
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our
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MIDLAND NUCLEAR COGENERATION PLANT
MIDLAND DOCKET NOS 50-329, 50-330
QUALITY ASSURANCE PROGRAM IMPLEMENTATION FOR SOILS REMEDIAL WORK
FILE: 0485.16 SERIAL: 18845

This letter summarizes recent discussions with NRC management regarding implementation of soils remedial construction and presents the Company's documentation of those discussions.

BACKGROUND

The 1980/1981 SALP Report, presented to Consumers in late April of this year, indicated that activities in the soils area should receive more inspection effort on the part of both the NRC and CP Co. Follow-up discussions with the NRR staff and Region III Inspectors led to the conclusion that the Quality Assurance Program and its definition was adequate; however, there was concern that certain aspects were not being or might not be satisfactorily implemented.

Consumers Power has performed an in-depth review of the implementation plans for the Midland soils work activities. This review included the areas of design and construction requirements and plans, organization and personnel, project controls and management involvement. The results of this review and the proposed steps to assure the successful implementation of all aspects of the work were discussed with the NRC management in a meeting held in Chicago on September 2, 1982.

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STEPS TO IMPROVE IMPLEMENTATION

A number of new steps have or are being taken by Consumers Power Co to enhance the implementation of the quality program with regard to the soils remedial work. These measures touch upon all aspects of the work, from design to post-construction verification and include the following:

- (1) Retaining a third party to independently assess the implementation of the auxiliary building underpinning work;
- (2) Integrating the soils QA and QC functions under the direction of MPQAD;
- (3) Creating a "Soils" project organization with dedicated employees and single-point accountability to accomplish all work covered by the ASLB order;
- (4) Establishing new and upgraded training activities, including a special quality indoctrination program, specific training in underpinning activities, and the use of a mock-up test pit for underpinning construction training;
- (5) Developing a quality improvement program (QIP), specifically for soils remedial work;
- (6) Increasing senior management involvement in the soils remedial project through weekly, on-site management meetings wherein both work progress and quality activities are reviewed;
- (7) Improving systems for tracking of and accounting for design commitments.

What follows is a description of the soils implementation plan, as it will be carried out using the new approaches outlined above, together with other specific aspects which we believe will be critical to the successful performance of the job. The discussion is limited to the implementation features specific to soils, is divided into areas roughly describing the progression of the job from design to completion and ends with a description of organizations, management involvement and NRC overview.

DESIGN ADEQUACY AND IMPLEMENTATION

The design for the required remedial activities is in an advanced state; design details and adequacy have been reviewed by numerous organizations. A special ACRS Subcommittee reviewed the soils activities and commented favorably on the thoroughness and conservatism of the review and remedial approaches. Numerous submittals to the NRC have been presented to clarify the design intent. It is our understanding that the Staff is completing its detailed review of all design aspects and is in the process of issuing an SSER. This advanced state of design has permitted the early development of a thorough planning effort and assisted in the organization and development of a detailed training effort. Following-up on design activities, the Project has assigned to the site a design team comprised of experienced structural and geotechnical engineers under the Resident Engineer. This team will monitor

and review the field implementation as specified in design documents, resolve on a timely basis routine construction questions requiring engineering response and administer the specific contingency plans immediately if any problem should arise during the underpinning work. Additional engineering resources for the soils work will continue to be located in Ann Arbor.

IMPLEMENTATION OF DESIGN FEATURES AND COMMITMENTS

All soils activities covered by the ASLB Order of April 30, 1982 are covered under soils-specific QA plans. These plans require that appropriate procedures are in place to accomplish the work in a quality manner and that detailed inspection plans be developed and utilized. Additionally, a Work Authorization Procedure and Work Permit System insure that the NRC and CP Co have specifically authorized and released the work. Under this system, the NRC reviews proposed work details, asks for additional information when necessary and authorizes construction activities in advance. CPCo then authorizes the work to proceed.

To further assure that commitments made to the NRC are properly accounted for in design documents, Consumers Power and Bechtel review the written records of commitments and insure that they are being incorporated into design documents. The Project is currently undertaking an additional review of past correspondence to create a computer listing of commitments. This computer list will be periodically reviewed to insure that commitments are incorporated in design or construction documents in a timely fashion.

PERFORMANCE OF PROJECT CONSTRUCTION, QUALITY ASSURANCE AND QUALITY CONTROL ACTIVITIES

To assure that project construction, quality assurance and quality control personnel correctly carry out their appointed tasks, a number of measures have been taken, including a reorganization of quality control, upgraded training programs, direct Company involvement in construction scheduling and control, and utilization of a contract format to minimize any cutting of corners by contractors. These elements of enhanced performance are described more specifically below.

First, the project has reorganized the Soils QA-QC effort, creating an integrated organization with single-point quality accountability under the MPQAD. This new organization is expected to improve QC performance, increase CPCo involvement in the management of the quality control function and improve QA-QC interfaces.

Second, extensive training programs for the soils underpinning work have been developed. This overall training program, which includes the major Construction and Quality organizations involved in soils work, covers both general training in quality and specific training relative to the construction procedures.

The majority of the personnel associated with Remedial Soils work have attended a special Quality Assurance Indoctrination Session. The QA indoctrination has been provided to Bechtel Remedial Soils Group, CPCo

Construction, QC, QA, Mergentime and Spencer, White and Prentis (SW&P) personnel down to the craft foreman level. This training consists of one three-hour session covering Federal Nuclear Regulations, the NRC, Quality Programs in general and the Remedial Soils Quality Plan in detail.

With regard to the work procedures, a requirement on both Mergentime and SW&P is that specific training on the procedures be provided prior to initiating any quality related construction activity. The identification of individuals to receive this training is spelled out in each procedure pertaining to a specific construction activity. Completion of the specific training requirements is a QA hold point which must be satisfied before work can proceed.

In further recognition of the importance of training to the underpinning work, the Company is utilizing a mock-up test pit as part of its training program for underpinning construction. The purpose of this test pit is to provide specific training in the construction of a pier, bell and grillage assembly from initial issuance of design drawings through completion of construction. This allows supervisory and craft personnel to perform work under the conditions, requirements and restraints which will be encountered when the actual underpinning starts. It also allows the various quality organizations to inspect the work and insure that their concerns and requirements are properly reflected in the procedures.

Third, to further enhance the performance of key project organizations, Consumers Power will maintain control over scheduling, both through the construction authorization process and by frequent meetings with the involved contractors and subcontractors. Each week, underpinning subcontractors will present proposed construction work to the Company. In addition, to assure the best quality work, the major subcontracts were entered into on a time-material basis. This should improve subcontractor attention to detail and acceptance of owner direction in the performance of specific construction activities.

Last, the Company is establishing a separate Quality Improvement Program (QIP) for the soils project. Although not part of the formal Quality Assurance program, the QIP is a management system that should be helpful in communicating and reinforcing project policies and expectations to all project participants. To launch this effort, an indoctrination program will be presented to all individuals, stressing the absolutes of Quality and the concept of "Doing it right the first time." Measurements specific to soils will be developed for those critical areas which are indicative of a "quality product". Tracking these activities will provide an indication of the effectiveness of the program. The QIP will provide mechanisms for individual "feedback" from all individuals involved, including the craft personnel.

INDEPENDENT ASSESSMENT

A third party will be retained to independently appraise the initial phases of the construction of the auxiliary building underpinning. This consultant will be mobilized as soon as possible and, after familiarizing itself with the design, will evaluate the auxiliary building underpinning construction work at

the site. If significant problems or adverse trends are observed, the third party assessment program will be extended in both scope and duration until a satisfactory conclusion can be drawn. The initial evaluation will be carried out over a three-month period.

The independent assessment will be conducted by a team of nuclear plant construction and quality assurance experts. This team will be supplemented by the addition of an underpinning consultant who will review the soils design documents, construction plans and construction itself to assure not only that the design intent is being implemented but also that the construction is consistent with industry standards. The assessment will further assure that the QA Program is being implemented satisfactorily and that the construction is being implemented in accordance with the construction documents. Arrangements are being made with Stone and Webster Engineering Corp to assume the lead role in this appraisal. They will be assisted by Parsons, Brinkerhoff, Quade and Douglas, Inc who will provide underpinning expertise. The NRC will be apprised of all findings of this independent assessment in a timely manner.

ORGANIZATION, MANAGEMENT INVOLVEMENT AND NRC OVERVIEW

The project organization formed for the performance of the soils remedial work incorporates single-point accountability, dedicated personnel to the extent practical, minimum interfaces-particularly at the working level, and a quality organization integrating QA and QC. The soils project organization is tailored to the task at hand. The entire organization, including quality assurance and quality control are staffed with well qualified, experienced personnel, augmented by design consultants and construction subcontractors nationally recognized in the underpinning field.

The soils remedial effort will also include a high level of senior management involvement. Project senior management will conduct weekly in-depth reviews on site of all aspects of the work including quality and implementation of commitments. In addition, the reporting chains to the senior project personnel have been shortened. The Company's CEO is briefed on a regular basis and schedules bi-monthly briefings on all aspects of the project including soils. During the bi-monthly briefings, the CEO normally tours the Midland site.

Complementing the CPCo management role, NRC Region Management overview of the construction process will be enhanced by monthly meetings, agreed upon by the Region, to overview the results of the quality program and the progress of the soils project. These meetings will cover any or all aspects of the project of general or special interest to the NRC management.

CONCLUSION

Based on the discussion outlined above, CP Co believes that the soils program has been thoroughly and critically evaluated and that all prerequisites for successful implementation have been or are being accomplished. The Company's program, with the initial overview from the independent implementation assessment, and the continuing overview by the NRC staff and management should

provide adequate assurance that the remedial soils activities will be successfully completed.

James W. Cook

JWC/JAM/bjw

CC Atomic Safety and Licensing Appeal Board
CBechhoefer, ASLB
MMCherry, Esq
FPCowan, ASLB
RJCook, Midland Resident Inspector
RSDecker, ASLB
SGadler
JHarbour, ASLB
GHarstead, Harstead Engineering
DSHood, NRC (2)
DFJudd, B&W
JDKane, NRC
FJKelley, Esq
RBLandsman, NRC Region III
WHMarshall
JPMatra, Naval Surface Weapons Center
WOtto, Army Corps of Engineers
WDPatton, Esq
SJPoulos, Geotechnical Engineers
FRinaldi, NRC
HSingh, Army Corps of Engineers
BStamiris

CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 18845 Dated September 17, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits information regarding the implementation of the Consumers Power Company Quality Program for the Midland Plant soils remedial work.

CONSUMERS POWER COMPANY

By J W Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me this 17th day of Sept 1982.

Patricia A. Pugh
Notary Public
Bay County, Michigan

My Commission Expires 3-4-86



**Consumers
POWER
Company**

Attachment 6
(K-8)

James W Cook
Vice President - Projects, Engineering
and Construction

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

October 5, 1982

Harold R Denton, Director
Office of Nuclear Reactor Regulation
Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

PRINCIPAL STAFF			
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J G Keppler
Administration, Region III
US Nuclear Regulatory Commission
799 Roosevelt Road
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MIDLAND NUCLEAR COGENERATION PLANT
MIDLAND DOCKET NOS 50-329, 50-330
MIDLAND PLANT INDEPENDENT REVIEW PROGRAM
FILE: 0485.16 SERIAL: 18879

REFERENCES: (1) R L TEDESCO LETTER TO J W COOK DATED JULY 9, 1982.
(2) J W COOK LETTER TO H R DENTON, SERIAL 18850
DATED SEPTEMBER 17, 1982.

ENCLOSURES: (1) MIDLAND PLANT INDEPENDENT REVIEW PROGRAM
(2) PERFORMANCE OBJECTIVES AND CRITERIA FOR CONSTRUCTION PROJECT
EVALUATION INPO, SEPTEMBER 1982

The ACRS interim report on the Midland Plant, dated June 8, 1982, contained a recommendation for a broader assessment of Midland's design adequacy and construction quality. In its correspondence of July 9, 1982, which is Reference 1 above, the NRC endorsed this ACRS recommendation and requested our proposal for performing an independent design adequacy review.

We briefly outlined several assessment activities for the Midland Project in our correspondence of September 17, 1982, identified above as Reference 2. Additional details of the program referred to in Reference 2 are enclosed for the NRC's review.

We have contacted our NRC Project Manager, Darl Hood, to arrange a meeting with the NRC Staff to discuss our Independent Review Program and to receive your concurrence or redirection of our plans. We will complete the planning phase, including team orientation and training, for the INPO program by

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October 29, 1982. We wish to initiate the implementation phase of the INPO program by November 8, 1982, in order to support our own and industry commitments to NRC.

James W. Cook

JWC/GSK/RLT/bjw

CC Atomic Safety and Licensing Appeal Board, w/a 1
CBechhoefer, ASLB, w/a 1
MMCherry, Esq, w/a 1
FPCowan, ASLB, w/a 1
RJCook, Midland Resident Inspector, w/a 1 & 2
RSDecker, ASLB, w/a 1
SGadler, Esq, w/a 1
JHarbour, ASLB, w/a 1
GHarstead, Harstead Engineering, w/a 1
DSHood, NRC, w/a 1 & 2 (2)
FJKelley, Esq, w/a 1
WHMarshall, w/a 1
WDPatton, Esq, w/a 1
WDShafer, NRC, w/a 1 & 2
BStamiris, w/a 1
MSinclair, w/a 1
LLBishop, Esq, w/a 1

CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 18879 Dated October 5, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits Midland Plant Independent Review Program.

CONSUMERS POWER COMPANY

By J W Cook
J W Cook, Vice President
Projects, Engineering and Construction

Sworn and subscribed before me this 5 day of Oct, 1982.

Barbara Townsend
Notary Public
Jackson County, Michigan

My Commission Expires September 8, 1984

MIDLAND PLANT INDEPENDENT REVIEW

1. INTRODUCTION & SUMMARY
2. BIENNIAL QUALITY AUDITS
3. INPO CONSTRUCTION EVALUATION
4. INDEPENDENT DESIGN VERIFICATION
5. APPENDIX: PREVIOUS ASSESSMENTS

overall project against the criteria developed by INPO for this program (a copy of the INPO Performance Objectives and Criteria for Construction Project Evaluations is attached). As indicated in the September 17, 1982 letter to Mr Denton and Mr Keppler, the INPO program for Midland will be different from most of industry's self-initiated evaluations in that an independent contractor rather than utility personnel will carry out the INPO evaluation. The second part of the Program described is the Biennial QA Audit which has been a requirement of the Company's QA Program for several years. The third part of the Program described in more detail is the Independent Design Verification (Vertical slice) of all aspects, historical and current, of a critical plant system or subsystem.

Consumers Power Company received proposals from several potential contractors to perform the complete program described above. With respect to the INPO type construction evaluation and Biennial QA Audit, we have selected Management Analysis Company (MAC) to perform these activities based on our evaluation of their technical capabilities and experience.

MAC has many years of experience in the Nuclear Industry and has performed Biennial QA Audits in addition to other type reviews of Company activities. MAC has previously consulted extensively at nuclear construction sites with identified QA problems. MAC was also a major participant in the development and implementation of the Palisades Regulatory Performance Improvement Program which has resulted in significant improvement to date at that facility. A description of other MAC assessments of Midland activities is included in the Appendix to this document.

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people
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The MAC Team will be under the direction of Mr L J Kube who has over 20 years experience in project management, engineering management, marketing, planning/scheduling, and design engineering having been employed by General Atomic and A O Smith Corporation prior to his employment with MAC. Mr Kube has been involved in the development of the INPO evaluation criteria, has participated in the three INPO Pilot evaluations and is the Project Manager for MAC for conducting an INPO evaluation on River Bend. The INPO type evaluation will be independent in that no Consumers Power Company or Bechtel personnel will be involved and MAC has never performed a direct line engineering or construction activity for Consumers Power Company.

For performance of the Independent Design Verification, we have selected Tera Corporation based on our evaluation of their technical capabilities and experience. Tera has many years of varied experience in the nuclear industry including independent design reviews, FSAR preparation, initial design of certain systems, and engineering, construction, operation and administration planning. Tera personnel are experienced in system design in the areas of mechanical, electrical, structural, and thermal hydraulic evaluations. Mr John W Beck, Vice President of Tera will be Project Manager for the Tera team. Mr Beck previously worked for Vermont Yankee Nuclear Power Corp as Executive Vice President serving as Chief Operating Officer. Prior to that he was Director of Engineering for Yankee Atomic Electric Co responsible for supervision and management of the plant, reactor, and environmental engineering departments. Prior to employment with Yankee, he was a Scientist at Bettis involved in Shippingport core design.

Individuals taking part in any of the three specific evaluations which make up the overall Independent Review Program will meet the "Independency Criteria" of Chairman Palladino's February 1, 1982 letter to Representative John Dingell and which are described as follows:

- MAC
1. No individuals on the Project team will have been previously utilized by Consumers Power Company to perform design or construction work.
 2. No individual involved will have been previously employed by Consumers Power Company.
 3. No individual owns or controls significant amounts of Consumers Power Company stock.
 4. No members of the present household of individuals involved are employed by Consumers Power Company.
 5. No relatives of individuals involved are employed by Consumers Power Company in a management capacity.

MAC will be responsible for integrating an overall evaluation report made up of the three inputs.

The major objective of the overall evaluation report is to provide the NRC, ACRS, and the Consumers Power Company Chief Executive Officer with an assessment of the overall quality of the Midland Project. We believe that this assessment will adequately address the NRC, ACRS, and public's questions regarding the adequacy and construction quality of the plant.

1. INTRODUCTION AND SUMMARY

The ACRS report dated June 8, 1982 on Midland Units 1 and 2 stated that "the NRC should arrange for a broader assessment of Midland's design adequacy and construction quality with emphasis on installed electrical, control, and mechanical equipment as well as piping and foundations."

On July 9, 1982, the Staff issued a letter to Consumers Power Company requesting a report on Midland Design Adequacy and Construction Quality. In this letter, the Staff stated that "With respect to assessment of Midland's design adequacy, such assessment would represent a significant contribution to the licensing review process if performed by a qualified, independent source following procedures utilized by some operating plants for Independent Design Verifications."

On September 17, 1982, the Company issued a letter to Mr Harold R Denton and Mr J G Keppler outlining the approach Consumers Power Company proposed for an Independent Review of the Midland Project and indicated that there had also been a Bechtel Corporate Staff project evaluation performed (described in more detail in attached appendix). It was stated that Consumers Power Company believes that the approach we are proposing for the forthcoming Independent Review will give a broader overview than assessments currently being recommended by the NRC for other NTOL plants.

The overall Independent Review Program described herein consists of three specific evaluations combined into a single program. The INPO type construction evaluation (horizontal type review), will examine the current

The final report will be submitted to the NRC and an auditable record will be maintained of all comments on any draft or final reports, any changes made as a result of such comments, and the reasons for such changes.

2. BIENNIAL QUALITY AUDITS

Background Of Biennial Quality Audit Requirements

The Consumers Power Company Quality Assurance Program Manual For The Midland Nuclear Plant, Topical Report CPC-1-A, requires the review of the Consumers Power Corporate Nuclear Quality Assurance Program to be performed at least once every 24 months or once every second calendar year by a Quality Assurance Program Audit (referred to as the Biennial Quality Audit).

This audit may be accomplished by a team consisting of Environmental & Quality Assurance personnel, selected employees from other Consumers Power Company departments or by an audit team of Quality Assurance personnel under contract to Consumers Power Company.

Plans For The 1982 Biennial Quality Audit

The scope of the 1982 Biennial Quality Audit will be similar to the audits conducted in 1976, 1978 and 1980. The audit will evaluate the Quality Assurance Program being utilized by Consumers Power Company and by Bechtel and will evaluate on a sampling basis, the degree of compliance with the Program by Consumers Power Company and by Bechtel. Specifically, the 1982 Biennial Quality Audit will be conducted by Management Analysis Company (MAC) and will comply with the requirements of NRC Regulatory Guides 1.144 (9/80, Rev 1) and 1.146 (8/80, Rev 0).

3. INPO CONSTRUCTION EVALUATION

General

In early 1982, utility nuclear power plant construction problems stimulated industry initiative and action to ensure that programs in effect nationwide meet performance goals as intended. Accordingly, the Institute of Nuclear Power Operations (INPO) was tasked by the Utility Industry to develop and manage a construction project evaluation program. The first effort was to define Performance Objectives and Criteria for project evaluations. Use of these criteria for an overall evaluation is intended to provide considerably more depth than an audit, for an audit generally does not go beyond conformance to program requirements. The evaluations include some assessment of administrative and quality records, but more important, focus on evaluating the success and efficiency of the project organization, systems and procedures in achieving the desired end results.

Following the drafting of the Performance Objectives, three pilot evaluations were conducted by INPO on plants under construction ie, Vogtle, Shearon Harris, and Hope Creek. During the last pilot a representative from NRC was present during data collection, evaluation and exit interview with utility personnel.

Following the pilot evaluations, the Performance Objectives and associated Criteria were modified to reflect experiences gained. A copy of the criteria to be used for the INPO evaluation is attached.

The performance objectives are broad in scope; each generally covers a single, well-defined area. The supporting criteria are more narrowly focused statements of activities that support or help meet the performance objectives. Several criteria are listed under each performance objective.

There are five Performance Objectives and associated Criteria which specifically address design effort. These are:

DC.1 Design Input

Process for defining and controlling design input

DC.2 Design Interfaces

The identification and coordination of interfaces to ensure input requirements are satisfied

DC.3 Design Process

Process followed to ensure safe, reliable and verifiable designs in compliance with requirements

DC.4 Design Output

Development of designs which are complete, accurate, understandable and constructable

DC.5 Design Changes

Control of changes to ensure compliance with design requirements

In addition there are numerous Performance Objectives which support evaluating design control. These include: Construction Engineering, Project Planning, Training, Independent Assessments, etc.

The above INPO Performance Objectives and associated Criteria will be utilized for planning the Independent Design Verification.

The INPO type self evaluation is aimed at achieving a level of performance above that required to meet Regulatory Requirements. Members of 35 Utilities (including Consumers Power) met, drafted and reviewed performance objectives and criteria to support the performance objectives of seven areas including design. A complete list of the areas whose objectives are intended to define optimum performance is:

Organization and Administration

Design Control

Construction Control

Process Support

Training

Quality Programs

Test Control

The thrust of this type of evaluation is that if utilities attempt to meet standards above those normally required to achieve quality, there will be greater assurance that Regulatory Requirements are met. The program was then applied during three pilot evaluations and modified based on the experience gained during the pilot evaluations. It essentially looks at all aspects of work in progress. This program has been developed during the calendar year 1982 and industry has made a commitment to the NRC to initiate INPO type evaluation on nuclear plants under construction by the end of 1982. The only exceptions will include those plants very close to fuel load.

Consumers Power Company selected MAC to perform the INPO Construction Evaluation primarily because of MAC's involvement in the development of the Performance Objectives and participation in all three pilot evaluations. The team supplied by MAC will be individuals experienced in multi-discipline activities associated with nuclear power plant engineering and construction. In addition, team members will be experienced in interviewing and evaluating ie, the type of activity MAC has been performing for the nuclear industry over the past seven years.

PREPARATION FOR INPO TYPE EVALUATION

The evaluation team leader will review the job status, select work areas to be evaluated and select team members based on the above. A request will then be made to CP Co for background documents. The team will then review the documents and prepare a schedule. Individual assignments will also be made. Three Tera members of the team organization representing Civil, Mechanical, and Electrical disciplines will be part of the MAC INPO type evaluation team. Prior to actually performing the evaluation, all team members will receive training in plant orientation, procedures and INPO evaluation techniques.

PERFORMING THE EVALUATION

The entire evaluation team will initially meet at the Site to review the work in progress. Sections of the team will then move to the Designer's and Owner's Offices. Team members will then begin the task of collecting pertinent facts relative to various aspects of the job via observations, inspections, discussions and review of documents. These facts will be assigned to the appropriate performance objective and reviewed against that

objective. As findings develop, additional investigations may take place. During this time, the team will communicate with the project personnel to assure validity of findings and draft evaluation summaries will be prepared.

REPORTING

At the conclusion of the evaluation, the team will verbally communicate their findings to the project. A formal report will then be prepared and presented to CP Co management. CP Co will acknowledge the findings and transmit the findings with their plans for corrective action concurrently to the NRC and INPO. INPO will assimilate various utilities reports into a comprehensive summary document and report the overall program progress to the NRC.

4. INDEPENDENT DESIGN VERIFICATION

Goals and Objectives

The independent design review is directed at verifying the quality of design engineering for the Midland Plant. The approach selected is a review and evaluation of a detailed "vertical slice" of the project design by a technically competent, independent organization. The design and as-built configuration of a selected safety system will be reviewed to assure its adequacy to function in accordance with its safety design bases and to assure applicable licensing commitments have been properly implemented.

Summary and Scope of Effort

The independent design verification (IDV) will consist of an independent design review of the Unit 2 auxiliary feedwater system (AFW) as an applicable sample of the design engineering effort at Midland Plant. This system was selected based upon system selection criteria discussed below. The review will be conducted by Tera Corporation and will utilize a multidisciplinary team of senior staff personnel to assure that the design and as-built configuration of the AFW conforms to its safety design bases and Consumers Power Company's licensing commitments as a benchmark for its acceptability. The design process, from concept to installation, will be identified and interfaces between design engineers evaluated to assure sufficient controls were placed on the transfer and specification of important design information. Although the review will focus on the AFW, the interfacing systems will be reviewed to determine that appropriate design constraints were imposed to

assure functionability of the AFW. Initially, important design elements for AFW will be outlined to assure the IDV includes an appropriate sample of the design interfaces between Consumers Power, B&W the nuclear steam supply system (NSSS) vendor, Bechtel the architect engineer, and other service related contractors. Design elements such as environmental qualification envelopes, seismic analysis, hydraulics and system control requirements will be selected to allow a diverse review of the various engineering disciplines (eg, Mechanical, Civil, Electrical). The design reviews in each area will evaluate the design approach used and, where appropriate, independent analytical techniques will be used to confirm questionable approaches or to permit assessment of the significance of any identified discrepancies.

To assure that the installed equipment reflects system design requirements, design specifications and drawings will be reviewed and in-field inspection of selected sections of the AFW conducted. The in-field inspection will confirm that the AFW is configured as specified in the design documents.

Throughout the IDV, all findings will be documented by each reviewer. Each finding will then be evaluated by the team leaders and more significant findings forwarded to a senior review team. At the conclusion of the effort, a preliminary report will be provided to Consumers Power and the original designers for review and provision of additional documentation that could have an impact on the final report findings. An auditable record of comments and additional information provided will be maintained. The final report will summarize the work accomplished, procedures used and a complete list and description of all findings from the review.

System Selection Criteria

The selection of a system to be reviewed by the independent contractor was based on the six criteria which follow.

- Importance to Safety - The system should have a relatively high level of importance to the overall safety of the Midland Plant.
- Inclusion of Design Interfaces - The system should be one which involves multiple design interfaces among engineering disciplines as well as design organizations, such as the NSSS vendor, architect engineer and sub-tier contractors. The system should also be one where design changes have occurred and thus provide the ability to test the effectiveness of the design process exercised by principal internal and external organizations or disciplines in areas of design change.
- Ability to Extrapolate Results - The system should be sufficiently representative of other safety systems such that the design criteria, design control process and the design change process are similar so that extrapolation of findings to other systems can be undertaken with confidence.
- Diverse in Content - The major engineering disciplines should all have input to the design of the system.
- Sensitive to Previous Experience - The system should be one which includes design disciplines or interfaces which have previously exhibited problems and thus a test of the system should be indicative of any generic condition.

* Ability to Test As-Built Installation - The system construction should be sufficiently completed that the as-built configuration can be verified against design.

The auxiliary feedwater system was selected for the independent design review after consideration of a number of other candidate systems. The auxiliary feedwater system had a sufficiently high profile for each of the criterion to justify its selection. Specifically, it involves interface with the NSSS vendor criteria, with containment design criteria, interface with design organizations, and the methodology of determining a water system's mechanical, electrical, and control component design criteria.

Technical Approach

The independent design verification (IDV) effort is comprised of three phases; Program Development, Review and Reporting.

The Program Development Phase includes the preparation of an IDV work plan and the development of a detailed review scope. The IDV work plan will include procedures and instructions for the work to be performed by Tera Corporation, the IDV contractor. An initial identification of the specific verification methods and depth of review to be utilized in addressing system design elements will also be completed as part of this phase.

The Review phase is the major activity of the IDV. This phase includes a design review of the systems as well as a field installation/as-built review to assure conformance of the design and the constructed facility. Initial efforts of the system design review will focus on the identification of the design process (chain) for the selected system. Emphasis will be placed on identifying design organizations and their subelements who contributed to the design and understanding the design practices and interactions between the design engineers. Paralleling this effort, the design and licensing criteria will be reviewed. It is anticipated that system design criteria information will include utility, B&W and Bechtel design requirements, licensing commitments, as well as other sub-tier documents.

The methods to be utilized in the review of system design elements will vary in depth. Depending upon the design area, the specific method may be a review of design criteria, a review of design calculations, a "blind" confirmatory

evaluation (eg alternative calculation or computer analysis by the IDV contractor) or a combination. Where appropriate, independent analytical techniques will be used to confirm design calculations or to permit assessment of the significance of any identified discrepancies. It is anticipated that the primary review method will be a review of calculations. Ultimately, the choice of review method will depend upon the nature of the design area and the type of verification method which is most effective in enabling the IDV reviews to reach a judgement as to the design adequacy in that design area.

This review will concentrate on each major step in the design process, for example:

- Design input information (transfer among designers, conformance with design criteria and commitments).
- Analyses and Calculations (selected review of inputs, assumptions, methodology, validation and usage of computer programs and reasonableness of certain analytical outputs).
- Drawings and Specifications (selected reviews for conformance with system design criteria, commitments, and incorporation of results of analyses and calculations).
- Field Verification (audit to assure that the as-built configuration reflects design requirements and pre-operational tests verify design analyses).

Findings from the INPO review as well as input from other sources such as, audit reports, 50.55e reports, design change reports and other documents will

also be considered to concentrate review in more depth in any areas where the design process may be suspect by historical evidence.

The IDV review scope will be broad enough in terms of design elements to include samples from each significant design organization, design interface and major engineering discipline.

The design elements to be evaluated include:

- Civil/Structural design of structures housing the AFW (eg, external or internal flooding, wind or tornado loads, seismic analysis, foundation design or missile protection).
- Mechanical/Electrical design of AFW systems and components (eg, pipe rupture protection, seismic subsystem evaluation, ASME code considerations, equipment qualification, penetration design, cable routing and separation, instrumentation and control system, system interlocks, fire protection, seismic and quality group classification or use of appropriate codes and standards).
- System performance requirements (requirements for accident mitigation, design transients and normal operation, hydraulic design, over-pressure protection, reliability, NPSH for pumps).

The installation/as-built verification review will include a walkdown of the selected system and inspection of system components. This review is intended to confirm system geometry and component nameplate data. Input from this evaluation will be assessed for its compatibility with design documents such as specifications and drawings.

The IDV will be conducted under project instructions and procedures that will require apparent discrepancies to be documented throughout the review. Initially, these findings will be categorized based upon the lead reviewer's judgement as to status as follows:

- 1) Open- The finding has the potential for becoming a confirmed error, but additional investigation or confirmatory analysis is necessary to make a final judgement;
- 2) Confirmed - The finding is judged to be an apparent error by the review team and will require corrective action, such as additional documentation not utilized by the team that documents the resolution of the findings or additional analysis, design or construction changes or procedural changes that may be necessary to resolve the finding;
- 3) Resolved - Sufficient additional information was available in the ongoing review to resolve the findings and to completely close out any additional concern about the findings.

Additionally, findings will be categorized as to whether or not they affect the AFW's safety function or licensing criteria. Additional design information will be solicited to allow the lead reviewers to reach disposition of each finding. As the reviews of each major design element reach a suitable stage, the individual findings will be evaluated in an integrated manner by the project team to further define or resolve the findings and to assure the classification is proper. After the team has completed its review, each finding will be submitted to a senior level review team to provide additional professional opinion regarding the classification of the finding.

Reporting will be in two stages, preliminary and final. The preliminary report, including the findings, as modified by the senior review team, will be provided to Consumers Power Company for review by the original designers. The preliminary report will provide an opportunity for additional information to be supplied which could have an impact on the findings but was not known to the IDV project team. All comments, additional information and changes to the findings will be maintained in an auditable manner. The final report will summarize the work accomplished, procedures used and include a complete description of all findings.

APPENDIX
PREVIOUS ASSESSMENTS OF DESIGN
AND CONSTRUCTION QUALITY AT MIDLAND

Historically, Consumers Power Company and its contractors have been committed to perform their work using QA programs which respond to all 10CFR50 Appendix B Quality Assurance criteria.

In addition to the Consumers Power Company audits in the areas of design and construction, the Company has utilized outside consultants to conduct Biennial Quality Audits. The Consumers Power Company Biennial Quality Audits were first instituted in 1976 and were subsequently conducted during 1978 and 1980. These audits were conducted to determine the Program's adequacy and to determine, on a sampling basis, the degree of compliance with the program. A summary of those audits are as follows:

A. 1976 Biennial Quality Audit

In 1976, the Biennial Quality Audit was conducted by the Nuclear Audit and Testing Company (NATCO) and included approximately 24 man-days of audit effort. The audit involved auditing for adequacy and implementation of the Consumers Power Company QA Program Procedures at the Consumers Power Company General Office in Jackson, Michigan and at the Midland Site. In addition, the audit involved auditing for adequacy and implementation of the Bechtel Nuclear Quality Assurance Manual at the Midland Site. Audit findings resulting from this audit have been closed out.

NO CONCLUSIONS!

B. 1978 Biennial Quality Audit

In 1978, the Biennial Quality Audit was conducted by the Management Analysis Company (MAC) and included approximately 70 man-days of audit effort. The audit involved auditing for adequacy and implementation of the Consumers Power Company QA Program Procedures at the Consumers Power Company General Office in Jackson, Michigan and at the Midland Site. In addition, the audit involved auditing for adequacy and implementation of the Bechtel Nuclear Quality Assurance Manual at the Bechtel Ann Arbor, Michigan offices (engineering) and at the Midland Site. Audit findings resulting from this audit have been closed out.

C. 1980 Biennial Quality Audit

In 1980, the Biennial Quality Audit was conducted by the Management Analysis Company (MAC) and included approximately 46 man-days of audit effort. The audit involved auditing for adequacy and implementation of the Consumers Power Company QA Program Procedures at the Consumers Power Company General Office in Jackson, Michigan and at the Midland Site. In addition, the audit involved auditing for adequacy and implementation of the Bechtel Nuclear Quality Assurance Manual at the Bechtel Ann Arbor, Michigan offices and at the Midland Site. Audit findings resulting from this audit have been closed out.

MAC also performed a special Assessment of Midland in 1981 which covered the following areas: Corrective actions resulting from 50.55e items including adequacy of corrective action, hardware inspection and system walkdown, corrective action status closeout of 1980 biennial Corporate Audit, assessment

of adequacy of Midland QA program (based on first two items), review of documentation (supplier quality verification records, radiographic records, certificates of compliance, and Bechtel FLAGS program), and assessment of Bechtel and Consumers personnel (Bechtel QC and auditors, Consumers auditors, and Bechtel welders' qualification).

d/w justify

Starting in 1976 upon the discovery of missing rebar in three areas of the auxiliary building (later this was determined to not be a safety problem), Consumers instigated a surveillance of construction activities by Consumers QA personnel. / Consumers Power surveillance provides formalized quality control inspections beyond those quality control inspections performed by the Bechtel Quality Control group. / *after the fact!*

In August 1980 the Quality Assurance Organizations of Consumers Power Company and Bechtel were integrated into one group with Consumers having the responsibility for direction and management. Consumers Power at this time set up a Design QA Engineering (DQAE) group at the Bechtel Ann Arbor offices to conduct day to day monitoring of engineering activities of Bechtel. The Consumers Power DQAE provides design and procurement quality/reliability services of problem prevention and early problem detection, resolution, and corrective action. DQAE personnel are degreed and have had direct design related experience in the areas of nuclear, mechanical, electrical, electronics and civil engineering. The DQAE functions consist of:

- 1.: Technical reviews of Design and Procurement documents (engineering procedures/instruction, selected design and procurement documents, and supplier design deviation requests).

2. Monitors that requirements of controlling documents are being implemented (FSAR, engineering procedures, Appendix B, codes and standards) into specifications, drawings, material requisitions, supplier documentation and design calculations.
3. Audits of engineering, supplier QA Department, Bechtel Quality Engineering and Document Control.

Starting in January 1979, NRC Region IV Vendor Inspection Branch has conducted seven inspections of the Bechtel Ann Arbor Office. The latest inspections were in May and July 1982. In three of these inspections, there were no findings. Corrective action has been completed on all of the findings from inspections prior to 1982. There were no findings from the May 1982 inspection and the one finding from the July 1982 inspection has not been closed out as yet.

Although not requested by the NRC, Consumers Power Company decided in early 1982 that based on occurrences at Diablo Canyon and other plants, an Independent Design Audit or Review was prudent. The Company did not know what NRC staff requirements would be applied to an independent audit for plants that are in the construction and licensing stage similar to Midland. It was decided that this particular Independent Design Review would be undertaken as soon as possible in order to provide timely identification of problems so that corrective action could be taken consistent with overall project schedules. The purpose was to review Bechtel Project Engineering activities to determine if design criteria are being correctly implemented and if design assumptions, design methods and the design processes are satisfactory. It was also decided that the review could be optimized by using people who were knowledgeable

about the Bechtel design process but were not working on Midland design such as Bechtel personnel located in offices other than Ann Arbor or Consumers personnel that have not been directly involved in Midland.

The review team consisted of six Bechtel and one Consumers Power Company employees with disciplines represented in the areas of mechanical, nuclear, electrical, civil/structural, plant design, control systems and technical support for plant operations. Short term assistance was provided by specialists and consultants from other Bechtel offices in specific areas such as piping design and seismic analysis. The general approach of the review was to conduct a broad review of important design methods and then to review in-depth, including field walkdowns, four features of the plant. Emphasis was on engineering and factors important to safety, calculations, and design features which will not be demonstrated by tests during construction and start-up. Interfaces within Bechtel and between Bechtel and B&W were also reviewed. The basic criteria and commitments used by the review team were the FSAR, Bechtel Topical Reports, project procedures, and industry guides and standards. Design methods selected for review included piping analysis, equipment qualification, separation hazards, instrumentation, structural and seismic analysis, and various nuclear analyses. The piping review included independent computer analysis of selected stress problems and hanger design and a review of unique computer programs developed for the Midland Project. The four features of the plant for an in-depth review were: reactor cavity design, on-site electrical systems, decay heat removal system and piping for the high pressure safety injection system outside containment. The review has been completed with findings issued and replied to. The final report as well

as other design review information will be submitted to MAC and Tera for use in the performance of their activities.

September 1982
Criteria
Preliminary

Performance
Objectives
and Criteria
for Construction
Project Evaluations

INPO 

8210120281

PERFORMANCE OBJECTIVES

AND CRITERIA

FOR CONSTRUCTION

PROJECT EVALUATIONS

INSTITUTE OF NUCLEAR POWER OPERATIONS

September 1982

PRELIMINARY

For Use In

SELF-INITIATED EVALUATIONS

FOREWORD

In early 1982, utility nuclear power plant construction problems stimulated industry initiative and action to ensure that programs in effect nationwide meet performance goals as intended. Accordingly, the Institute of Nuclear Power Operations (INPO) was tasked to develop and manage a construction project evaluation program. The first effort was to define performance objectives and criteria for project evaluations. Use of the criteria is intended to provide considerably more depth than an audit, for an audit generally is regarded to be no more than a check of the paper trail. An evaluation includes some assessment of administrative records, but more important it focuses on evaluating the quality of the end result of implementing the project systems and procedures. It also includes assisting the utility by transferring technology, management systems, and procedural systems when the utility is not as strong as has been observed elsewhere in the industry. Such an evaluation can result in an uplifting, or upgrading, by specific recommendations on how to achieve a higher level of excellence.

This program is not intended to evaluate whether or not the design is adequate. Rather, the program will evaluate if the design documents are controlled and if the plant is being constructed as the design specifies; therefore, design control and quality of construction are the key objectives being evaluated.

These performance objectives and criteria are intended for use by INPO member utilities and third parties in the evaluation of the quality of engineering and construction of nuclear power plants. The scope of this document addresses the phase of the project beginning with the plant design process and extending through design, construction, and testing to issuance of the Nuclear Regulatory Commission operating license.

PERFORMANCE OBJECTIVES AND CRITERIA
FOR
CONSTRUCTION PROJECT EVALUATIONS

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ORGANIZATION AND ADMINISTRATION

1. project control, including planning, scheduling, and cost control
 2. engineering, analysis, and design control
 3. procurement control
 4. construction control
 5. management information systems
 6. training and qualifications
 7. construction testing and turnover control
 8. quality assurance
 9. material receipt, handling, storage, and maintenance
 10. record and document management
 - ~~11. legal and licensing requirements~~
 12. staffing, personnel policy, and salary administration
- E. The project manager exercises control in those functional areas assigned to managers who do not report to him to ensure that the plant is engineered, designed, constructed, and licensed in a manner resulting in a safe and reliable plant.
- F. The project manager's relationship to higher corporate management and ultimately to the chief executive officer is defined clearly and documented.
- G. Clearly defined access to the project manager is provided to other managers having responsibility for the functional areas under Criterion D.
- H. Corporate administration of contracts is delegated clearly with contractual obligations well-understood and enforced. Responsibility and appropriate authority for prompt action on contract changes, renegotiations, or violations of contracts have been assigned.
- I. Staffing for all project organizations is adequate for the authorities and responsibilities assigned.

OA.2 MANAGEMENT INVOLVEMENT AND COMMITMENT TO QUALITY

PERFORMANCE OBJECTIVE

Senior and middle managers in the owner's corporate office, designer's office, and at the construction site who are assigned functional responsibility for matters relating to the nuclear project should exhibit, through personal interest, awareness, and knowledge, a direct involvement in significant decisions that could affect their responsibilities.

CRITERIA

- A. Procedures or written statements of policy address subjects relating to the engineering, design, and construction of nuclear projects. They include policies related to project quality, such as workmanship, problem identification and correction, action item tracking, reporting, and procedural compliance.
- B. Project personnel in the corporate office and at the construction site and designer's offices are aware of these procedures and policy statements and have them readily available for reference. They are able to explain how they are put into practice.
- C. Project personnel demonstrate compliance with these policy statements and the statements have a high degree of credibility.
- D. Both vertical and horizontal communication of significant problems and corrective actions are effective and coordinated to provide an accurate representation of conditions.
- E. Meetings involving corporate and project management personnel result in the regular review of key aspects of the nuclear project.

- K. Designated managers associated with the project have responsibility and authority, by policy and practice, to stop or delay engineering, design, or construction activities when their judgement indicates that continuation will result in a failure to meet the project objectives.
- L. Management accountability for the project is consistent with the project structure and extends to the contractors, architect/engineering firm, and nuclear steam supply system supplier contractor.
- M. A complementary relationship is evident between management and quality assurance that supports implementation of a strong corporate commitment to quality.
- N. Decisions are made known to appropriate individuals for implementation.

6. regular review of project status and current problems
 7. review of selected data and trends discussed in the functional sections of this document
 8. monitoring of organization's performance against established goals and objectives
 9. involvement in and understanding of trending programs and corrective actions related to developing adverse trends
 10. active involvement in ensuring that construction practices and procedures are followed in a manner that enhances the quality of the end product
 11. responsibility for ensuring that workers are qualified for their individual assignments and that they perform their work to project standards
- E. The project middle managers are sensitive to the need to control work assignments to ensure that project-related effort is not diluted.
- F. Appropriate supervisory, technical, and procedural training is conducted for first-line and middle managers having responsibilities for functional areas in support of project activities. Appropriate records of attendance, material presented, and test results (if given) are retained to document this training.

DESIGN CONTROL

DC.1 DESIGN INPUTS

PERFORMANCE OBJECTIVE

Inputs to the design process should be defined and controlled to achieve complete and quality designs.

CRITERIA

- A. Design inputs such as codes, standards, regulatory commitments and requirements, criteria, and other design bases are identified, defined clearly, documented, evaluated, approved, and their scope of applicability is defined prior to their use in the design process.
- B. The design inputs include consideration of all of the requirements necessary to produce a quality design including feedback from pertinent industry engineering, design, and construction experience.
- C. Plant constructability, operability, inspectability and maintainability are considered in plant designs.
- D. The design inputs are provided at a level of detail and clarity necessary to be useable and understandable by all persons using these inputs.
- E. A systems, components, and materials experience information base, to the extent available, is a key element in the design process. Specifications for key safety-related equipment that does not have a substantial service history contain a requirement for supplier acceptance tests.
- F. The issuance and use of design inputs is controlled by the use of complete and understandable procedures.
- G. All changes to the approved design inputs are documented and approved prior to their use.
- H. Design personnel utilize supplier expertise as applicable in the design process.
- I. Design and design control information is readily available for use by all design personnel.

DC.2 DESIGN INTERFACES

PERFORMANCE OBJECTIVE

Design organization external and internal interfaces should be identified and coordinated to ensure a final design that satisfies all input requirements.

CRITERIA

- A. Design organization engineering authority is documented, and limits of responsibility and authority are defined clearly.
- B. The flow of design information between both external and internal organizations is controlled and timely.
- C. The external and internal interfaces and responsibilities are defined and controlled by procedures.
- D. Oral and other informal means of communication, including letters and memos, which provide significant design information, are confirmed and promptly made a part of the design input by a controlled document.
- E. System interaction is considered in system design and analysis.
- F. Systematic and effective lines of communication are established.
- G. Design and design change information are coordinated effectively with all affected disciplines and operating personnel.
- H. Transfer of design responsibilities and documents from one organization to another is planned and implemented in a controlled manner.

- H. Supervisory and management involvement in the design process is evident by the quality and timeliness of the output information and resolution of design problems.
- I. Design personnel provide timely technical support and follow-up on systems they have designed.
- J. Design processes are monitored for compliance with design commitments.
- K. Design control measures, such as procedures and checklists, are used to ensure that design inputs, such as design criteria, design bases, regulatory requirements, codes, and standards, are translated correctly into design documents, including specifications, calculations, drawings, procedures, instructions, and other documents needed to build a plant.
- L. Drawings, specifications, and other design documents are prepared under a controlled process that establishes standards for pertinent items such as format, content, status, and revision.

DC.3 DESIGN CHANGES

PERFORMANCE OBJECTIVE

Changes to released project design documents should be controlled to ensure that constructed designs comply with the most recent design requirements.

CRITERIA

- A. The design organization's response is timely and effective regarding identified changes.
- B. Reasons for the change are identified, evaluated, and, if necessary, actions taken to avoid future problems.
- C. The responsible design organization considers inputs to the original design before a change is issued.
- D. Design changes are coordinated with any affected discipline and/or organization in a timely manner.
- E. Appropriate procedures and methods are revised if design changes make these revisions necessary.
- F. Prior to the approval of the design change, consideration is given to quality, safety, cost, and schedule.
- G. Changes are subject to control measures commensurate with those of the original design.
- H. A system is utilized to determine whether or not the change being made impacts other parts of the system being changed, other areas of the plant, or other plants under construction.
- I. Methods are in place to ensure that changes are implemented in a timely manner.
- J. All changes, including those initiated by regulation, construction, vendor, or design, are properly reviewed by the design organization and, if approved, incorporated into the design documents.
- K. Appropriate design changes are evaluated promptly by each affected discipline, and necessary corrective action is taken and documented in a timely manner.

CONSTRUCTION CONTROL

CC.1 CONSTRUCTION ENGINEERING

PERFORMANCE OBJECTIVE

Engineering and design performed under the authority of the construction organization should be controlled as to consistency with the basic design criteria to ensure compliance with applicable codes, standards, and regulatory commitments.

CRITERIA

- A. Construction engineering authority is documented, and limits of responsibility and authority are defined clearly.
- B. Procedures are effective in controlling the engineering and design processes of the construction engineering organization.
- C. Guidelines are issued to ensure that the basic design criteria used by the construction engineering organization is consistent with that used in the original plant design.
- D. Interface links between architect/engineering home office and the construction engineering group are efficient, effective, and defined clearly.
- E. Interface links among major vendors and subcontractors and the construction engineering group are efficient, effective, and defined clearly.
- F. Construction engineering field change control is maintained effectively as required to support the construction effort and to ensure final as-built conditions are defined.
- G. Construction engineering supports major construction equipment processes (e.g., special rigging studies and transportation studies) with calculations and design prior to important field construction effort.
- H. State-of-the-art engineering and design verification exists for construction engineering processes.

CC.2 CONSTRUCTION FACILITIES AND EQUIPMENT

PERFORMANCE OBJECTIVE

Construction facilities and equipment should be planned for, acquired, installed, and maintained consistent with project needs to support quality construction.

CRITERIA

- A. A site plan has provided for key location of facilities such as warehouses, craft shops, equipment storage, and production facilities.
- B. Construction equipment is acquired in a manner to support the construction schedule and is maintained in optimum condition to support quality work.
- C. Facilities and equipment, both temporary and permanent, meet the project needs and specifications, and are maintained in accordance with established requirements.
- D. Periodic inspections or surveillances of the work areas and activities are performed to ensure that facilities and equipment support construction needs.

CC.4 CONTROL OF CONSTRUCTION PROCESSES

PERFORMANCE OBJECTIVE

The construction organization should monitor and control all construction processes to ensure the project is completed to design requirements and that a high level of quality is achieved.

CRITERIA

- A. Construction activities are identified in advance to allow for development of procedures and selection, training, and qualification of personnel.
- B. Work procedures and instructions have sufficient detail to ensure that construction activities are in accordance with engineering requirements.
- C. Construction activities are performed in accordance with work procedures, instructions, and current revisions of drawings approved for construction.
- D. Rework activities are performed in accordance with established procedures and are subject to required inspections.
- E. Work is performed by and under the supervision of qualified personnel who recognize and accept a responsibility for quality.
- F. Proper tools are available and are used correctly.

CC.6 CONSTRUCTION CORRECTIVE ACTIONS

PERFORMANCE OBJECTIVE

The construction organization should evaluate audits, inspections, and surveillances; process replies and follow-up; and take corrective action to prevent recurrence of similar problems.

CRITERIA

- A. The construction organization tracks construction audits and surveillances, prepares well-researched replies that address the deficiencies, and takes prompt and effective corrective action.
- B. The construction organization evaluates audits for generic problems and trends and takes appropriate action to prevent recurrence.
- C. Nonconformances are identified, tracked, and closed out in a timely manner.
- D. The construction organization reviews nonconformances to ensure corrective actions have been taken, evaluates for trends, and reports problem areas to upper management.

PROJECT SUPPORT

PS.1 INDUSTRIAL SAFETY

PERFORMANCE OBJECTIVE

The construction site industrial safety program should achieve a high degree of personnel safety.

CRITERIA

- A. An effective industrial safety program with clearly defined policies, procedures, scheduled training requirements, and individual responsibilities is implemented with the full support of managers and supervisors.
- B. Selected data and trends of industrial safety activities are monitored, including the following:
 - 1. summary analysis of first aid treatments
 - 2. analysis of accidents requiring doctor's care
 - 3. incidence of lost-time accidents
 - 4. frequency of safety violations identified
- C. General housekeeping practices prevent the accumulation of debris and trash.
- D. A safe and orderly job site working environment exists.
- E. Lifting and rigging equipment is checked regularly.
- F. A fire protection program is defined, organized, and well-publicized.
- G. The site controls hazardous materials effectively.
- H. A safety tagging program exists and is implemented effectively to protect equipment, personnel, and material.

PS.3 PROJECT CONTROL

PERFORMANCE OBJECTIVE

Project scheduling and work planning and coordination should ensure that the objectives of the project plan are met through effective and efficient use of project resources.

CRITERIA

- A. Individuals responsible for functional areas demonstrate an awareness of the need for and knowledge of project controls and utilize these controls as required.
- B. Elements of work are defined into manageable segments that can be accomplished by a typical work unit on a definite schedule.
- C. Elements of work are defined in a way that identifies clearly the construction unit or discipline responsible for the work.
- D. Based on input and feedback from responsible project personnel, a controlling construction schedule exists that provides a plan for completion of work elements and commitments and that provides management with a clear, concise, and understandable method of tracking project milestone completion.
- E. Elements of work are recorded in a tracking system that is established prior to the work being performed and that allows project construction completion to be monitored based on installed quantities.
- F. Work elements are integrated into the construction schedule in a manner that facilitates construction erection sequence, minimizes interferences and rework, and optimizes project resources.
- G. Deviations from the project schedule and plan, caused by regulatory, productivity, design and other changes and interferences, are communicated to the proper level

PS.4 PROJECT PROCUREMENT PROCESS

PERFORMANCE OBJECTIVE

The project procurement process should ensure that equipment, materials, and services furnished by suppliers or contractors meet project requirements.

CRITERIA

- A. Procurement documents provide clear and adequate technical, quality assurance, commercial, and administrative requirements necessary to define the scope and requirements of the contract.
- B. The preparation, review, and approval of procurement documents are controlled in accordance with established procedures.
- C. A list of qualified suppliers or contractors is used to identify sources of quality products and services.
- D. Only those suppliers or contractors who are listed as qualified are requested to furnish bids or proposals.
- E. Proposals and bids are evaluated for compliance with the requirements and scope defined in the procurement documents. These evaluations are performed by the personnel responsible for the preparation of the procurement specifications.
- F. The recommendation and contract award are conducted in accordance with established procedures.
- G. Subtier suppliers or contractors are contractually bound to adhere to related portions of the contract.
- H. Supplier and contractor performance histories are used to improve the procurement process.
- I. Purchasing and contract documents are reviewed to ensure inclusion of requirements to achieve quality.

PS.6 DOCUMENTATION MANAGEMENT

PERFORMANCE OBJECTIVE

The management of project documentation should support the effective control and coordination of project activities and provide a strong foundation for the documentation/information requirements of the plant's operational phase.

CRITERIA

- A. A comprehensive records management plan and schedule exists to do the following:
1. identify the documents and records required by regulations, purchase specifications, corporate requirements, and standards
 2. specify the minimum content and format requirements and acceptance criteria for each record/document type
 3. clearly designate responsibility for receipt, review of acceptability, resolution of deficiencies, and control of documents during construction
 4. contain proper methods for declaring appropriate documents "as-built" during construction
 5. determine what, when, how, to whom, by whom, and in what format records will be turned over to the plant's operational staff
- B. The records management plan is effective in identifying the current status of project documents such as the following:
1. design drawings
 2. specifications
 3. structure/system descriptions
 4. vendor drawings and manuals
 5. design criteria and procedures

TRAINING

TN.1 TRAINING MANAGEMENT SUPPORT

PERFORMANCE OBJECTIVE

Management should ensure that an effective program exists for indoctrination, training, and qualification of personnel involved in the project.

CRITERIA

- A. Corporate managers in each area have an active interest and involvement in the training program.
- B. Managers are trained and have adequate knowledge in areas related to their roles in the design and construction of a safe and reliable plant.
- C. Training is neither interrupted, deferred, or cancelled, nor are personnel diverted routinely from training to other activities.
- D. Management and supervisors are involved actively in assessing the qualifications and training needs of individuals with respect to their assigned tasks.
- E. Management makes use of feedback information to improve the effectiveness of the training program.
- F. Actions taken as a result of monitoring training and qualification trends are reviewed by appropriate levels of management on a periodic basis.

TN.3 GENERAL TRAINING AND QUALIFICATION

PERFORMANCE OBJECTIVE

The training program should ensure that all employees receive indoctrination and training required to perform effectively, and that employees are qualified as appropriate to their assigned responsibilities.

CRITERIA

- A. Initial selection, training and indoctrination enable individuals to perform assigned responsibilities effectively.
- B. The previous qualification and training of new hires and transfers are verified.
- C. Individuals are qualified as appropriate for their assigned responsibilities.
- D. Training on a continuing basis, both formal and on-the-job, maintains the employee's ability to perform consistently and effectively.
- E. Continuing training provides an effective means of keeping employees up-to-date regarding changes to policies, procedures, processes, instructions, and commitments.
- F. Individuals are requalified or recertified as required to keep their qualifications current.
- G. Feedback is acquired and used to modify and improve training methods and content.

QUALITY PROGRAMS

OP.1 QUALITY PROGRAMS

PERFORMANCE OBJECTIVE

The quality assurance program scope, content, and applicability should be appropriate, defined clearly, and understood.

CRITERIA

- A. The quality assurance and quality control programs include all necessary program elements.
- B. Day-to-day activities are observed and monitored under a continuing program designed to ensure the highest quality of personnel performance, workmanship and attention to detail.
- C. The quality assurance program is applied to the project in an appropriately graduated way.
- D. The relationship between manuals and the applicability of procedures is defined clearly and understood.
- E. Audit and surveillance schedules are modified as appropriate to verify the effectiveness of program implementation and to reflect the need for increased monitoring.
- F. The utility conducts evaluations of contractors' quality assurance program with sufficient regularity and in sufficient depth to ensure program effectiveness.
- G. The programs provide for indoctrination and training of personnel as necessary to ensure that suitable proficiency is achieved and maintained.
- H. The "stop process" and "stop work" authority is understood clearly and implemented effectively.

QP.3 INDEPENDENT ASSESSMENTS

PERFORMANCE OBJECTIVE

Management should provide an effective, independent assessment of project activities affecting the quality of the project.

CRITERIA

- A. A plan is implemented to ensure that audits and surveillances effectively assess applicable project activities in a timely manner.
- B. The results of the independent assessments identify substantive issues affecting performance.
- D. Independent assessments are performed by individuals with no direct functional responsibilities for the area being assessed.
- E. Independent assessments are performed by individuals suitably qualified to conduct the assessment.
- F. The analysis of the assessments properly evaluate the activity assessed.
- G. The results of the assessments and evaluations are directed to and used by the management of organizations to improve their effectiveness.
- H. Periodic evaluations of the effectiveness and adequacy of the total quality program are performed. Results are reported to the senior management level, and appropriate action is implemented.

TEST CONTROL

TC.1 TEST PROGRAM

PERFORMANCE OBJECTIVE

The test program should verify the plant's full capability to operate as intended by testing the plant's systems functionally.

CRITERIA

- A. A clear policy is developed and endorsed by top management that describes the test organization's responsibility for component, system, and preoperational testing.
- B. The principal design organization is involved in formulating test objectives and acceptance criteria.
- C. The test program describes the scope of system testing, provides detailed guidance for conduct of testing, and includes methods for evaluation of completed tests.
- D. Nonconforming conditions and discrepancies are identified and tracked, and appropriate resolution or corrective action is achieved.
- E. Adequacy of plant operating and maintenance procedures is demonstrated.
- F. The test program describes the quality assurance program under which it functions.

TC.3 TEST PLAN

PERFORMANCE OBJECTIVE

The test organization should prepare a plan and a schedule that describe the sequence of system or component testing to support major schedule milestones.

CRITERIA

- A. The plan and schedule are developed by personnel experienced in test and start-up operations.
- B. The plan and schedule are coordinated with the engineering and construction schedules so restraints are identified for project management action.
- C. The plant systems are scoped into logical, bounded, well-defined subsystems that can be tested as units.
- D. The schedule for individual system or component testing describes the required elements of testing, including those systems required to support individual system testing.
- E. The status of testing is monitored by a tracking system.

TC.5 TEST PROCEDURES AND TEST DOCUMENTS

PERFORMANCE OBJECTIVE

Test procedures and test documents should provide appropriate direction and should be used effectively to verify operational and design features of respective systems.

CRITERIA

- A. The necessary technical data are used in test procedure preparation.
- B. Approved test procedures are available in advance of their intended use to allow adequate test preparation and training.
- C. The test procedures describe clearly the objectives, prerequisites, system boundaries, and acceptance criteria for tests.
- D. Test procedures receive the prescribed review before approval.
- E. Tests are performed in accordance with approved procedures.
- F. Necessary retesting is conducted when design changes occur during or after completion of the test phase.
- G. The results of the test program receive an independent review and approval.

Attachment H
(K-9)

NRC AND CPCO
WORK AUTHORIZATION PROCEDURE

Effective Date August 12, 1982

APPROVED

J. Mooney
Midland Project Office

APPROVED

W. D. Schaefer
Chief, Midland Section OSC

~~820824 0309~~

NRC AND CPCO WORK AUTHORIZATION PROCEDURE

SCOPE

To review all construction work covered by the ASLB Order of April 30, 1982.

PURPOSE

To provide a mechanism for NRC Region 3 review and authorization of activities to be implemented at the Midland site as described in the ASLB Order.

To designate appropriate NRC and CPCO responsible individuals.

REFERENCES

- 1) ASLB Memorandum and Order dated April 30, 1982.
- 2) ASLB Memorandum and Order dated May 7, 1982.
- 3) Letter to J W Cook from D G Eisenhut dated May 25, 1982, "Completion of Soils Remedial Activities Review".

PROCEDURE

- 1.0 CPCo Project Management Organization will provide, at the beginning of the month a detailed list of all work activities to be implemented. This list will cover the construction activities anticipated to be in progress for the next 60-day period.
- 2.0 Upon receipt of the list the NRC will review the list and designate those activities as critical or non critical and advise CPCo Construction in writing of this designation.
 - 2.1 For those activities designated non critical, CPCo is authorized to proceed with the work. This work shall be accomplished in accordance with the staff approved Quality Assurance Plan.
 - 2.2 For those activities designated critical, the NRC will advise CPCo Construction of the required details essential for further staff review to determine the specifics of the work. CPCo is not authorized to proceed with work prior to receiving written authorization from the NRC.

- 2.2.1 CPCo Construction will provide the work details as requested by the Region.
 - 2.2.2 After review by the Region, CPCo will be provided with specific written authorization to conduct the identified work activities.
 - 2.3 Should these authorized activities not start within 90 days, these activities will be resubmitted for authorization.
- 3.0 Changes may be required for authorized critical and non critical activities. These changes shall be processed as follows:
- 3.1 Changes that alter the description of a previously submitted activity, in 1.0 above, shall be submitted to the Region for review. The review and authorization process will be as in 2.0 above.
 - 3.2 Changes which do not alter the description of a previously submitted activity, in 1.0 above, are not required to be submitted to the NRC but, shall be accomplished in accordance with the staff approved Quality Assurance Plan.
- 4.0 Work activities not previously identified on the work list, in 1.0 above, shall be identified and authorized as in 1.0 and 2.0 above. Approval of these work activities may be given verbally by the NRC responsible individual to the NRC Senior or Resident Inspector, who will then issue written authorization.
- 5.0 Emergency work activities may be performed to mitigate conditions which could affect personnel safety or could result in damage to facilities and equipment.

These activities shall require immediate notification of the Senior Resident Inspector.

6.0 Responsible individuals

6.1 The NRC representative shall be the Chief, Midland Section Office of Special Cases or his designee.

6.2 The CPCo designated representative shall be the Site Manager or his designee.

7.0 Changes to this procedure shall be approved the the Chief, Midland Section Office of Special Cases and the Site Manager.

WORK ACTIVITY LIST
FOR SEVEN DAYS FROM LIFTING OF STOP WORK ORDER

- Aux Bldg
1. Operate all instruments in seven day "baseline"
 2. Test all instrumentation systems per C-1493
 3. Adjust set and finalize covers on all instruments
 4. Verify post tension systems on control tower
 5. Maintain instrument system
- Freeze Wall
6. Continue monitoring utility protection pits (4)
 7. Install clay to below duct bank (pit 4) (details attac'ed)
 8. Add additional wells (up to 5) on west perimeter (outside C-45)
 9. Continue operation of systems and wells
- FIVP
10. Install and grout bolts and plates
 11. Lift off test on bolts (and hardness tests)
 12. Tension bolts
- Crack Mapping
13. Clean FIVP to crack map
 14. Crack map FIVP's
 15. Crack map EPA's
 16. Crack map remainder Aux Bldg
- Underpinning
17. Drift to piers 12 E/W
 18. Dig piers 12 E/W
 19. Install piers
 20. Drift to piers 9 E/W
 21. Implement C-200 if needed
 22. Install bumpers, handrails, stairs, etc in access shaft
- SWPS
23. Complete fireline relocation
 24. Install 6 deep seated benchmarks
 25. Install ejector wells
 26. Install soldier piles
 27. Excavate 36" service water pipe (train A)
- BWST
28. Construct new ring beams
- Other
29. Finish 72" line repair
 30. Approval of Quality Assurance Plans



CONFIRMATORY ACTION LETTER
UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

Attachment I,
(K-10)

AUG 12 1982

Docket No. 50-329
Docket No. 50-330

Consumers Power Company
ATTN: Mr. James W. Cook
Vice President
Midland Project
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

Based on discussions between you and Mr. W. Shafer on August 11, 1982, we understand that you have stopped work in the remedial soils area in accordance with Stop Work Order FSW-24.

Prior to lifting this stop work order in whole or in part you will obtain prior Region III approval. Such approval will be based on a clear understanding and approval by Region III of the work activities to be undertaken.

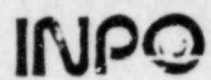
If your understanding is different than the above, please contact this office immediately.

Sincerely,

for James G. Keppler
Regional Administrator

cc: DMB/Document Control Desk (RIDS)
→ Resident Inspector, RIII
The Honorable Charles Bechhoefer, ASLB
The Honorable Jerry Karbour, ASLB
The Honorable Frederick P. Cowan, ASLB
The Honorable Ralph S. Decker, ASLB
Michael Miller
Ronald Callen, Michigan
Public Service Commission
Myron M. Cherry
Barbara Stamiris
Mary Sinclair
Wendell Marshall
Colonel Steve J. Gadler (P.E.)

8208160393



Institute of
Nuclear Power
Operations

1820 Water Place
Atlanta, Georgia 30339
Telephone 404 953-3600
TWX 810-756-0467

CONFIRMATORY ACTION LETTER

Attachment I
(K-11)

SEP 24 1982

Docket No. 50-329
Docket No. 50-330

Consumers Power Company
ATTN: Mr. James W. Cook
Vice President
Midland Project
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

This letter confirms the telephone discussion on September 24, 1982, between Messrs. Warnick and Shafer of this office and Mr. D. Miller and others of your staff regarding the problems in the remedial soils QC requalification program identified by Messrs. Gardner and Landsman.

The purpose of this letter is to document our understanding of the actions you have taken or plan to take.

As a result of our discussion, we understand that you have initiated or plan to initiate the following actions:

- (1) All work on remedial soils has been stopped with the exception of those continuous activities such as maintaining the freeze wall and well pumping.
- (2) All examinations related to remedial soils QC requalification have stopped and all QC personnel previously certified have been decertified.
- (3) A retraining program will be established and conducted for all QC personnel who failed and for future failures.
- (4) A written examination will be developed for all QC requalification examinations in the area of remedial soils.

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OFFICE							
IRNAME							
DATE							
CONFIRMATORY ACTION LETTER							

CONFIRMATORY ACTION LETTER

Consumers Power Company

- 2 -

SEP 24 1982

We also understand that you will meet with our staff on September 29, 1982, to describe what measures you will establish to accelerate the requalification and certification of the QC personnel involved in the balance of plant quality program.

If our understanding of your actions is not in accordance with the above, please contact this office immediately.

Sincerely,

James G. Keppler
Regional Administrator

cc: DMB/Document Control Desk (RIDS)
Resident Inspector, RIII
The Honorable Charles Bechhoefer, ASLB
The Honorable Jerry Harbour, ASLB
The Honorable Frederick P. Cowan, ASLB
The Honorable Ralph S. Decker, ASLB
Michael Miller
Ronald Callen, Michigan
Public Service Commission
Myron M. Cherry
Barbara Stamiris
Mary Sinclair
Wendell Marshall
Colonel Steve J. Gadler (P.E.)
William Paton, ELD

OFFICE	RIII	RFW	Davis	Keppler			
NAME	Shafert	Warnick	Davis	Keppler			
DATE	9/24/82	9/24/82	9/24	9/24			



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

Alfred
@ file

May 3, 1983

Docket Nos: 50-329 OM, OL
 and 50-330 OM, OL

Mr. J. W. Cook
 Vice President
 Consumers Power Company
 1945 West Parnall Road
 Jackson, Michigan 49201

PRINCIPAL STAFF	
RA	EFF
D/RA	SCS <i>draft B</i>
A/RA	P/O
D-EP	S/O
D/MA	RC <i>see</i>
D/ENSP	
DE	
ML	
OL	FILE <i>see</i>

Dear Mr. Cook:

Subject: Acceptance of TERA Corporation for Independent Assessment of the Auxiliary Feedwater System

Consumers Power Company letters of October 5 and December 3, 1982, selected the TERA Corporation to perform the independent design and construction verification (IDCV) program for Midland Plant, Units 1 and 2, subject to NRC approval. By letters dated February 9 and 17, 1983, the TERA Corporation provided the Engineering Program Plan (EPP) and the Project Quality Assurance Plan (PQAP) for the IDCV program with respect to the Unit 2 Auxiliary Feedwater System (AFWS). The staff has completed its review of the acceptability of TERA for the AFWS proposal.

By letters dated March 18 and 30 and April 21, 1983, the TERA Corporation provided to the NRC sworn statements attesting to corporate and individual independence. In these documents, TERA presented its finding that the Corporation, its subsidiaries and individual members of the Midland IDCV team satisfy the independence criteria set forth in Chairman Palladino's letter to Congressmen Ottinger and Dingell on February 1, 1982. TERA stated that prior to the current IDCV program contract, it has never been under contract to Consumers Power Company. TERA has also provided sworn affidavits for its personnel with previous NRC employment indicating independence from NRC technical evaluations and positions, while with the NRC, for matters related to the IDCV program for the Midland Plant.

The staff has reviewed the corporate and individual independence information provided by TERA and finds it to be in conformance with the Chairman's letter of February 1, 1982. The staff also finds that the activities of TERA members while previously employed with the NRC were not of the type which would compromise independence for the IDCV program scope. Accordingly, TERA is appropriately classified as an independent third-party with respect to the Midland IDCV program.

The staff has also reviewed the qualifications of the TERA organization and personnel participating in the independent assessment. The staff finds TERA technically qualified to conduct the EPP as planned.

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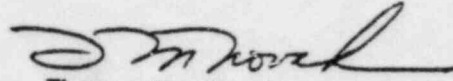
MAY 9 1983

Mr. J. W. Cook

- 2 -

The staff is presently awaiting a TERA submittal which will outline an expanded program to include two additional systems. This will necessitate staff review regarding details of the outline of the expanded program.

Sincerely,



Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

cc: See next page

MIDLAND

Mr. J. W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

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Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Mr. J. W. Cook

- 2 -

cc: Lee L. Bishop
Harmon & Weiss
1725 I Street, N.W., Suite 506
Washington, D. C. 20006

Mr. Ron Callen
Michigan Public Service Commission
6545 Mercantile Way
P.O. Box 30221
Lansing, Michigan 48909

Mr. Paul Rau
Midland Daily News
124 McDonald Street
Midland, Michigan 48640

Billie Pirner Garde
Director, Citizens Clinic
for Accountable Government
Government Accountability Project
Institute for Policy Studies
1901 Que Street, N.W.
Washington, D. C. 20009

Mr. Howard Levin, Project Manager
TERA Corporation
7101 Wisconsin Avenue
Bethesda, Maryland 20814

Ms. Lynne Bernabei
Government Accountability Project
1901 Q Street, N.W.
Washington, D. C. 20009

Supplemental page to the Midland OM, OL Service List

Mr. J. W. Cook

- 3 -

cc: Commander, Naval Surface Weapons Center
ATTN: P. C. Huang
White Oak
Silver Spring, Maryland 20910

Mr. L. J. Auge, Manager
Facility Design Engineering
Energy Technology Engineering Center
P.O. Box 1449
Canoga Park, California 91304

Mr. Neil Gehring
U.S. Corps of Engineers
NCEED - T
7th Floor
477 Michigan Avenue
Detroit, Michigan 48226

Charles Bechhoefer, Esq.
Atomic Safety & Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

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6125 N. Verde Trail
Boca Raton, Florida 33433

Jerry Harbour, Esq.
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Geotechnical Engineers, Inc.
ATTN: Dr. Steve J. Poulos
1017 Main Street
Winchester, Massachusetts 01890

Mr. J. G. Keppler
Mr. D. G. Eisenhut

-2-

Please contact me should you require further clarification.

Sincerely,

Howard A. Levin

Howard A. Levin
Project Manager
Midland Independent Design and
Construction Verification
Program

Enclosure

cc: J. Cook, CPC
G. Kexley, CPC
D. Hood, NRC

Sworn and Subscribed Before Me This 21st Day of April 1983

Susan M. Shaver
Notary Public

My Commission Expires 7-1-86



TERA CORPORATION

Service List for Midland Independent Design
and Construction Verification Program

cc: Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

James G. Keppler, Regional Administrator
U.S. Nuclear Regulatory Commission,
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

U.S. Nuclear Regulatory Commission
Resident Inspectors Office
Route 7
Midland, Michigan 48640

Mr. J. W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Michael I. Miller, Esq.
Isham, Lincoln & Beale
Three First National Plaza,
51st floor
Chicago, Illinois 60602

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Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Ms. Mary Sinclair
5711 Summerset Drive
Midland, Michigan 48640

Cherry & Flynn
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Chicago, Illinois 60602

Lee L. Bishop
Harmon & Weiss
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Mr. Wendell Marshall
Route 10
Midland, Michigan 48440

Mr. Steve Gadler
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Director, Citizens Clinic
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Mr. Ron Callen
Michigan Public Service Commission
6545 Mercantile Way
P.O. Box 30221
Lansing, Michigan 48909

Mr. Paul Rau
Midland Daily News
124 McDonald Street
Midland, Michigan 48640

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF HOWARD A. LEVIN

My name is Howard A. Levin. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached.* I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Prior to my employment with TERA Corporation, I was employed by the Nuclear Regulatory Commission (NRC). While a member of the NRC staff, I did not provide safety evaluations* on aspects of Consumers Power Company's Construction Permit and Operating License Applications which are within the scope of the Midland IDCV Program.

* Mutual Fund CM A
PAC FUND

Signed

Howard A. Levin

Sworn and Subscribed Before Me This 19 Day of ^{APRIL} ~~March~~ 1983 ^{HAL JR}

[Signature]
Notary Public

My Commission Expires July 1, 1986

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF JAMES A. LONG III

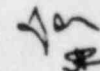
My name is James A. Long III. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

James A. Long III

Sworn and Subscribed Before Me This 19th Day of ~~March~~ ^{April} 1983 

[Signature]
Notary Public

My Commission Expires July 1, 1986

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF MICHAEL B. AYCOCK

My name is Michael B. Aycock. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

Michael B. Aycock

Sworn and Subscribed Before Me This 19 Day of ~~March~~ ^{April} 1983 *WBA*

[Signature]
Notary Public

My Commission Expires July 1, 1986

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF DONALD K. DAVIS

My name is Donald K. Davis. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

Donald K Davis

Sworn and Subscribed Before Me This 19 ^{April} Day of ~~March~~ 1983 ^{DA}

[Signature]
Notary Public

My Commission Expires July 1, 1986

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

Funds in which D.K. DAVIS HAS AN interest

1. Franklin TAX-Free - California
2. Inter Capital Liquid Asset
3. TERA Deferred Compensation (Retirement)

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF RICHARD P. SNAIDER

My name is Richard P. Snaider. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

Richard P. Snaider

Sworn and Subscribed Before Me This 19TH Day of APRIL ~~March~~ 1983

[Signature]
Notary Public

My Commission Expires JULY 1, 1986

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

SNAIDER

MUTUAL FUNDS

ENERGY (NEUBERGER-BERMAN)

PACE (AMERICAN GENERAL)

MERRILL-LYNCH HIGH INCOME BOND FUND

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF HENRY J. GEORGE

My name is Henry J. George. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

Henry J. George

Sworn and Subscribed Before Me This 19 Day of ^{April} ~~March~~ 1983

[Signature]
Notary Public

My Commission Expires July 1, 1986

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert L. Cudlin

My name is Robert L. Cudlin. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached.**I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox. ***

Prior to my employment with TERA Corporation, I was employed by the NRC. While a member of the NRC staff, I did not provide safety evaluations*on aspects of Consumer Power Company's Midland CP and OL applications which are within the scope of the Midland IDCV program.

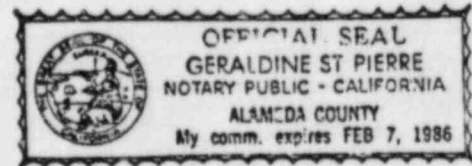
Signed

Robert L. Cudlin

Sworn and Subscribed Before Me This 15 ^{April 1983} Day of ~~March~~ 1983

Geraldine St Pierre
Notary Public

My Commission Expires February 7, 1986



*These safety evaluations include technical evaluations and subsequent formulations of NRC staff positions.

** First Jersey Securities

*** Brother, Joseph Cudlin, is currently employed by B&W as Manager, Analysis Technology

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF CHRISTIAN C. NELSON

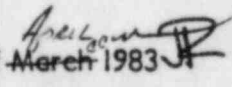
My name is Christian C. Nelson. I am employed by TERA Corporation.


I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

Christian C. Nelson

Sworn and Subscribed Before Me This 21 Day of ^{April}~~March~~ 1983 


Notary Public

My Commission Expires July 1, 1983

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF STEPHEN F. SCHREURS

My name is Stephen F. Schreurs. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

Stephen F. Schreurs

Sworn and Subscribed Before Me This 21 Day of ~~March~~ ^{APRIL} 1983 ^{SRB}

[Signature]
Notary Public

My Commission Expires July 1, 1983

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF JOSEPH MARTORE

My name is Joseph Martore. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification (IDCV) at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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Signed

Joseph Martore

Sworn and Subscribed Before Me This 21 Day of ^{APRIL}~~MARCH~~ 1983
JM

Susan N. Shaver
Notary Public

My Commission Expires 7-1-86

* These safety evaluations include technical evaluations and subsequent formulation of NRC staff positions.

MEETING AGENDA
MIDLAND IDCV PROGRAM
APRIL 13, 1983

- PURPOSE
- MEETING OBJECTIVES
- BACKGROUND
 - PHILOSOPHY OF REVIEW
 - REVIEW APPROACH
 - BASES FOR SAMPLE SELECTION
- PROTOCOL
 - RESULTS REPORTING
 - STATUS REPORTING
 - COMMUNICATIONS
- DETAILS OF IDCV SCOPE
 - OVERVIEW
 - AUXILIARY FEEDWATER SYSTEM
 - STANDBY ELECTRIC POWER SYSTEM
 - CONTROL ROOM HVAC



PURPOSE

- ALLOW TERA TO BE RESPONSIVE TO NRC'S MARCH 22, 1983 LETTER



OBJECTIVES

- DISCUSSION OF IDCV PROTOCOL
- RECEIVE ANY COMMENTS GENERATED BY NRC'S REVIEW OF THE IDCV ENGINEERING PROGRAM PLAN
- CURRENT SCOPE OF TERA'S AFW SYSTEM REVIEW
- CONCEPTUAL DESCRIPTION OF SCOPE FOR STANDBY ELECTRIC POWER SYSTEM AND CONTROL ROOM HVAC SYSTEM

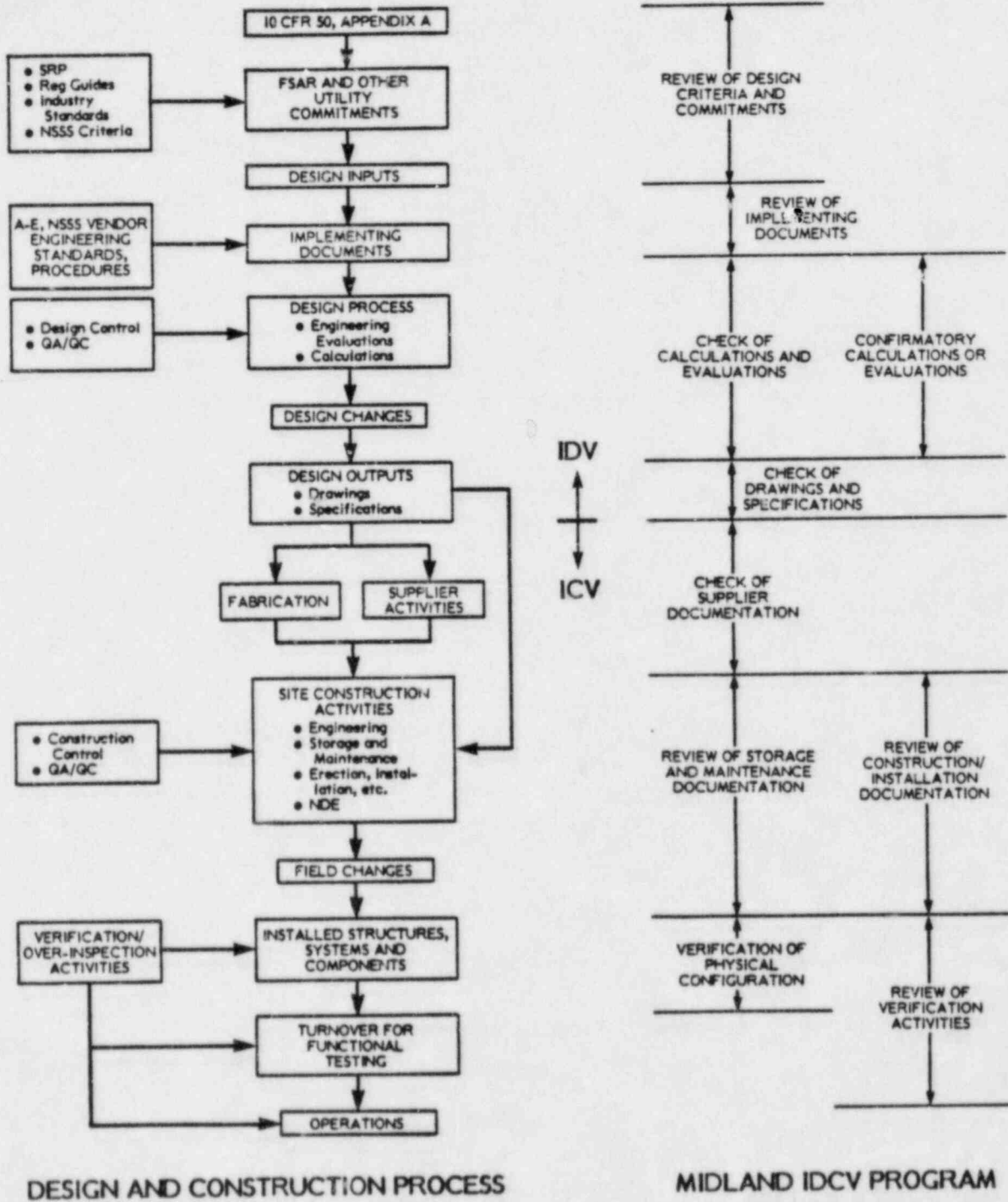


PHILOSOPHY OF REVIEW

- SELECT A REPRESENTATIVE SAMPLE OF ENGINEERED SYSTEMS, COMPONENTS, AND STRUCTURES WHICH WILL FACILITATE:
 - AN INTEGRATED ASSESSMENT OF IMPORTANT PARAMETERS AFFECTING THE FUNCTIONAL CAPABILITY OF THE TWO SYSTEMS, AND
 - THE ABILITY TO EXTRAPOLATE FINDINGS TO SIMILARLY DESIGNED FEATURES WITH A HIGH DEGREE OF CONFIDENCE
- CONSIDER POSITIVE AND NEGATIVE FINDINGS WHICH WILL ALLOW A BALANCED VIEW OF OVERALL QUALITY
- ASSESS ROOT CAUSE AND EXTENT OF IDENTIFIED FINDINGS
- REVIEW CORRECTIVE ACTION TAKEN TO ADDRESS FINDINGS



INTER-RELATIONSHIP BETWEEN THE MIDLAND DESIGN AND CONSTRUCTION PROCESS AND THE MIDLAND IDCV PROGRAM



**INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM**

DESIGN AREA	SCOPE OF REVIEW				
	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
I. AFW SYSTEM PERFORMANCE REQUIREMENTS					
SYSTEM OPERATING LIMITS	X	X	X		
ACCIDENT ANALYSIS CONSIDERATIONS	X				
SINGLE FAILURE	X	X	X	•	
TECHNICAL SPECIFICATIONS	X	X			
SYSTEM ALIGNMENT/SWITCHOVER	X	X			
REMOTE OPERATION AND SHUTDOWN	X				
SYSTEM ISOLATION/INTERLOCKS	X	X			
OVERPRESSURE PROTECTION	X	•	•	•	
COMPONENT FUNCTIONAL REQUIREMENTS	X	X	X		X
SYSTEM HYDRAULIC DESIGN	X	X	X	•	
SYSTEM HEAT REMOVAL CAPABILITY	X	X	X	•	
COOLING REQUIREMENTS	X				
WATER SUPPLIES	X	X			
PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING	X	•	•		•
POWER SUPPLIES	X	X			•
ELECTRICAL CHARACTERISTICS	X	•	•		
PROTECTIVE DEVICES/SETTINGS	X	X			X
INSTRUMENTATION	X	X	X		X
CONTROL SYSTEMS	X	X	X		•
ACTUATION SYSTEMS	X				•
NDE COMMITMENTS	X	•			•
MATERIALS SELECTION	X	X			
FAILURE MODES AND EFFECTS	•	•		•	

KEY

X - INITIAL SCOPE OF REVIEW

(X) - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

BASES FOR SAMPLE SELECTION

- SIMILAR TO SYSTEM SELECTION CRITERIA
 - IMPORTANCE TO SAFETY
 - INCLUSION OF DESIGN/CONSTRUCTION INTERFACES
 - ABILITY TO EXTRAPOLATE RESULTS
 - DIVERSE IN CONTENT
 - SENSITIVE TO PREVIOUS EXPERIENCE
 - ABILITY TO TEST AS-BUILT INSTALLATION
- STRONG RELIANCE UPON ENGINEERING JUDGMENT
- POTENTIAL USE OF STATISTICAL TECHNIQUES TO ESTABLISH SAMPLE SIZE FOR REPETITIVE PRODUCTION ACTIVITIES (E.G., CONCRETE AND STEEL PROPERTIES, WELDING RECORDS, ETC.)
- INDUSTRY DESIGN/CONSTRUCTION EXPERIENCE
- INDUSTRY OPERATING EXPERIENCE
- PROJECT DESIGN/CONSTRUCTION EXPERIENCE
 - AREAS EXPERIENCING REPEATED PROBLEMS
 - AREAS WHICH MAY NOT HAVE RECEIVED EXTENSIVE PRIOR REVIEW
- AREAS WHERE FINDINGS HAVE BEEN IDENTIFIED



PROTOCOL FOR REPORTING AND COMMUNICATIONS
MIDLAND IDC V PROGRAM

- INTERPRETATION OF NRC PROTOCOL GOVERNING COMMUNICATIONS
 - ALL CONTACTS AND INFORMATION EXCHANGE ARE RECORDED AND AUDITABLE
 - PROPRIETARY MATERIAL WILL BE AUDITABLE, BUT EXCLUDED FROM SUBMITTALS
 - PRIOR NOTICE OF MEETINGS TO DISCUSS "SUBSTANTIVE MATTERS"
 - AT FINDING STAGE, NOT DURING SOLICITATION OF INFORMATION
 - SPECIAL CASES - CONFIRMATORY CALCULATIONS, PROGRAM CHANGES, SIGNIFICANT SAFETY ISSUE IDENTIFICATION
- REPORTING
 - PERIODIC STATUS REPORTS
 - TRACKING SYSTEM SUMMARY FOR OCR ITEMS, FINDING REPORTS AND FINDING RESOLUTION REPORTS
 - PROGRESS SUMMARY AND CHANGES TO REVIEW SCOPE



PROTOCOL FOR REPORTING AND COMMUNICATIONS
MIDLAND IDC V PROGRAM

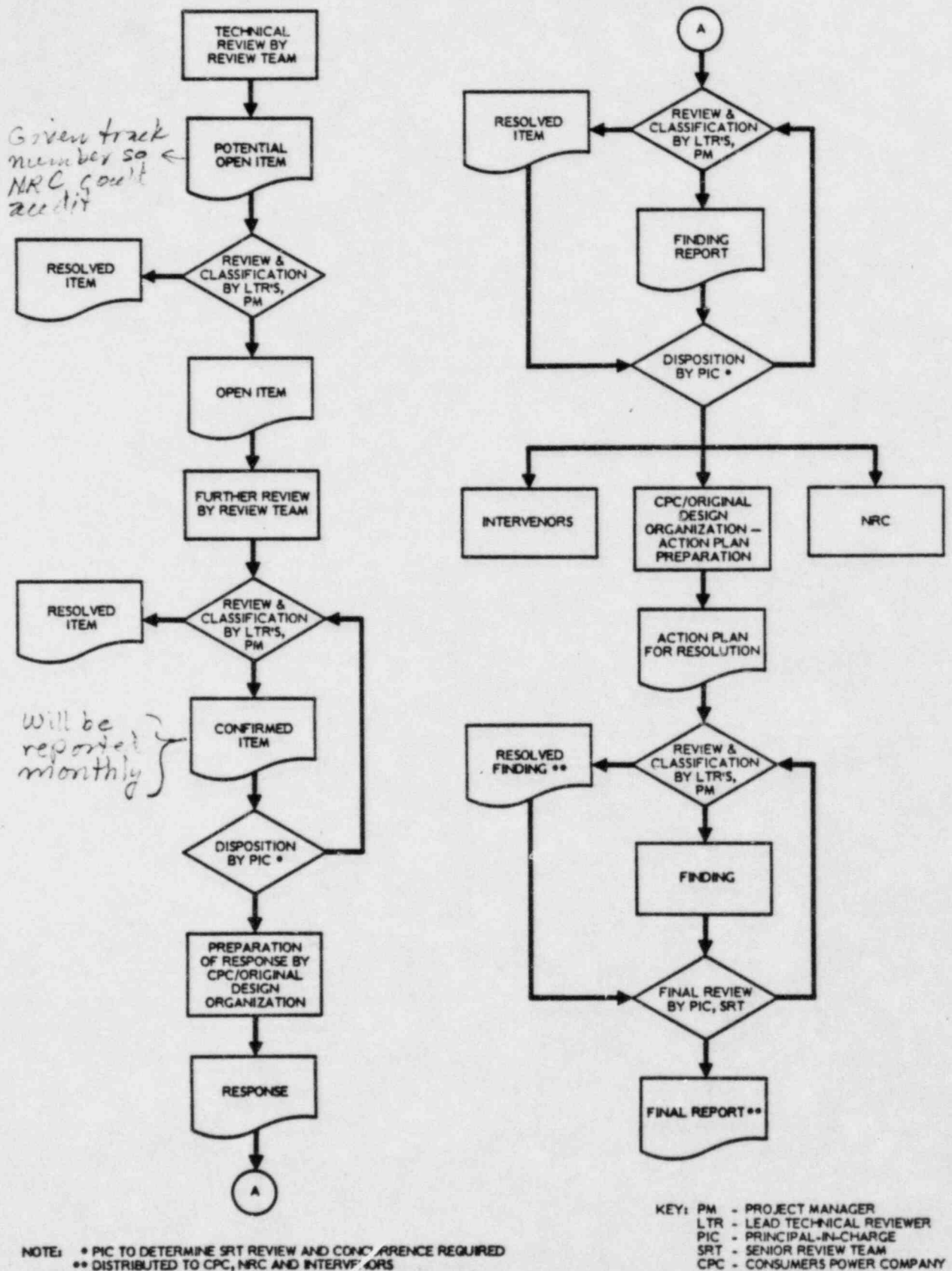
(Continued)

- REPORTING (CONTINUED)
 - FOR FINDING REPORTS, IDENTIFICATION OF SIGNIFICANT SAFETY ISSUES
 - CURRENT CONFIRMED ITEMS, FINDING REPORTS AND FINDING RESOLUTION REPORTS
- INTERIM AND FINAL REPORTS
 - TOPICAL INTERIM REPORTS AS COMPLETED FOR EACH SYSTEM
 - FINAL REPORT
- DOCUMENTATION
 - TERA RECORDS LOCATED IN BETHESDA, MARYLAND AND AVAILABLE FOR NRC AUDIT
 - INTERNAL QA AUDIT RESULTS AVAILABLE FOR NRC INSPECTION



REPORT FLOW CHART

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM



NOTE: * PIC TO DETERMINE SRT REVIEW AND CONCURRENCE REQUIRED
 ** DISTRIBUTED TO CPC, NRC AND INTERVENORS

FIGURE 5.2-1

SCOPE OF DESIGN VERIFICATION REVIEW

- REVIEW OF DESIGN CRITERIA AND COMMITMENTS
 - REGULATIONS AND LICENSING COMMITMENTS
 - ADEQUACY, CONSISTENCY, AND ACCURACY
- REVIEW OF IMPLEMENTING DOCUMENTS
 - EXISTENCE OF IMPLEMENTING DOCUMENT (E.G., DISCIPLINE DESIGN INSTRUCTIONS, STANDARD DESIGN PRACTICES, INTERFACE DOCUMENTS BETWEEN NSSS AND A-E, ETC.)
 - DESIGN CRITERIA ADEQUATELY DEFINED AND INTERPRETABLE
- CHECK OF CALCULATIONS AND EVALUATIONS
 - SAMPLING CHECK OF ORIGINAL ANALYSES, CALCULATIONS OR EVALUATIONS; REVIEW OF
 - DESIGN INPUTS (INCORPORATION OF DESIGN CRITERIA, CONFORMANCE WITH COMMITMENTS, TRANSFER OF INFORMATION)
 - ASSUMPTIONS
 - METHODOLOGY (INCLUDING ANALYTICAL TECHNIQUES, EVALUATION PROCEDURES)
 - VALIDATION AND USE OF COMPUTER CODES
 - REVIEW OF OUTPUTS
 - COMPLIANCE WITH CODES, STANDARDS, NRC GUIDANCE



SCOPE OF DESIGN VERIFICATION REVIEW
(continued)

- CONFIRMATORY CALCULATIONS OR EVALUATIONS
 - "BLIND" INDEPENDENT RE-ANALYSIS OR RE-EVALUATION FOR SELECTED DESIGN AREAS
 - INDEPENDENT RE-ANALYSIS OR RE-EVALUATION FOR DESIGN AREA THAT MAY BE SUSPECT ON BASIS OF A REVIEW OF ORIGINAL CALCULATIONS OR EVALUATIONS
 - ALTERNATIVE TECHNIQUES, SIMPLE BOUNDING EVALUATIONS OR DETAILED ANALYTICAL TECHNIQUES MAY BE EMPLOYED
- CHECK OF DRAWINGS AND SPECIFICATIONS
 - VERIFICATION THAT THE DRAWING OR SPECIFICATION REFLECTS DESIGN REQUIREMENTS SPECIFIED IN THE DESIGN CALCULATIONS OR EVALUATIONS



SCOPE OF CONSTRUCTION VERIFICATION REVIEW

- REVIEW OF SUPPLIER DOCUMENTATION
 - SAMPLING CHECK AGAINST DESIGN SPECS AND DRAWINGS;
REVIEW OF
 - DRAWINGS
 - TEST REPORTS
 - CERTIFIED MATERIAL PROPERTY REPORTS
 - STORAGE AND INSTALLATION REQUIREMENTS
 - OPERATION AND MAINTENANCE REQUIREMENTS

- REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION
 - RECEIPT INSPECTION DOCUMENTATION

 - STORAGE, INCLUDING IN-STORAGE AND IN-PLACE MAINTENANCE
 - REQUIREMENTS INCLUDING PARAMETERS SUCH AS TEMPERATURE, HUMIDITY, CLEANLINESS, LUBRICATION, ENERGIZATION, ETC.

 - OBSERVATION OF ON-GOING ACTIVITIES

- REVIEW OF CONSTRUCTION/INSTALLATION DOCUMENTATION
 - IMPLEMENTATION OF PROPER REQUIREMENTS SUCH AS ERECTION SPECIFICATIONS, INSTALLATION REQUIREMENTS, CONSTRUCTION PROCEDURES, CODES AND STANDARDS, ETC.

 - REVIEW OF DESIGN CHANGES, FIELD MODIFICATIONS, ETC.

 - EVALUATION OF DOCUMENTATION FOR ITEMS SUCH AS CONCRETE, WELDING, BOLTING ACTIVITIES, ETC.



SCOPE OF CONSTRUCTION VERIFICATION REVIEW

(continued)

- OBSERVATION OF ON-GOING CONSTRUCTION ACTIVITIES
- REVIEW OF SELECTED VERIFICATION ACTIVITIES
 - CABLE SEPARATION, PIPE SUPPORT, AND BOLTING OVER-INSPECTION PROGRAMS, ETC.
 - OBSERVATION OF VARIOUS WALKDOWN ACTIVITIES (E.G., SYSTEMS INTERACTION - SEISMIC II/I)
 - COLD HYDROS
 - COMPONENT AND SYSTEM FUNCTIONAL TESTING PROGRAMS
 - CONSTRUCTION COMPLETION PROGRAM
- VERIFICATION OF PHYSICAL CONFIGURATION
 - INSTALLATION OF SYSTEM IN ACCORDANCE WITH PIPING AND INSTRUMENTATION DIAGRAMS
 - INSTALLATION OF COMPONENTS AND PIPING IN ACCORDANCE WITH ARRANGEMENT DRAWINGS AND ISOMETRICS (APPROXIMATE LOCATION AND ORIENTATION)
 - INSPECTION OF SELECTED FEATURES FOR COMPLIANCE WITH DESIGN DETAILS (APPROXIMATE DIMENSIONS)
 - VERIFICATION OF IDENTITY (EQUIPMENT PART NUMBERS, ETC.) IN ACCORDNACE WITH DRAWINGS, SPECIFICATIONS, OR SCHEMATICS
 - QUALITY OF WORKMANSHIP



AFW SYSTEM SAMPLE SELECTION BOUNDARIES 1/

<u>INTERFACING SYSTEM</u>	<u>INTERFACE POINT</u>
Main Steam	Valves 074 and 077 <u>2/</u> (motor-operated steam inlet valves to AFW pump turbine)
NSSS	Steam Generator Nozzles
Service Water A	Valve 283 (manual supply valve to AFW suction)
Service Water B	Valve 282 (manual supply valve to AFW suction)
Unit 2 Condensate Tank (from)	Valve 008 (motor-operated supply valve to AFW suction)
Deaerators	Valve 006 (check valve to AFW suction)
Unit 1 Condensate Tank (return)	Valve 019 (test and low flow manual valve)
Cooling Pond (return)	Valve 017 (manual isolation valve)
ac/dc Power System <u>3/</u>	Breaker or fuse interfacing AFW components with power source
ESFAS	AFW actuation system and FOGG
Main FW Loop A	Valve 303 (isolation valve between AFW and MFW used for startups)
Vents and Drains	First Valve
HVAC	AFW pump room fan coolers and associated ductwork and supports

1/ P&ID M-439, Sheet 3A, Revision 9 and 3B, Revision 10

2/ P&ID M-432, Sheet 1A, Revision 5

3/ Power supplies dedicated to AFW system are within sample selection boundaries.



**INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM**

DESIGN AREA	SCOPE OF REVIEW				
	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
I. AFW SYSTEM PERFORMANCE REQUIREMENTS					
SYSTEM OPERATING LIMITS	X	X	X		
ACCIDENT ANALYSIS CONSIDERATIONS	X				
SINGLE FAILURE	X	X	X	•	
TECHNICAL SPECIFICATIONS	X	X			
SYSTEM ALIGNMENT/SWITCHOVER	X	X			
REMOTE OPERATION AND SHUTDOWN	X				
SYSTEM ISOLATION/INTERLOCKS	X	X			
OVERPRESSURE PROTECTION	X	•	•	•	
COMPONENT FUNCTIONAL REQUIREMENTS	X	X	X		X
SYSTEM HYDRAULIC DESIGN	X	X	X	•	
SYSTEM HEAT REMOVAL CAPABILITY	X	X	X	•	
COOLING REQUIREMENTS	X				
WATER SUPPLIES	X	X			
PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING	X	•	•		•
POWER SUPPLIES	X	X			•
ELECTRICAL CHARACTERISTICS	X	•	•		
PROTECTIVE DEVICES/SETTINGS	X	X			X
INSTRUMENTATION	X	X	X		X
CONTROL SYSTEMS	X	X	X		•
ACTUATION SYSTEMS	X				•
NDE COMMITMENTS	X	•			•
MATERIALS SELECTION	X	X			
FAILURE MODES AND EFFECTS	•	•		•	

KEY

X - INITIAL SCOPE OF REVIEW

(X) - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM (CONTINUED)

DESIGN AREA	SCOPE OF REVIEW				
	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
II. AFW SYSTEM PROTECTION FEATURES					
SEISMIC DESIGN	X				
• PRESSURE BOUNDARY	X	X	X	X	X
• PIPE/EQUIPMENT SUPPORT	X	X	X	X	X
• EQUIPMENT QUALIFICATION	X	X	X		X
HIGH ENERGY LINE BREAK ACCIDENTS	X				
• PIPE WHIP	X	X	X		X
• JET IMPINGEMENT	X				
ENVIRONMENTAL PROTECTION	X				
• ENVIRONMENTAL ENVELOPES	X	X	X		X
• EQUIPMENT QUALIFICATION	X	X	X		X
• HVAC DESIGN	X				
FIRE PROTECTION	X	X	X		
MISSILE PROTECTION	X				
SYSTEMS INTERACTION	X	X	X		
III. STRUCTURES THAT HOUSE THE AFW SYSTEM					
SEISMIC DESIGN/INPUT TO EQUIPMENT	X	X	X		X
WIND & TORNADO DESIGN/MISSILE PROTECTION	X				
FLOOD PROTECTION	X				
HELBA LOADS	X				
CIVIL/STRUCTURAL DESIGN CONSIDERATIONS	X				
• FOUNDATIONS	X	X	X		
• CONCRETE/STEEL DESIGN	X	X	X		X
• TANKS	(X)	(X)	(X)		

KEY

X - INITIAL SCOPE OF REVIEW

(X) - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

**INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM
MIDLAND INDEPENDENT CONSTRUCTION VERIFICATION PROGRAM**

SYSTEM/COMPONENT	SCOPE OF REVIEW				
	REVIEW OF SUPPLIER DOCUMENTATION	REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION	REVIEW OF CONSTRUCTION/INSTALLATION DOCUMENTATION	REVIEW OF SELECTED VERIFICATION ACTIVITIES	VERIFICATION OF PHYSICAL CONFIGURATION
I. MECHANICAL					
● EQUIPMENT	X	X	X	X	X
● PIPING	X		X	X	X
● PIPE SUPPORTS	X		X	X	X
II. ELECTRICAL					
● EQUIPMENT	X	X	X	X	X
● TRAYS AND SUPPORTS	X		*	*	X
● CONDUIT AND SUPPORTS	X		*	*	X
● CABLE	X	X	X	X	X
III. INSTRUMENTATION AND CONTROL					
● INSTRUMENTS	X	X	X	X	X
● PIPING/TUBING	X				X
● CABLE	X		*	*	X
IV. HVAC					
● EQUIPMENT	X	X	X	X	X
● DUCTS AND SUPPORTS	X				X
V. STRUCTURAL					
● FOUNDATIONS	X		X		
● CONCRETE	X		X		X
● STRUCTURAL STEEL	X		X		X
VI. NDE/MATERIAL TESTING PROGRAM					X

KEY

- X - INITIAL SCOPE OF REVIEW
- (X) - DELETED SCOPE OF REVIEW
- * - ADDED SCOPE OF REVIEW

**MIDLAND IDCV
SUPPLIER DOCUMENTATION REVIEW**

Item No.	Type	Component ID		Gen Cmpl	Dwgs	Funct Reqs	EQ	SGRT	Weld	Mat Props	Misc	Comments
		ID No.	P.O. No.						NDE QA			
1.	Pump	2P-005A	M-14	X	X	X		X	X	X	X	
2.	Motor	2P-005A	M-14	X	X	X		X	X	X	X	
3.	Pump	2P-005B	M-14	X	X	X		X	X	X	X	
4.	Turbine	2G-005B	M-14	X	X	X			X	X	X	
5.	Valve	2LV-3975AIV	J-255	X	X	X	X	X	X	X	X	
6.	Operator	2LV-3975AI	J-255	X	X	X	X	X			X	
7.	Valve	2MO-3965AV	M-117	X	X	X	X		X	X	X	
8.	Operator	2MO-3965A	M-117	X	X	X	X				X	
9.	Valve	2MO-3993A2V	M-398		X	X		X				
10.	Operator	2MO-3993A2	M-398		X	X		X				
11.	Valve	2XV-3989	M-118	X	X	X						
12.	Operator	2XV-3989AI	M-118		X	X						
13.	Valve	25V-3969A	J-256	X	X	X			X	X	X	
14.	Valve	2MO-3226V	M-117		X	X	X					
15.	Operator	2MO-3226	M-117		X	X	X					
16.	Valve	2MO-3277AV	M-117		X	X	X	X	X			
17.	Operator	2MO-3277A	M-117		X	X	X	X				
18.	Heat-X	2E-105A	M-14		X	X		X				

**MIDLAND IDCV
STORAGE AND MAINTENANCE DOCUMENTATION REVIEW**

Item No.	Type	Component ID		Receipt Inspection		Storage & Maintenance		Visual Inspection	Comments
		ID No.	P.O. No.	Doc. Review	Observ.	Doc. Review	Observ.		
1.	Pump	2P-005A	M-14	X		X		X	
2.	Motor	2P-005A	M-14	X		X		X	
3.	Pump	2P-005B	M-14	X		X		X	
4.	Turbine	2G-005B	M-14	X		X		X	
5.	Valve	2LV-3975AIV	J-255	X		X		X	
6.	Operator	2LV-3975AI	J-255	X		X		X	
7.	Valve	2MO-3965AV	M-117	X		X		X	
8.	Operator	2MO-3965A	M-117	X		X		X	
9.	Valve	2MO-3993A2V	M-398						
10.	Operator	2MO-3993A2	M-398						
11.	Valve	2XV-3989	M-118						
12.	Operator	2XV-3989AI	M-118						
13.	Valve	25V-3969A	J-256	X					
14.	Valve	2MO-3226V	M-117						
15.	Operator	2MO-3226	M-117						
16.	Valve	2MO-3277AV	M-117						
17.	Operator	2MO-3277A	M-117						

ADDITIONAL VERIFICATION AND SAMPLING

- CLASSIFICATION OF "OPEN ITEMS", "CONFIRMED ITEMS" AND "RESOLVED ITEMS"

- INCREASE REVIEWER'S LEVEL OF CONFIDENCE

- DETERMINATION OF EXTENT OF FINDINGS

- ROOT-CAUSE IDENTIFICATION
 - RANDOM ERROR
 - SYSTEMATIC ERROR

- REQUESTED BY CPC OR NRC



SUMMARY
SYSTEMS REVIEW TOPICS
AFW SYSTEM
MIDLAND IDCV PROGRAM

TOPIC 1.1-1 SYSTEM OPERATING LIMITS

REVIEW OF SPECIFIED SYSTEM OPERATING LIMITS (TEMPERATURE, PRESSURE, FLOW RATE, ETC.) TO ASCERTAIN WHETHER THEY ARE SPECIFIED IN CONSIDERATION OF FUNCTIONAL PERFORMANCE REQUIREMENTS.

- REVIEW OF APPLICABLE CRITERIA, SUCH AS B&W BOP CRITERIA DOCUMENT.
- CHECK CALCULATIONS RELATED TO VALVE OPENING TIMES, SYSTEM TEMPERATURE, PRESSURE, AND FLOWRATES.
- REVIEW SELECTED LIMITS IDENTIFIED IN THIS TOPIC AS PART OF TOPICS COVERING COMPONENT FUNCTIONAL REQUIREMENTS, SYSTEM HYDRAULIC DESIGN, SYSTEM HEAT REMOVAL CAPABILITY, COOLING REQUIREMENTS, AND WATER SUPPLIES.

TOPIC 1.2-1 ACCIDENT ANALYSIS CONSIDERATIONS

REVIEW OF FSAR ACCIDENT ANALYSES TO IDENTIFY ACCIDENTS IN WHICH AFWS MAY BE INVOLVED EITHER AS A CONTRIBUTOR OR AS AN ENGINEERED SAFETY SYSTEM.



SUMMARY
SYSTEMS REVIEW TOPICS
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(Continued)

- FEED BACK INFORMATION INTO TOPICS CONCERNING COMPONENT FUNCTIONAL REQUIREMENTS, SYSTEM HYDRAULIC DESIGN, AND SYSTEM HEAT REMOVAL CAPABILITY.
- REVIEW ASSUMPTIONS REGARDING OPERATOR "INVERSION" OF FOGG DURING STEAM GENERATOR TUBE RUPTURE.
- REVIEW ANTICIPATED TRANSIENT OPERATOR GUIDELINE DOCUMENT REGARDING FOGG OPERABILITY.

TOPIC I.3-1 SINGLE FAILURE

REVIEW OF ALL ACTIVE MECHANICAL COMPONENTS AND ELECTRICAL COMPONENTS TO DETERMINE WHETHER THE FAILURE OF ONE COMPONENT CAN INCAPACITATE THE SYSTEM.

- REVIEW FSAR DOCUMENTATION
- PERFORM CONFIRMATORY SINGLE FAILURE ANALYSIS FOR PORTION OF AFW



SUMMARY
SYSTEMS REVIEW TOPICS
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NEW TOPIC - FAILURE MODES AND EFFECTS ANALYSIS

REVIEW EXISTING FMEA TO ASCERTAIN COMPLETENESS, INCLUSION OF ALL IMPORTANT SUBSYSTEMS AND COMPONENTS.

TOPIC I.4-1 TECHNICAL SPECIFICATIONS

REVIEW OF MIDLAND TECHNICAL SPECIFICATIONS (AND FSAR COMMITMENTS) AGAINST NRC STS.

- REVIEW HELD IN ABEYANCE WHILE APPLICANT AND NRC DEVELOP SPECIFICATIONS.

TOPIC I.5-1 SYSTEM ALIGNMENT/SWITCHOVER

REVIEW SYSTEM ALIGNMENT CRITERIA, APPLICABLE SWITCHOVERS AND ALIGNMENTS, AND AVAILABLE PROCEDURES TO DETERMINE WHETHER SYSTEM CAN MEET DESIGN OBJECTIVES.

- REVIEW AVAILABLE SYSTEM ALIGNMENT PROCEDURES.
- REVIEW RELATED ELECTRICAL TOPICS, INCLUDING SWITCHOVER TO AUXILIARY SHUTDOWN PANEL, AS PART OF CONTROL SYSTEMS, ACTUATION SYSTEMS.



SUMMARY
SYSTEMS REVIEW TOPICS
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(Continued)

TOPIC I.6-I REMOTE OPERATION AND SHUTDOWN

REVIEW OF CAPABILITY FOR SAFE SHUTDOWN FROM OUTSIDE THE CONTROL ROOM.

- CONCLUSIONS BASED ON CPC'S ANALYSES FOR FIRE PROTECTION WILL BE TESTED AS PART OF THE TOPICS REGARDING COMPONENT FUNCTIONAL REQUIREMENTS, FIRE PROTECTION, INSTRUMENTATION, AND CONTROL SYSTEMS.

TOPIC I.7-I SYSTEM ISOLATION/INTERLOCKS

REVIEW ADEQUACY OF ALL ISOLATION REQUIREMENTS AND INTERLOCKS DESIGNED TO IMPLEMENT SYSTEM PERFORMANCE REQUIREMENTS.

- REVIEW ISOLATION OF THE SYSTEM UNDER CONSIDERATIONS OF LOSS OF AC POWER/SEISMIC EVENT.
- REVIEW SYSTEM ISOLATION UPON NEED FOR SERVICE WATER INSTEAD OF "NORMAL" SOURCES.



SUMMARY
SYSTEMS REVIEW TOPICS
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(Continued)

TOPIC I.8-1 OVERPRESSURE PROTECTION

REVIEW OF AFW SYSTEM TO ASSESS NEED FOR PROTECTIVE DEVICES TO PREVENT OVERPRESSURIZATION FOR ANY MODES OF OPERATION.

- REVIEW CALCULATION WHICH INCLUDED PIPE RATING DETERMINATIONS.
- PERFORM CONFIRMATORY CALCULATION FOR PIPING BOTH INSIDE AND OUTSIDE CONTAINMENT.
- REVIEW MANAGEMENT CORRECTIVE ACTION REPORT RELATED TO SUCTION OVERPRESSURE CONDITION REPORTED ON ANOTHER B&W REACTOR.
- REVIEW RECENT DESIGN PRESSURE CHANGES REQUESTED FOR SOME DRAIN PIPING ON AFW TURBINE.

TOPIC II.14-1 SYSTEMS INTERACTION

REVIEW OF THE POTENTIAL FOR SYSTEMS INTERACTION AND MEANS FOR PREVENTION THEREOF.

- REVIEW BECHTEL/CPCO PROGRAM FOR SEISMIC II/I AND PROXIMITY.
- WILL AUDIT "WALK-DOWN" IN AREAS CONTAINING AFW'S EQUIPMENT.



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TOPIC I.9-1 COMPONENT FUNCTIONAL REQUIREMENTS

REVIEW IS A FOCAL POINT OF THE RESULTS OF MANY OTHER REVIEWS TO DETERMINE IF COMPONENTS MEET FUNCTIONAL REQUIREMENTS IDENTIFIED THEREIN.

- USES INPUT FROM SYSTEM HYDRAULIC DESIGN, SYSTEM HEAT REMOVAL CAPABILITY, SYSTEM OPERATING LIMITS, AND OTHER REVIEW AREAS.
- EVALUATE PUMPS AND DRIVERS AND LEVEL CONTROL VALVES; CHECK OTHER COMPONENTS AFTER FURTHER EVALUATIONS ARE COMPLETE.
- REVIEW PUMPS AND DRIVERS FOR:
 - FLOW
 - HEAD
 - NPSH
 - DRIVER SIZING
- REVIEW LEVEL CONTROL VALVES FOR:
 - PRESSURE DROPS
 - CAPABILITY TO MEET DESIGN BASIS
 - ENVIRONMENTAL QUALIFICATION
 - INTERFACE WITH POWER SUPPLY



SUMMARY
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TOPIC I.10-I SYSTEM HYDRAULIC DESIGN

REVIEW FLUID FLOW CONSIDERATION FOR PIPING SYSTEM.

- REVIEW NPSH CALCULATIONS
- PREPARE CONFIRMATORY EVALUATION TO CHECK HYDRAULIC PARAMETERS DURING AUTOMATIC SWITCHOVER.
- PREPARE CONFIRMATORY CALCULATION BASED ON HEAT GENERATION RATE.

TOPIC I.11-I SYSTEM HEAT REMOVAL CAPABILITY

REVIEW STEAM GENERATOR HEAT TRANSFER FROM PRIMARY TO SECONDARY AND SECONDARY SIDE RESPONSE.

- PREPARE CONFIRMATORY CALCULATION OF HEAT GENERATION RATE TO EVALUATE AVAILABLE DOCUMENTATION AND PROVIDE INPUT TO HYDRAULIC DESIGN REVIEW.
- COMPARE AFW WATER TEMPERATURE AGAINST OTHER PLANT DESIGN PARAMETERS.
- EVALUATE STATION BLACKOUT EVENT.



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TOPIC I.12-1 COOLING REQUIREMENTS

REVIEW REQUIREMENT FOR HEAT REJECTION FROM AFW.

- EVALUATE STATION BLACKOUT EVENT.
- COMPARE AFW HEAT LOADS AND ROOM COOLER SIZING.

TOPIC I.13-1 WATER SUPPLIES

CHECK SIZING OF WATER SUPPLIES IN THE SYSTEM HEAT REMOVAL CAPABILITY EVALUATION.

- EVALUATE TEMPERATURE OF WATER SUPPLIES.
- REVIEW SEISMIC/NON-SEISMIC INTERFACE FOR SUCTION LINES.



SUMMARY
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TOPICS II.5-1 THROUGH II.7-1 HELBA/PIPE WHIP/JET IMPINGEMENT

REVIEW BASIS FOR BREAK POSTULATION AND DYNAMIC EFFECTS OF RESULTING INTERACTION

- REVIEW SUCTION LINE BREAK AS PART OF EQUIPMENT QUALIFICATION AREA.
- REVIEW OTHER LINES USING STRESS ANALYSIS RESULTS.

TOPICS II.8-1 THROUGH II.11-1 ENVIRONMENTAL PROTECTION

REVIEW PREDICTION OF TEMPERATURE AND PRESSURE ENVIRONMENT AND FLOODING, AND EXAMINE QUALIFICATION RECORDS FOR AFFECTED EQUIPMENT

- REVIEW AUXILIARY BUILDING PRESSURE/TEMPERATURE CALCULATIONS.
- PREPARE CONFIRMATORY CALCULATION FOR PRESSURE/TEMPERATURE INSIDE CONTAINMENT.
- REVIEW EQUIPMENT QUALIFICATION REPORT AND BACKUP DATA FOR SELECTED COMPONENTS.



SUMMARY
MECHANICAL REVIEW TOPICS
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(Continued)

- CONSIDER HVAC DESIGN AS PART OF COOLING REQUIREMENTS.
 - REVIEW FLOODING CALCULATIONS.
 - VERIFY EQUIPMENT LOCATIONS IN FIELD.
-

TOPIC II.12-1 FIRE PROTECTION

REVIEW MEASURES, INCLUDING DETECTION AND SUPPRESSION, FOR ADDRESSING CONSEQUENCES OF A FIRE TO ENSURE SAFETY DESIGN BASIS CAN BE SATISFIED.

- FOR SELECTED AFW COMPONENTS AND FIRE ZONES, VERIFY THAT LOCATION, SEPARATION, BARRIERS, FIRE LOADING, AND PROTECTION SATISFY FSAR CRITERIA AND INFORMATION.
- VERIFY SUPPRESSION SYSTEM AND DETECTION SYSTEM SPECIFICATIONS SATISFY FSAR CRITERIA, AND CHECK SUPPRESSION SYSTEM FLOW CALCULATIONS, FOR SAMPLE ZONE CONTAINING REDUNDANT AFW COMPONENTS.
- CONFIRM EMERGENCY LIGHTING LOCATION FOR SAMPLE ZONES.
- CONFIRM TRANSFER SWITCH DESIGN (ISOLATE PORTIONS OF CIRCUIT DAMAGED BY FIRE, AND PERMIT REQUIRED OPERATION OF COMPONENTS).



SUMMARY
MECHANICAL REVIEW TOPICS
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(Continued)

TOPIC II.13-1 MISSILE PROTECTION (IN PLANT)

REVIEW BASIS FOR SELECTING INTERNAL MISSILES AND REVIEW CONCLUSIONS REGARDING ADEQUACY OF PROTECTION FOR AFW OR OTHER SYSTEMS IF AFW GENERATES MISSILE.

- CONSIDER MISSILES WITHIN AFW AND FROM OTHER SYSTEMS.



SUMMARY
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TOPIC I.15-1 POWER SUPPLIES

REVIEW ELECTRICAL INDEPENDENCE AND DIVERSITY OF AFW POWER SOURCES TO ASSESS SYSTEM CAPABILITY TO OPERATE DURING LOSS OF OFFSITE POWER WITH SINGLE FAILURE OR STATION BLACKOUT

- REVIEW INCLUDES POWER SUPPLIES TO PUMPS, INSTRUMENTATION, VALVES AND CONTROLS FOR BOTH AFW TRAINS

TOPIC I.16-1 ELECTRICAL CHARACTERISTICS

REVIEW CABLE SIZING DESIGN AND PHYSICAL INDEPENDENCE OF ELECTRICAL SYSTEMS

- EVALUATE CABLE QUALIFICATION FOR FIRE PROTECTION WITH ENVIRONMENTAL QUALIFICATION
- REVIEW CABLE SIZING CALCULATION AND APPLICATION OF CALCULATION TO SEVERAL AFW CABLES
- REVIEW PHYSICAL INDEPENDENCE CRITERIA APPLICATION TO CABLE ROUTING PROCESS



SUMMARY
ELECTRICAL REVIEW TOPICS
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(Continued)

TOPIC 1.17-1 PROTECTIVE DEVICES/SETTINGS

REVIEW APPLICATION OF PROTECTIVE DEVICES/FEATURES TO MOTORS AND ELECTRICAL PENETRATION ASSEMBLIES. ALSO REVIEW PROTECTIVE DEVICE BYPASS DESIGN

- REVIEW AFW PUMP MOTOR PROTECTIVE RELAY FEATURES AND SETTINGS
- REVIEW DC POWER AND INSTRUMENT PENETRATION ASSEMBLIES AND RELATED CIRCUITS TO VERIFY PROTECTIVE DESIGN FEATURES
- VERIFY THERMAL OVERLOAD AND TORQUE SWITCH BYPASS FEATURES FOR ALL MOTOR OPERATED VALVES

TOPIC 1.18-1 INSTRUMENTATION

REVIEW ADEQUACY TO MONITOR OR ALARM SYSTEM STATUS AND PERFORMANCE

- REVIEW ACCURACY OF S/G WATER LEVEL MEASUREMENT SYSTEM UNDER APPLICABLE DESIGN ENVIRONMENTS
- CHECK MONITORING AND ALARM OF PROCESS VARIABLES AGAINST DESIGN CRITERIA
- CHECK SELECTED INSTRUMENT RANGES AGAINST EXPECTED VALUES OF PROCESS VARIABLES



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ELECTRICAL REVIEW TOPICS
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TOPIC I.18-1 (CONTINUED)

- REVIEW AFWAS LOW S/G WATER LEVEL SETPOINT CALCULATION

TOPIC I.19-1 CONTROL SYSTEMS

REVIEW ADEQUACY TO CONTROL IN ACCORDANCE WITH DESIGN CRITERIA

- REVIEW S/G LEVEL CONTROL SYSTEM DESIGN ADEQUACY FROM DESIGN INPUT, ANALYSES AND CIRCUITRY
- REVIEW SUCTION AUTO SWITCHOVER, FOGG, MOTOR OPERATED VALVES AND PUMP MOTOR CONTROL

TOPIC I.20-1 ACTUATION

REVIEW OF AFWAS AND FOGG CAPABILITY TO ACTUATE AFW COMPONENTS

- REVIEW AFWAS AND FOGG SPECIFICATION AGAINST DESIGN INPUT/CRITERIA
- REVIEW MOTOR OPERATED AND LEVEL CONTROL VALVES, PUMP MOTOR AND TURBINE LOGIC DIAGRAMS AND SCHEMATICS



SUMMARY
CIVIL/STRUCTURAL REVIEW TOPICS
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TOPIC II.2-1 SEISMIC DESIGN - PRESSURE BOUNDARY

- A CHECK OF THE PIPING STRESS ANALYSIS FOR A SELECTED PORTION OF THE AFW.
- AN INDEPENDENT CONFIRMATORY PIPING STRESS ANALYSIS OF A PORTION OF THE AFW UTILIZING AS-BUILT CONFIGURATION.
- A REVIEW OF ASSOCIATED ISOMETRIC DRAWINGS.
- A REVIEW OF ASSOCIATED SPECIFICATIONS INCLUDING PIPING FABRICATION AND INSTALLATION.

TOPIC II.3-1 SEISMIC DESIGN - PIPE/EQUIPMENT SUPPORTS

- A CHECK OF THE CALCULATIONS OF EACH TYPE OF PIPE SUPPORT ASSOCIATED WITH THE SELECTED PORTIONS OF THE AFW SYSTEM.
- AN INDEPENDENT CONFIRMATORY LOAD CALCULATION FOR ALL SUPPORTS WITHIN SELECTED PORTION OF AFW CHECKED FOR PIPING STRESS
- AN INDEPENDENT CONFIRMATORY STRESS ANALYSIS OF EACH TYPE OF PIPE SUPPORT ASSOCIATED WITH SELECTED PORTIONS OF THE AFW SYSTEM.



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CIVIL/STRUCTURAL REVIEW TOPICS
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- A REVIEW OF ASSOCIATED PIPE SUPPORT DRAWINGS AND SPECIFICATIONS INCLUDING FABRICATION AND INSTALLATION OF PIPE SUPPORTS.

TOPIC II.4-I SEISMIC DESIGN - EQUIPMENT QUALIFICATION

- A REVIEW OF THE BASES AND ASSOCIATED SPECIFICATIONS FOR SEISMIC QUALIFICATION FOR SEVENTEEN REPRESENTATIVE AFW COMPONENTS.

TOPIC III.1-I SEISMIC DESIGN/INPUT TO EQUIPMENT

- AN OVERALL REVIEW OF THE SEISMIC ANALYSIS OF THE AUXILIARY BUILDING INCLUDING:
 - REVIEW OF THREE DIMENSIONAL LUMPED MASS SPRING MODEL
 - CHECK OF SPECIFIC LUMPED MASS AND SPRING ELEMENTS
 - REVIEW OF OUTPUT MODE SHAPES AND FREQUENCIES
 - REVIEW OF TIME HISTORY ANALYSIS
 - CHECK OF SPECIFIC FLOOR RESPONSE SPECTRA, INCLUDING SPECTRA BROADENING



SUMMARY
CIVIL/STRUCTURAL REVIEW TOPICS
AFW SYSTEM
MIDLAND IDCV PROGRAM
(Continued)

- CHECK OF PROPER INPUT TO EQUIPMENT SPECIFICATIONS FOR COMPONENTS REVIEWED FOR SEISMIC QUALIFICATION

TOPICS III.2-1 THROUGH III.4-1 WIND AND TORNADO MISSILE/FLOOD PROTECTION/HELBA LOADS

- REVIEW BASIS FOR WIND AND TORNADO WIND LOADS, TORNADO DEPRESSURIZATION AND MISSILES, FLOOD PROTECTION FROM INTERNAL AND EXTERNAL SOURCES AND HIGH ENERGY LINE BREAK ANALYSIS LOADINGS.

TOPIC III.6-1 FOUNDATIONS

- A CHECK OF THE CALCULATIONS FOR THE AUXILIARY BUILDING BASE MAT AT ELEVATION 568'-0" INCLUDING A REVIEW OF THE THREE DIMENSIONAL FINITE ELEMENT MODEL.

TOPIC III.7-1 CONCRETE/STEEL DESIGN

- A CHECK OF THE CALCULATIONS FOR SELECTED MAJOR STRUCTURAL COMPONENTS OF THE AUXILIARY BUILDING INCLUDING:
 - FLOOR SLAB AT ELEVATION 614'-0" AND 659'-0"
 - WALL AT LINE C AND LINE 5.6



SUMMARY
CIVIL/STRUCTURAL REVIEW TOPICS
AFW SYSTEM
MIDLAND IDCV PROGRAM
(Continued)

- A REVIEW OF THE MAJOR CIVIL SPECIFICATIONS INCLUDING REINFORCING STEEL, CONCRETE AND STRUCTURAL STEEL.
- A REVIEW OF THE ASSOCIATED CONCRETE AND STRUCTURAL STEEL DRAWINGS.

TOPIC I.14-1 PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING

- REVIEW OF P&ID'S FOR TESTING CAPABILITY.
- REVIEW OF PRESERVICE AND FIRST 10 YEAR INTERVAL INSPECTION PLAN FOR NDE AND SYSTEM PRESSURE TESTING.
- REVIEW OF PREOPERATIONAL TEST PROCEDURES.
- REVIEW OF PRESERVICE INSPECTION MANUAL.
- REVIEW OF TESTING PROGRAM MANUAL.
- REVIEW OF PUMP AND VALVE INSERVICE TESTING PLAN.
- REVIEW OF CLEANING AND TESTING PROCEDURES



SUMMARY
CIVIL/STRUCTURAL REVIEW TOPICS
AFW SYSTEM
MIDLAND IDCV PROGRAM
(Continued)

TOPIC I.21-I NDE COMMITMENTS

- REVIEW OF PRESERVICE AND FIRST 10 YEAR INTERVAL INSPECTION PLAN FOR NDE AND SYSTEM PRESSURE TESTING.
- REVIEW OF SELECTED WELDING AND NDE SPECIFICATIONS, INSTRUCTIONS AND FIELD PROCEDURES.

TOPIC I.22-I MATERIALS SELECTION

- REVIEW OF THE PROCESS FOR ESTABLISHING THE BASIS FOR SELECTION OF MATERIALS FOR SELECTED STRUCTURAL ELEMENTS, COMPONENTS AND A PORTION OF THE AFWS PIPING SYSTEM.
- INCLUDE REQUIREMENTS RELATED TO STRENGTH, TOUGHNESS, HARDNESS, COMPATIBILITY, ELECTRICAL INSULATION PROPERTIES, PROTECTIVE COATINGS, CORROSION RESISTANCE, FIRE PROTECTION AND OTHER CHEMICAL AND PHYSICAL REQUIREMENTS.



**SUMMARY
ICV REVIEW TOPICS
AFW SYSTEM
MIDLAND IDCV PROGRAM**

TOPICS I.1-1c THRU V.3-1c: CONSTRUCTION VERIFICATION

FOR SELECT GROUPS OF 44 REPRESENTATIVE COMPONENTS,
SUBMATRICES DEVELOPED FOR EACH REVIEW SCOPE:

- SUPPLIER DOCUMENTATION REVIEW AGAINST DESIGN SPECIFICATIONS AND DRAWINGS:
 - GENERAL COMPLETION
 - DRAWINGS
 - FUNCTIONAL REQUIREMENTS/TEST REPORTS
 - ENVIRONMENTAL QUALIFICATION
 - SQRT
 - WELDING, NDE, QA RECORDS
 - MATERIAL PROPERTY REPORTS
 - MISC. (STORAGE & INSTALLATION AND O&M INSTRUCTIONS, COATINGS, ETC.)

- STORAGE AND MAINTENANCE DOCUMENTATION REVIEW
 - RECEIPT INSPECTION
 - STORAGE, INCLUDING IN-STORAGE AND IN-PLACE MAINTENANCE, ADDRESSING TEMPERATURE, HUMIDITY, CLEANLINESS, LUBRICATION, ENERGIZATION, ETC.

(DOCUMENTATION REVIEW AND OBSERVATION OF ACTIVITIES)



**SUMMARY
ICV REVIEW TOPICS
AFW SYSTEM
MIDLAND IDCV PROGRAM**

(Continued)

- CONSTRUCTION/INSTALLATION DOCUMENTATION REVIEW
 - IMPLEMENTATION OF PROPER REQUIREMENTS SUCH AS ERECTION SPECIFICATIONS, INSTALLATION REQUIREMENTS, CONSTRUCTION PROCEDURES, CODES AND STANDARDS, ETC.
 - REVIEW OF DESIGN CHANGES, FIELD MODIFICATIONS, ETC.
 - EVALUATION OF DOCUMENTATION FOR ITEMS SUCH AS CONCRETE, WELDING, BOLTING ACTIVITIES, ETC.
 - OBSERVATION OF ON-GOING CONSTRUCTION ACTIVITIES
- REVIEW OF SELECTED VERIFICATION ACTIVITIES
 - CABLE ROUTING, PIPE SUPPORT, AND BOLTING OVERINSPECTION PROGRAMS, ETC.
 - OBSERVATION OF VARIOUS WALKDOWN ACTIVITIES (E.G., SYSTEM INTERACTION - SEISMIC II/I)
 - COLD HYDROS
 - COMPONENT AND SYSTEM FUNCTIONAL TESTING PROGRAMS
 - CONSTRUCTION COMPLETION PROGRAM



SUMMARY
ICV REVIEW TOPICS
AFW SYSTEM
MIDLAND IDCV PROGRAM

(Continued)

- VERIFICATION OF PHYSICAL CONFIGURATION
 - VISUAL INSPECTION INCLUDING QUALITY OF WORKMANSHIP, IDENTIFICATION, APPROX. SIZE AND LOCATION, ORIENTATION AND MAJOR FEATURES
 - SELECTED DETAILED VERIFICATION INCLUDING NAME PLATE DATA, GROUNDING, MATERIALS, INSULATION, PHYSICAL DIMENSIONS
 - 100% DIMENSIONAL VERIFICATION OF THE PIPING AND HANGERS OF A SELECTED PORTION OF THE AFW SYSTEM

TOPIC VI.I-1c NDE/MATERIALS TESTING PROGRAM

- VISUAL INSPECTION/MEASUREMENT OF SELECTED SHOP AND FIELD WELDING:
 - PIPING
 - PIPE SUPPORTS
 - PENETRATIONS
 - STRUCTURAL STEEL
- MAG. PARTICLE/RADIOGRAPHY OF SELECTED SHOP AND FIELD WELDING, UT AS NECESSARY



**STANDBY ELECTRIC POWER SYSTEM
SAMPLE SELECTION BOUNDARY**

INTERFACING SYSTEM

INTERFACE POINT

Offsite Power	Breaker connecting offsite power to Class IE 4160V bus
Non-Class IE Distribution/Loads	Breaker connecting Non-Class IE Distribution/Load to Class IE bus
Class IE 480 Volt Buses	Breaker connecting 480 volt bus to step-down side of Class IE XFMR from 4160V bus
Class IE AC Distribution to 125 VDC System	Breaker connecting battery charger to AC system
Class IE 125 VDC Distribution	Breakers connecting Non-DG or AFW related loads to 125 VDC bus
120 Vac Preferred Power Distribution	Connecting device of non DG or AFW related loads to 120 Vac preferred distribution
120 Vac Control and Instrument Power	Connecting device or non DG or AFW related load to instrument bus - connecting breaker to MCC feed
Raw Water	Cooling water interface to raw water shown on FSAR Figure 9.5-26
DG Support Systems	DG starting system, lubrication and fuel oil
Structures	DG building and foundations



**INITIAL SAMPLE REVIEW MATRIX FOR THE STANDBY ELECTRIC POWER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM**

DESIGN AREA	SCOPE OF REVIEW				
	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
I. STANDBY ELECTRIC POWER SYSTEM PERFORMANCE REQUIREMENTS					
SYSTEM OPERATING LIMITS - DG	X	X	X		
ACCIDENT ANALYSIS CONSIDERATIONS - DG, AC, DC	X	X			
SINGLE FAILURE - DG, PDS, AC, DC	X	X	X	X	
TECHNICAL SPECIFICATIONS - DG, DC	X	X			
LOCAL OPERATION - DG	X				
SYSTEM INTERLOCKS - DG	X	X			
COMPONENT FUNCTIONAL REQUIREMENTS - DG, PDS, AC, DC	X	X	X		X
COOLING/HEATING REQUIREMENTS - DG	X	X	X		
PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING - DG	X	X	X		X
ELECTRICAL CHARACTERISTICS - DG, PDS, AC, DC	X	X	X		X
PROTECTIVE DEVICES/SETTINGS - DG, PDS	X	X	X		
INSTRUMENTATION - DG, AC, DC	X	X	X		X
CONTROL SYSTEMS - DG	X	X	X		X
ACTUATION SYSTEMS - DG	X	X	X		X
FAILURE MODES AND EFFECTS - DG, PDS, AC, DC	X	X	X		
ELECTRICAL LOAD CAPACITY - DG, PDS, AC, DC	X	X	X	X	
ELECTRICAL LOADS SEQUENCING - DG, PDS	X	X	X		X
ELECTRICAL LOAD SHEDDING - DG, PDS	X	X	X		
FUEL OIL SYSTEM - DG	X	X			
LUBE OIL SYSTEM - DG	X	X			
STARTING MECHANISM AND AIR SUPPLY SYSTEM - DG	X	X	X		X
COMBUSTION AIR SUPPLY - DG	X	X	X		
INDEPENDENCE - DG, PDS, AC, DC	X	X	X		
CABLE SIZING/ROUTING/SEPARATION - PDS	X	X	X	X	X

KEY

- DG - DIESEL GENERATOR
- DGB - DIESEL GENERATOR BUILDING
- PDS - POWER DISTRIBUTION SYSTEM
- AC - PREFERRED 120V AC POWER SYSTEM SERVICING AFW SYSTEM
- DC - 125V DC POWER SYSTEM SERVICING AFW SYSTEM

**INITIAL SAMPLE REVIEW MATRIX FOR THE STANDBY ELECTRIC POWER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM (CONTINUED)**

DESIGN AREA	SCOPE OF REVIEW				
	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
II. STANDBY ELECTRIC POWER SYSTEM PROTECTION FEATURES					
SEISMIC DESIGN	X				
● PRESSURE BOUNDARY - DG	X	X	X		
● PIPE/EQUIPMENT SUPPORT - DG, PDS	X	X	X	X	X
● EQUIPMENT QUALIFICATION - DG, PDS	X	X	X		X
HIGH ENERGY LINE BREAK ACCIDENTS	X				
● PIPE WHIP - PDS, AC, DC	X				
● JET IMPINGEMENT - PDS, AC, DC	X				
ENVIRONMENTAL PROTECTION	X				
● ENVIRONMENTAL ENVELOPES - DG, PDS	X				
● EQUIPMENT QUALIFICATION - DG, PDS	X	X	X		X
● HVAC DESIGN - DG	X				
FIRE PROTECTION - DG	X	X	X		
MISSILE PROTECTION - DG	X				
SYSTEMS INTERACTION - DG, PDS, AC, DC	X	X			
III. STRUCTURES THAT HOUSE THE STANDBY ELECTRIC POWER SYSTEM					
SEISMIC DESIGN/INPUT TO EQUIPMENT - DGB	X	X	X		X
WIND & TORNADO DESIGN/MISSILE PROTECTION - DGB	X	X	X		X
FLOOD PROTECTION - DGB	X	X	X		
HELBA LOADS - DGB	X				
CIVIL/STRUCTURAL DESIGN CONSIDERATIONS					
● FOUNDATIONS - DGB	X	X	X		
● CONCRETE/STEEL DESIGN - DGB	X	X	X		X
● TANKS	X	X	X	X	X

KEY

- DG - DIESEL GENERATOR
- DGB - DIESEL GENERATOR BUILDING
- PDS - POWER DISTRIBUTION SYSTEM
- AC - PREFERRED 120V AC POWER SYSTEM SERVICING AFW SYSTEM
- DC - 125V DC POWER SYSTEM SERVICING AFW SYSTEM

INITIAL SAMPLE REVIEW MATRIX FOR THE STANLEY ELECTRIC POWER SYSTEM
MIDLAND INDEPENDENT CONSTRUCTION VERIFICATION PROGRAM

SYSTEM/COMPONENT	SCOPE OF REVIEW				
	REVIEW OF SUPPLIER DOCUMENTATION	REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION	REVIEW OF CONSTRUCTION/INSTALLATION DOCUMENTATION	REVIEW OF SELECTED VERIFICATION ACTIVITIES	VERIFICATION OF PHYSICAL CONFIGURATION
I. MECHANICAL					
● EQUIPMENT - DG	X	X	X	X	X
● PIPING - DG	X		X		X
● PIPE SUPPORTS - DG	X		X		X
II. ELECTRICAL					
● EQUIPMENT - DG, PDS, AC, DC	X	X	X	X	X
● TRAYS AND SUPPORTS - PDS	X		X	X	X
● CONDUIT AND SUPPORTS - PDS	X		X	X	X
● CABLE - PDS	X	X	X	X	X
III. INSTRUMENTATION AND CONTROL					
● INSTRUMENTS - DG	X	X	X	X	X
● PIPING/TUBING - DG	X		X		X
● CABLE - DG, PDS	X	X	X	X	X
IV. HVAC					
● EQUIPMENT - DG	X				X
● DUCTS AND SUPPORTS - DG	X				X
V. STRUCTURAL					
● FOUNDATIONS - DG	X		X		
● CONCRETE - DG	X		X		
● STRUCTURAL STEEL - DG	X		X		

KEY

- DG - DIESEL GENERATOR
- DGB - DIESEL GENERATOR BUILDING
- PDS - POWER DISTRIBUTION SYSTEM
- AC - PREFERRED 120V AC POWER SYSTEM
SERVICING AFW SYSTEM
- DC - 125V DC POWER SYSTEM SERVICING
AFW SYSTEM

SUMMARY
ELECTRICAL REVIEW TOPICS
STANDBY ELECTRIC POWER SYSTEM
MIDLAND IDCV PROGRAM

FAILURE MODES AND EFFECTS ANALYSIS

IDENTIFY FAILURE MODES OF D/G, PDS, AC, DC SYSTEM COMPONENTS, DETERMINE EFFECTS ON STANDBY POWER AND AFW SYSTEMS; IDENTIFY METHOD OF FAILURE DETECTION.

ELECTRICAL LOAD CAPACITY

REVIEW PLANT DRAWINGS AND SELECTED DG, PDS, AC, DC ELECTRICAL LOAD CALCULATIONS TO VERIFY LOAD CALCULATION METHODOLOGY AND D/G EXPECTED ELECTRICAL LOAD. REVIEW BOTH CONTINUOUS LOAD AND LOAD VERSUS TIME CALCULATIONS FOR D/G. CHECK AGAINST PRESERVICE TEST RESULTS - VERIFY D/G RATING.

ELECTRICAL LOAD SEQUENCING

REVIEW D/G, PDS LOAD SEQUENCER FOR DESIGN COMPLIANCE WITH IEEE 279 AND 308. (CLASS IE DESIGN CRITERIA). VERIFY SEQUENCER LOAD CONTROL VERSUS TIME FOR INPUT INTO LOAD CAPACITY REVIEW.

ELECTRICAL LOAD SHEDDING

REVIEW 4.16 KV AND 6.9 KV BUS LOAD SHEDDING LOGIC DESIGN, ACTUATION INPUTS, OUTPUTS, AND INTERLOCKS/PERMISSIVES ASSOCIATED WITH LOAD SEQUENCING.



SUMMARY
ELECTRICAL REVIEW TOPICS
STANDBY ELECTRIC POWER SYSTEM
MIDLAND IDC V PROGRAM

INDEPENDENCE

THE ELECTRICAL INDEPENDENCE OF REDUNDANT D/G, PDS, AC AND DC SYSTEMS WILL BE CHECKED BY REVIEWING THE LOAD GROUP INDEPENDENCE CRITERIA, PLANT SINGLE LINE DRAWINGS AND SELECTED LOAD GROUP CABLE DESIGNATIONS.

CABLE SIZING/ROUTING/SEPARATION

THE CABLE SIZING CALCULATION APPLICABLE TO 4160V CABLE WILL BE REVIEWED. SELECTED CABLE SIZES WILL BE CHECKED BY CALCULATION AND THE APPLICABLE CIRCUIT SCHEDULE. THE DESIGN PROCESS FOR ROUTING 4160V CABLE WILL BE REVIEWED TO VERIFY COMPLIANCE WITH REQUIREMENTS.



SUMMARY
MECHANICAL REVIEW TOPICS
STANDBY ELECTRICAL POWER SYSTEM
MIDLAND IDCV

FUEL OIL SYSTEM

FUEL OIL STORAGE AND TRANSFER SYSTEM TO PROVIDE SEPARATE AND INDEPENDENT SUPPLY TO EACH DIESEL GENERATOR FOR 7 DAYS AT ESF LOAD.

- o CHECK OF DESIGN CALCULATIONS AND EVALUATIONS

 - PUMP PERFORMANCE
 - NPSH
 - DELIVERY PRESSURE
 - FLOW RATE
 - FUEL CONSUMPTION AND TANK CAPACITY
 - SYSTEM CONTROL LOGIC INCLUDING MANUAL ACTION
 - FLOODING CONSIDERATIONS FOR BURIED TANK AND ATTACHMENTS
 - PIPING DESIGN
 - SEISMIC
 - VIBRATION FROM DIESEL GENERATOR
 - ALLOWABLE DIESEL ENGINE INTERFACE LOADS
 - UNIQUE FIRE PROTECTION CONSIDERATIONS



SUMMARY
MECHANICAL REVIEW TOPICS
STANDBY ELECTRIC POWER SYSTEM
MIDLAND IDCV

(Continued)

STARTING SYSTEM

PRESSURIZED AIR SUPPLY AND DISTRIBUTION SYSTEM TO PROVIDE INDEPENDENT AND REDUNDANT CAPABILITY TO START EACH DIESEL ENGINE WITH TIMED AIR INJECTION TO EACH CYLINDER.

- o CHECK OF DESIGN CALCULATIONS AND EVALUATIONS
 - VENDOR PERFORMANCE SPECIFICATION FOR STARTING AIR
 - PNEUMATIC DESIGN AND COMPRESSOR SIZING
 - CONTROL LOGIC FOR AIR DISTRIBUTION TO CYLINDERS
 - MOISTURE ENTRAINMENT
 - CLOGGING OF AIR FILTERS
 - PREVENTIVE MEASURES
 - DETECTION
 - IMPACT ON PNEUMATIC DESIGN
- o REVIEW ELECTRIC AUTOMATIC START PROVISIONS INCLUDING DC POWER SUPPLIES AND FIELD FLASHING



SUMMARY
MECHANICAL REVIEW TOPICS
STANDBY ELECTRIC POWER SYSTEM
MIDLAND IDCV

(Continued)

COMBUSTION INTAKE AND EXHAUST SYSTEM

COMBUSTION AIR SUPPLY AND ENGINE EXHAUST DISCHARGE SYSTEM
CONSISTING OF AIR INTAKES, FILTERS, TURBOCHARGERS, SILENCERS,
AND EXHAUST STACK.

- o CHECK OF DESIGN CALCULATIONS AND EVALUATION
 - TORNADO MISSILE AND DEBRIS CONSIDERATIONS
 - SEISMIC DESIGN OF STACK AND INTAKE
 - EXHAUST BACK PRESSURE
 - INTAKE FLOW RATE
 - EXHAUST RECYCLE/METEOROLOGICAL EFFECTS
 - OFFSITE GAS RELEASE
 - OXYGEN SUPPLY
 - COMBUSTIBLE INTAKE



SUMMARY
CIVIL/STRUCTURAL REVIEW TOPICS
STANDBY ELECTRIC POWER SYSTEM
MIDLAND IDCV PROGRAM

CIVIL/STRUCTURAL DESIGN CONSIDERATIONS - TANKS

A REVIEW OF THE CALCULATIONS OF THE UNDERGROUND EMERGENCY DIESEL OIL STORAGE TANK AND FOUNDATION.

AN INDEPENDENT CONFIRMATORY ANALYSIS OF THE DIESEL OIL DAY TANK AND SUPPORT SYSTEM.

A REVIEW OF APPLICABLE DRAWINGS AND SPECIFICATIONS.



CONTROL ROOM HVAC SAMPLE
SELECTION BOUNDARY

INTERFACING SYSTEM

INTERFACE POINT

AC/DC Power System 1/

Breaker or fuse interfacing HVAC components with Class IE source

Plant HVAC

Mechanical components 2/ in Control Room Area Ventilation System (CRAVS)

HVAC Switchgear, battery and Spreading Room

Portions Integral with CRAVS included

ESFAS

Control Room Isolation System (CRIS)

Accident Monitoring Inst.

Portions essential for Control Room Habitability

Plant I&C 1/

Portions essential for isolation of Control Room and operation of CRAVS

Control Room Structure

Portions required for pressure boundary including penetration and doors

1/ Portions dedicated to Control Room HVAC are within sample selection boundaries.

2/ Includes supports, equipment and ducting.



INITIAL SAMPLE REVIEW MATRIX FOR THE CONTROL ROOM HVAC SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM

DESIGN AREA	SCOPE OF REVIEW				
	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
<u>I. CONTROL ROOM HVAC SYSTEM PERFORMANCE REQUIREMENTS</u>					
SYSTEM OPERATING LIMITS	X	X	X		
ACCIDENT ANALYSIS CONSIDERATIONS	X	X			
SINGLE FAILURE	X	X	X		
TECHNICAL SPECIFICATIONS	X	X			
SYSTEM ALIGNMENT/SWITCHOVER	X	X			
SYSTEM ISOLATION/INTERLOCKS	X	X	X		X
COMPONENT FUNCTIONAL REQUIREMENTS	X	X	X		X
SYSTEM PNEUMATIC DESIGN	X	X	X	X	X
COOLING/HEATING REQUIREMENTS	X	X	X		
PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING	X	X			
POWER SUPPLIES	X	X			
INSTRUMENTATION/DETECTION	X	X	X		X
CONTROL SYSTEMS	X	X			X
ACTUATION SYSTEMS	X	X	X		X
NDE COMMITMENTS	X	X	X		
MATERIALS SELECTION	X	X	X		X
FAILURE MODES AND EFFECTS	X	X	X		
FILTRATION	X	X	X		X
PRESSURIZATION	X	X	X		X
VENTILATION	X	X	X	X	X

INITIAL SAMPLE REVIEW MATRIX FOR THE CONTROL ROOM HVAC SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM (CONTINUED)

DESIGN AREA	SCOPE OF REVIEW				
	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
II. <u>CONTROL ROOM HVAC SYSTEM PROTECTION FEATURES</u>					
SEISMIC DESIGN	X				
● PRESSURE BOUNDARY	X	X	X		
● DUCT/PIPE/EQUIPMENT SUPPORT	X	X	X		X
● EQUIPMENT QUALIFICATION	X	X	X		X
HIGH ENERGY LINE BREAK ACCIDENTS	X				
● PIPE WHIP	X				
● JET IMPINGEMENT	X				
ENVIRONMENTAL PROTECTION	X				
● ENVIRONMENTAL ENVELOPES	X	X	X	X	X
● EQUIPMENT QUALIFICATION	X	X	X		X
FIRE PROTECTION	X	X			
MISSILE PROTECTION	X				
SYSTEMS INTERACTIONS	X				
III. <u>STRUCTURES THAT HOUSE THE CONTROL ROOM HVAC SYSTEM</u>					
SEISMIC DESIGN/INPUT TO EQUIPMENT	X	X	X		
CIVIL/STRUCTURAL DESIGN CONSIDERATIONS	X				
● CONCRETE/STEEL DESIGN	X	X			
● LEAK TIGHTNESS	X	X	X		

**INITIAL SAMPLE REVIEW MATRIX FOR THE CONTROL ROOM HVAC SYSTEM
MIDLAND INDEPENDENT CONSTRUCTION VERIFICATION PROGRAM**

SYSTEM/COMPONENT	SCOPE OF REVIEW				
	REVIEW OF SUPPLIER DOCUMENTATION	REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION	REVIEW OF CONSTRUCTION/INSTALLATION DOCUMENTATION	REVIEW OF SELECTED VERIFICATION ACTIVITIES	VERIFICATION OF PHYSICAL CONFIGURATION
I. MECHANICAL					
● EQUIPMENT	X	X	X	X	X
● PIPING	X		X		X
● PIPE SUPPORTS	X		X		X
II. ELECTRICAL					
● EQUIPMENT	X		X	X	X
● TRAYS AND SUPPORTS	X		X		X
● CONDUIT AND SUPPORTS	X		X		X
● CABLE	X		X		X
III. INSTRUMENTATION AND CONTROL					
● INSTRUMENTS/DETECTORS	X	X	X	X	X
● PIPING/TUBING	X		X		X
● CABLE	X		X		X
IV. HVAC					
● DUCTS AND SUPPORTS	X	X	X		X
V. STRUCTURAL					
● CONCRETE	X		X		X
● STRUCTURAL STEEL	X		X		X
VI. NDE/MATERIALS TESTING PROGRAM					X

SUMMARY
MECHANICAL REVIEW TOPICS
CONTROL ROOM HVAC SYSTEM
MIDLAND IDCV PROGRAM

DUCT AIR FLOW

REVIEW OF SYSTEM PRESSURE DROP AND FLOW FOR SAFETY RELATED SYSTEM ALIGNMENT.

- DETERMINE FLOW PATHS FOR SAFETY RELATED OPERATING MODES.
- CHECK DUCT SIZING CALCULATIONS AND PRESSURE DROP THROUGH DAMPERS, VALVES, FILTERS ETC.
- PERFORM CONFIRMATORY CALCULATION FOR CRITICAL ALIGNMENT.

FILTRATION

REVIEW TECHNICAL SPECIFICATIONS AND RELATED DOCUMENTS USED TO PROCURE ALL HEPA FILTERS, AND REVIEW DESIGN.

- CHECK SPECIFICATION OF CRITICAL PARAMETERS.
 - PARTICULATE FILTERING EFFICIENCY
 - TOXIC GAS ADSORPTION
 - PRESSURE DROP



SUMMARY
MECHANICAL REVIEW TOPICS
CONTROL ROOM HVAC SYSTEM
MIDLAND IDCV PROGRAM
(Continued)

- REVIEW CALCULATIONS FOR AIRBORNE DOSE RATE AFTER ACCIDENT.
- CHECK FILTER PRESSURE DROP AGREEMENT WITH FLOW CALCULATIONS.

PRESSURIZATION

REVIEW CALCULATIONS FOR PRESSURE DIFFERENTIAL DRIVING INFILTRATION OR EXFILTRATION UNDER POST-ACCIDENT AND OFFSITE HAZARDOUS GASEOUS RELEASE MODES.

- REVIEW QUANTITATIVE BASIS FOR LEAKAGE PATH.
- USE SYSTEM FLOW CHARACTERISTICS AND FAN CURVE PERFORMANCE TO CHECK GLOBAL PRESSURE DIFFERENTIAL.
- REVIEW LOCAL PRESSURE DIFFERENCES DUE TO EXTERNAL WIND OR LOCAL INTERNAL SUBCOMPARTMENT EFFECTS.
- CHECK METEOROLOGICAL ASSUMPTIONS.



SUMMARY
MECHANICAL REVIEW TOPICS
CONTROL ROOM HVAC SYSTEM
MIDLAND IDCV PROGRAM
(Continued)

VENTILATION

CHECK DESIGN FOR ADEQUATE TEMPERATURE CONTROL AND OXYGEN SUPPLY, AND CONTROL OF ACCIDENT AIRBORNE RADIATION CONCENTRATIONS OR TOXIC LEVELS OF HAZARDOUS GASEOUS CONSTITUENTS.

- CHECK EQUILIBRIUM TEMPERATURE FOR ISOLATED MODE.
- CHECK OXYGEN CONTENT AND OTHER AIR CONSTITUENTS AT END OF ISOLATION PERIOD.
- REVIEW EXTERNAL AIRBORNE RADIATION LEVELS AT INTAKE.
- REVIEW TOXIC GASEOUS COMPONENT CONCENTRATIONS.
- PERFORM CONFIRMATORY CALCULATION OF HABITABILITY DURING ONE CRITICAL MODE.



SUMMARY
ELECTRICAL REVIEW TOPICS
CONTROL ROOM HVAC
MIDLAND IDCV PROGRAM

HVAC INSTRUMENTATION

REVIEW INSTRUMENTATION ADEQUACY FOR MONITORING STATUS OF CONTROL ROOM VENTILATION SYSTEM. REVIEW DESIGN CRITERIA, DRAWINGS, AND SPECIFICATIONS FOR MAKE-UP AIR RADIATION AND TOXIC GAS DETECTORS. INCLUDE REVIEW OF BASIS FOR SELECTED TOXIC GAS CONCENTRATION LIMITS AND SETPOINTS IN HAZARDOUS GAS MONITORING SYSTEM (HGMS). VENDOR DATA FOR HGMS WILL BE REVIEWED FOR COMPLIANCE WITH SPECIFICATIONS.



SUMMARY
CIVIL/STRUCTURAL REVIEW TOPICS
CONTROL ROOM HVAC SYSTEM
MIDLAND IDCV PROGRAM

STRUCTURES - LEAKTIGHTNESS

A REVIEW OF COMPONENT SPECIFICATIONS TO ENSURE
LEAKTIGHTNESS OF THE CONTROL ROOM.



Attendance
April 13, 1983

<u>Name</u>	<u>Organization</u>
Paul H. Ford	LC# / NRR / DL
DICK VOLMER	NRC / DE
T. M. NOUAK	NRR / DL
BOB BOSNAK	NRR / DE / MEB
Douglas M. Witt	TERA
Lionel D. Bates	TERA
Gil Keeley	Consumers
FRED BUCKMAN	CONSUMERS
LOUIS GIBSON	CONSUMERS
FRANK RINALDI	NRR / DE / SGER
MOE Messien	NRA / DE / SAB
Jim Stone	NRC / IE
H. L. BRAMMER	NRC / DE / MEB
Arnold Lee	NRC / DE / EQB
John TSAD	NRC / DST / RRAB
DAVID RUBINSTEIN	NRC / DST / RRAB
GOUTAM BAGCHI	NRC / DE / ERB
Don K. DAVIS	TERA
E. G. ADENSAM	NRC / DC / LB #4
HOWARD LEVIN	TERA
JOHN BEZIL	TERA
CURT STALEY	TERA
FRANK A. DOUGHERTY	TERA
TED SULLIVAN	NRC / DE
HORACE SHAW	NRC / DE / MEB
PAUL KESHISHIAN	NRC / IE /
J. Harrison	NRC / IE / RIII
R. F. Warnick	NRC - RIII
W. T. Le Fave	NRC - ASB / DSI



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

APR 8 1983

Docket Nos. 50-329, OM, OL
50-330 OM, OL

PRINCIPAL STAFF	
✓	5/4/12
✓	
✓	

AS

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: RECORD OF TELEPHONE DISCUSSION REGARDING PROPOSED
APRIL 13, 1983 MEETING AND OPEN ITEMS REPORTING

On April 7, 1983, I called H. Levin, TERA Corporation, regarding the independent design and construction verification (IDCV) program for Midland Plant, Units 1 and 2. The purpose was to establish the agenda for the forthcoming meeting on April 13, 1983. TERA will describe the present status of their planning for the IDCV Program with respect to the second (On-site emergency power) and third (HVAC for Control Room) systems. The first IDCV system (Auxiliary Feedwater) will be reviewed briefly, followed by questions and comments.

I related to Mr. Levin the third paragraph from the enclosed letter of March 25, 1983 from Ms. B. Garde. I asked if any reporting of open, confirmed or resolved (OCR) items has been given to Consumers Power Company and not to NRC, as implied by Ms. Garde. Mr. Levin replied that no OCR item reporting has occurred to date to either party, and that TERA is operating in accordance with the Protocol enclosed with J. Keppler's 3/28/83 letter to Consumers Power Company, the external service list from Ms. Adensam's letter of March 24, 1983, and Section 5.0 of the TERA IDCV Engineering Program Plan. Mr. Levin would like to discuss reporting further at the April 13, 1983 meeting.

E. Adensam

JH Darl Hood, Project Manager
Licensing Branch #4
Division of Licensing

Enclosure:
Ltr. from Billie Garde
to Darl Hood dtd 3/25/83

430415001

APR 15 1983

NRR Service List for Midland Independent Design
and Construction Verification Program

9080

Mr. Howard Levin, Project Manager
TERA Corporation
7101 Wisconsin Avenue
Bethesda, Maryland 20814

cc: James G. Keppler, Regional Administrator
U.S. Nuclear Regulatory Commission,
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

U.S. Nuclear Regulatory Commission
Resident Inspectors Office
Route 7
Midland, Michigan 48640

Mr. J. W. Cook
Vice President
Consumers Power Company
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Jackson, Michigan 49201

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Chicago, Illinois 60602

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Consumers Power Company
212 West Michigan Avenue
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Ms. Mary Sinclair
5711 Summerset Drive
Midland, Michigan 48640

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Lee L. Bishop
Harmon & Weiss
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Mr. Wendell Marshall
Route 10
Midland, Michigan 48640

Mr. Steve Gadler
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St. Paul, Minnesota 55108

Billie Pirner Garde
Director, Citizens Clinic
Government Accountability Project
Institute for Policy Studies
1901 Que Street, N.W.
Washington, D. C. 20009

Charles Bechhoefer, Esq.
Atomic Safety & Licensing Board
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Washington, D. C. 20555

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6125 N. Verde Trail
Boca Raton, Florida 33433

Jerry Harbour, Esq.
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Ron Callen
Michigan Public Service Commission
6545 Mercantile Way
P.O. Box 30221
Lansing, Michigan 48909

Mr. Paul Rau
Midland Daily News
124 McDonald Street
Midland, Michigan 48640

Ms. Lynne Bernabei
Government Accountability Project
1901 Q Street, N.W.
Washington, D. C. 20009

Mr. J. G. Keppler
Mr. D. G. Eisenhut

2

March 30, 1982

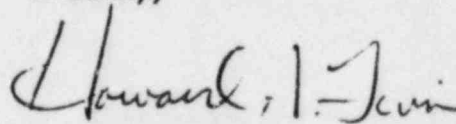
In the process of securing an affidavit from Mr. David Hamel, we have determined that he briefly (approximately a man week) provided consultation services on the Midland project in the area of equipment qualification while employed by Nutech. Mr. Hamel had recently been identified as a potential project participant and has not made any contribution to date. We have no near term plans of using Mr. Hamel; however, if this should change we will resolve the issue and provide you with his affidavit and a complete description of his past activities. Under no circumstances will Mr. Hamel participate in either the IDCV or CCP Overview projects in the equipment qualification area.

On March 24, 1983, Darl Hood, NRC Midland Project Manager, contacted me to request clarification relative to individuals who included additional information on mutual or other funds as an attachment to their individual affidavits. Mr. Hood desired an accounting of which individuals had included these attachments, to assure that in the process of reproduction, attachments had not become separated. This accounting is included as Attachment 4.

Mr. Hood contacted me again on March 30, 1982 to request further clarification relative to individuals who were previously employed by the Nuclear Regulatory Commission. He requested that these individuals submit an affidavit addressing their past involvement with the Midland project while on the NRC staff. Specifically, he was interested in determining whether anyone had provided a safety evaluation on aspects of Consumer Power Company's CP or OL applications which are within the scope of the Midland IDCV program. These affidavits are provided as Attachment 5.

We believe that the information transmitted under this cover completes our submittal on this topic. Should project needs require the assignment of additional personnel or the services of a subcontracted organization, we will obtain the necessary affidavits from these individuals or firms and transmit them to the NRC. Please contact me should you require clarification or further information.

Sincerely,



Howard A. Levin
Project Manager
Midland Independent Design and
Construction Verification Program

cc: J. Cook, CPC
G. Keeley, CPC
D. Hood, NRC

Enclosures
HAL/djb



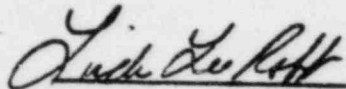
TERA CORPORATION

Mr. J. G. Keppler
Mr. D. G. Eisenhut

3

March 30, 1982

Sworn and Subscribed Before Me This 31ST Day of March 1983


Notary Public

My Commission Expires My Commission Expires July 1, 1986



TERA CORPORATION



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

March 28, 1983

Docket Nos: 50-329 OM, OL
 and 50-330 OM, OL

SEARCHED	
SERIALIZED	
INDEXED	
FILED	
APR 1 1983	
FBI - MEMPHIS	
FILED	FILED

APPLICANT: Consumers Power Company
 FACILITY: Midland Plant, Units 1 and 2
 SUBJECT: RECORD OF TELEPHONE DISCUSSION REGARDING
 INDEPENDENCE AND QUALIFICATION OF TERA
 PERSONNEL

On March 24, 1983, I called H. Levin, TERA Corporation regarding individual affidavit statements of independence forwarded as Attachment 2 of his letter dated March 18, 1983, as related to the Midland independent design and construction verification (IDCV) program. I noted that when compared with the resumes from Appendix C of the Project Quality Assurance Plan forwarded February 9 and 17, 1983, (1) affidavits from some IDCV reviewers are missing; and (2) resumes are not provided for some of the IDCV reviewers for which affidavits are provided. Mr. Levin replied that further affidavits and resumes are being processed and will be forwarded to the NRC shortly.

I noted that the standard form used for each affidavit states "A list of such funds [mutual funds or other funds not under individual's control] in which I have an interest are attached." Apparently, such attachments are included only if the individual owns such funds. I stated that this procedure does not provide for distinction between an error of omission and an intentional omission. Mr. Levin will, therefore, provide a list giving each name for which no such attachments are intended.

ARL Hood

Darl S. Hood, Project Manager
 Licensing Branch No. 4
 Division of Licensing

cc: See next page

4304050025
200

MAR 31 1983

NRR Service List for Midland Independent Design
and Construction Verification Program

cc: James G. Keppler, Regional Administrator
U.S. Nuclear Regulatory Commission,
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

U.S. Nuclear Regulatory Commission
Resident Inspectors Office
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Midland, Michigan 48640

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Vice President
Consumers Power Company
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Harmon & Weiss
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Mr. Wendell Marshall
Route 10
Midland, Michigan 48640

Mr. Steve Gadler
2120 Carter Avenue
St. Paul, Minnesota 55108

Billie Pirner Garde
Director, Citizens Clinic
for Accountable Government
Government Accountability Project
Institute for Policy Studies
1901 Que Street, N.W.
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Charles Bechhoefer, Esq.
Atomic Safety & Licensing Board
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Dr. Frederick P. Cowan
Apt. B-125
6125 N. Verde Trail
Boca Raton, Florida 33433

Jerry Harbour, Esq.
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Ron Callen
Michigan Public Service Commission
6545 Mercantile Way
P.O. Box 30221
Lansing, Michigan 48909

Mr. Paul Rau
Midland Daily News
124 McDonald Street
Midland, Michigan 48640



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

March 22, 1983

~~2/25/83~~
 (2) file

Docket Nos: 50-329 OM, OL
 and 50-330 OM, OL

PRINCIPAL STAFF		
✓ RA	4/10	ENF
D/RA		SCS
A/RA		PAO
DPRP		SLO
DRMA		RC
DRMSP		
DE		
ML		
OL		FILE

Mr. J. W. Cook
 Vice President
 Consumers Power Company
 1945 West Parnall Road
 Jackson, Michigan 49201

Dear Mr. Cook:

Subject: Selection of Additional System for Midland
 Plant Independent Design and Construction
 Verification Program

Your letter of December 3, 1982, noted that the Independent Design Verification effort to be performed by the TERA Corporation would be based upon the Auxiliary Feedwater System (AFWS) and would also be implemented on another system which the staff would select based on three candidates provided by Consumers Power Company on a risk assessment basis. The three candidate systems identified were (1) the electric power system (diesel generator), (2) the safeguards chilled water system, and (3) the containment isolation system. You further noted that the TERA program would be expanded to include a more in-depth review of construction activities to provide assurance of as-built construction adequacy. Your letter of January 10, 1983, the associated meeting of February 8, 1983, and TERA's Engineering Program Plan transmitted February 9 and 17, 1983, provided further information regarding the expanded program.

The staff has reviewed the three candidate systems for the second system for TERA's Independent Design and Construction Verification Program. We have also reviewed the six selection criteria specified in TERA's Engineering Program Plan, Section 1.3 and have selected the electric power system (diesel generator) for the second system. For both the AFWS and the electric power system (diesel generator), we request that special attention be applied to the program provisions regarding cable sizing, routing, and installation and to program provisions for expansion of scope and reassessment of elements of the review based on TERA's early observations.

The staff is also concerned that the AFWS and electric power system may not provide a sufficient sample of the independent review of heating, ventilating and air conditioning (HVAC) systems commensurate with QA problems and corrective actions. For this reason, we request that the portion of the HVAC system assuring control room habitability also be selected for an independent review.

MAR 25 1983

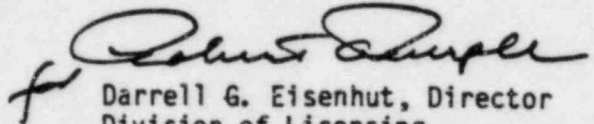
8303290578

Mr. J. W. Cook

- 2 -

We understand that the TERA program documents will be updated to reflect the additional selections and resubmitted for staff review.

Sincerely,

A handwritten signature in cursive script, appearing to read "Darrell G. Eisenhut".

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

cc: John Beck, TERA Corp.
J. Keppler, RIII

MIDLAND

Mr. J. W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

cc: Michael I. Miller, Esq.
Ronald G. Zamarin, Esq.
Alan S. Farnell, Esq.
Isham, Lincoln & Beale
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James E. Brunner, Esq.
Consumers Power Company
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Jackson, Michigan 49201

~~Ms. Mary Sinclair~~
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Stewart H. Freeman
Assistant Attorney General
State of Michigan Environmental
Protection Division
720 Law Building
Lansing, Michigan 48913

Mr. Wendell Marshall
Route 10
Midland, Michigan 48640

Mr. Roger W. Huston
Suite 220
7910 Woodmont Avenue
Bethesda, Maryland 20814

Mr. R. B. Borsum
Nuclear Power Generation Division
Babcock & Wilcox
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Division of Radiological Health
Department of Public Health
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Mr. Walt Apley
c/o Mr. Max Clausen
Battelle Pacific North West Labs (PNWL)
Battelle Blvd.
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Mr. I. Charak, Manager
NRC Assistance Project
Argonne National Laboratory
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Argonne, Illinois 60439

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Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Mr. J. W. Cook

- 2 -

cc: Lee L. Bishop
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Director, Citizens Clinic
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Government Accountability Project
Institute for Policy Studies
1901 Que Street, N.W.
Washington, D. C. 20009

Mr. Howard Levin, Project Manager
TERA Corporation
7101 Wisconsin Avenue
Bethesda, Maryland 20814

Supplemental page to the Midland OM, OL Service List

Mr. J. W. Cook

- 3 -

cc: Commander, Naval Surface Weapons Center
ATTN: P. C. Huang
White Oak
Silver Spring, Maryland 20910

Mr. L. J. Auge, Manager
Facility Design Engineering
Energy Technology Engineering Center
P.O. Box 1449
Canoga Park, California 91304

Mr. Neil Gehring
U.S. Corps of Engineers
NCEED - T
7th Floor
477 Michigan Avenue
Detroit, Michigan 48226

Charles Bechhoefer, Esq.
Atomic Safety & Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

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Boca Raton, Florida 33433

Jerry Harbour, Esq.
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Geotechnical Engineers, Inc.
ATTN: Dr. Steve J. Poulos
1017 Main Street
Winchester, Massachusetts 01890



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

J. Neppeln
CFE

MAR 21 1983

letter only

PRINCIPAL STAFF	
RA	<i>W. E. H. E.</i>
D/RA	<i>G. J. ...</i>
A/RA	PAO
DPRP	SLO
DRMA	RC
DRMSP	
DE.	
ML	
OL	FILE <i>700</i>

3 letters

Docket Nos: 50-329 OM, OL
and 50-330 OM, OL

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: TERA CORPORATION'S PROJECT QUALITY ASSURANCE AND ENGINEERING PROGRAM PLANS FOR THE MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM

Enclosed is a copy of a letter from TERA Corporation dated March 18, 1983, forwarding additional information on their Independent Design and Construction Verification (IDCV) Program for Midland Plant, Units 1 and 2. The additional information covers (1) corporate and individual independence, (2) professional qualifications (3) scope of review, (4) reporting and auditability, and (5) program status.

The letter requests the following actions from the NRC: (1) early selection of the second system, (2) comments and direction regarding reporting and auditability, and (3) a meeting to discuss the procedure for handling interaction with other parties.

Darl S. Hood

Darl S. Hood, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosure:
As stated

cc w/encl:
See next page

4303280012

Attachment received in RIII on 3/21/83

MAR 25 1983

MIDLAND (For TERA Revisions)

cc: Ms. Mary Sinclair
5711 Summerset Drive
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Assistant Attorney General
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Ms. Barbara Stamiris
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Lee L. Bishop
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Government Accountability Project
Institute for Policy Studies
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Charles Bechhoefer, Esq.
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Jerry Harbour, Esq.
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. J. G. Keppler
Mr. D. G. Eisenhut

2

March 18, 1983

TERA proposes that a core of senior level personnel principally involved with the Midland Independent Design and Construction Verification (IDCV) program participate in the Midland CCP Overview for the purpose of maximizing the benefits gained to date within the IDCV relative to the understanding of the complex design and construction evolution and chains, project experience, and technical details of the design and construction efforts. Accordingly, it is proposed that the Midland IDCV project organization, management structure, and procedures be maintained and appropriately modified to meet the CPP Overview project objectives.

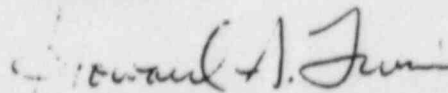
Mr. Martin Jones will be assigned responsibility for direction of site activities. Mr. Jones has previously served as Manager of Construction of the Summer Nuclear Plant for the South Carolina Electric and Gas Company. He is eminently qualified for this assignment with over 22 years of nuclear power plant experience.

The proposed CCP Overview staff has been selected based upon their unique technical, construction, and project management qualifications and experience. Key personnel are listed along with a short description of their areas of expertise, number of years of experience, and highlights of their previous employment (Attachment 3). Resumes have been provided previously to the NRC under separate cover in Appendix C of the Project Quality Assurance Plan, Revision 2, for the Midland IDCV program. (Reference: letters from Mr. Howard A. Levin to Mr. J. G. Keppler and Mr. D. G. Eisenhut dated February 9, 1983 and February 17, 1983.)

TERA Corporation is committed to providing an independent, comprehensive, and integrated assessment of the quality of the Midland plant through the activities currently in progress within the Midland IDCV Program. Consideration of the CCP Overview efforts within the Midland IDCV program will provide overall enhancement in meeting these objectives.

We are prepared to answer any questions that you may have relative to these matters. Please contact me at (301) 654-8960 or Mr. John Beck at (214) 871-1075.

Sincerely,



Howard A. Levin
Project Manager

cc: J. Cook, CPC
G. Keeley, CPC
D. Hood, NRC

Enclosures



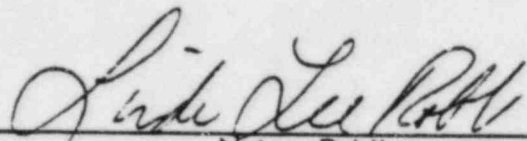
TERA CORPORATION

Mr. J. G. Keppler
Mr. D. G. Eisenhut

3

March 18, 1983

Sworn and Subscribed Before Me This 18th Day of March 1983



Notary Public

My Commission Expires My Commission Expires July 1, 1986

HAL/djb



TERA CORPORATION

ATTACHMENT I

CORPORATE AFFIDAVIT STATEMENT
OF INDEPENDENCE

STATEMENT OF CORPORATE INDEPENDENCE

AFFIDAVIT OF JOHN W. BECK ON BEHALF OF TERA CORPORATION AND ITS SUBSIDIARIES

My name is John W. Beck. I am a Vice President of TERA Corporation. This statement is made on behalf of TERA Corporation and its subsidiaries.

TERA Corporation is under consideration for conducting an Independent Overview of the Construction Completion Program (CCP) at the Midland Nuclear Plant site. I will serve in the capacity of Principal-in-Charge of the team which will conduct the CCP Overview.

The criteria for corporate independence and individual independence of personnel assigned to work on the CCP Overview program are set forth in a letter from Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission (NRC), to the Honorable John D. Dingell, Chairman, Committee on Energy and Commerce, U.S. House of Representatives, dated February 1, 1982.

TERA Corporation has determined that the Corporation and individual members of the CCP Overview team satisfy the following criteria:

1. TERA Corporation and individuals assigned to the Midland CCP Overview program do not have any direct previous involvement with the Midland activities that they will be reviewing.
2. TERA Corporation and individuals assigned to the Midland CCP Overview program have not been previously hired by Consumers Power Company, Bechtel, or Babcock and Wilcox to perform design, construction or quality work relative to the Midland activities that they will be reviewing.
- *3. TERA Corporation and individuals assigned to the Midland CCP Overview program have not been previously employed by Consumers Power Company.
4. The individuals assigned to work on the Midland CCP Overview program do not have present household members employed by Consumers Power Company.
5. The individuals assigned to work on the Midland CCP Overview program do not have any relatives employed by Consumers Power Company.

*With the exception of the Midland Independent Design and Construction Verification Project.

6. TERA Corporation and individuals assigned to work on the Midland CCP Overview program do not own or control significant amounts of Consumers Power Company stock.

TERA Corporation has obtained affidavits for each individual currently assigned to the Midland CCP Overview program team. In the event that additional personnel are assigned to the team, TERA Corporation will obtain affidavits from these individuals as well.

Signed

John W. Bush

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires _____

TERRY GAMBLE, Notary Public
in and for the State of Texas
My Commission Expires 8-17-86

ATTACHMENT 2

**INDIVIDUAL AFFIDAVIT STATEMENTS
OF INDEPENDENCE**

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF John Beck

My name is John Beck. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

John W Beck

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires _____

TERRY GAMBLE, Notary Public
in and for the State of Texas
My Commission Expires 8-17-86

*With the exception of the Midland Independent Design and Construction Verification Project.

Murray Savings Money Market Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF HOWARD A. LEVIN

My name is HOWARD A. LEVIN. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached.* I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

* MERRILL LYNCH CMA
PACE FUND

Howard A. Levin

Sworn and Subscribed Before Me This 17th Day of March 1983

And Lubert
Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Mark Polit

My name is Mark Polit. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

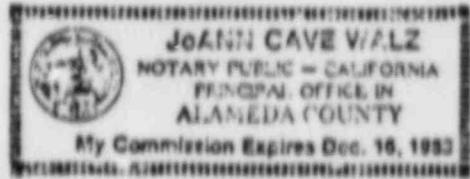
* with the exception of the Midland Independent Design and Construction Verification Program.

Signed

Mark Polit

Sworn and Subscribed Before Me This 17 Day of March 1983

JoAnn Cave Valz
Notary Public
My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Curt Staley

My name is Curt Staley. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel,* or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Curt Staley

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires TERRY GAMBLE, Notary Public
in and for the State of Texas
My Commission Expires 8-17-88

** Except as follows:

- 1976-1977 Engineering Supervisor and Deputy Project Engineer, Bechtel Power Corporation, Gaithbrg, MD, for the Dickerson Steam Generation Plant, Potomac Electric Power Company.
- 1968-1974 Senior Engineer and Group Leader, Bechtel Power Corporation, San Francisco, CA, for the Limerick Generating Station, Philadelphia Electric Company.

*With the exception of the Midland Independent Design and Construction Verification Project.

Merrill Lynch Ready Assets Trust

Murray Savings Money Market Funds

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Frank Dougherty

My name is Frank Dougherty. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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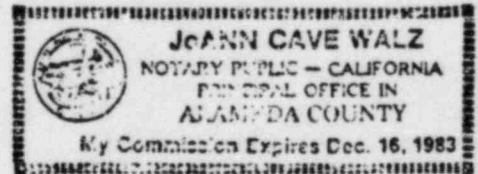
Signed

Frank A. Dougherty

Sworn and Subscribed Before Me This 17 Day of March 1983

JoAnn Cave Walz
Notary Public

My Commission Expires 12/16/83



Mutual Funds

Merrill Lynch CMA Money Trust
Kemper Money Market
Daily Interest Fund

Mathera Fund

Energy Fund

20th Century Growth Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF RICHARD P. SNAIDER

My name is RICHARD P. SNAIDER. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Richard P. Snider

Sworn and Subscribed Before Me This 17th Day of March 1983

Archie Lee Rott
Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

SNAIDER

MUTUAL FUNDS

ENERGY FUND

MERRILL-LYNCH HIGH INCOME BOND FUND

AMERICAN GENERAL PACE FUND

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF LIONEL D. BATES

My name is Lionel D. Bates. I am employed by TERA Corporation as Lead Technical Reviewer

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

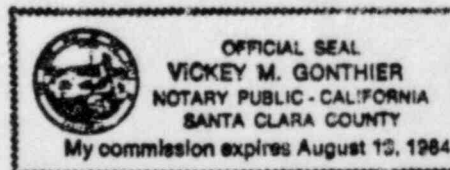
Signed

Lionel D. Bates

Sworn and Subscribed Before Me This 17th Day of March 1983

Vickey M. Gonthier
Notary Public

My Commission Expires 8-13-84



*With the exception of the Midland Independent Design Construction Verification Program.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF MARTIN B. JONES, JR.

My name is Martin B. Jones, Jr.. I am employed by TERA Corporation as Associate, Lead Site Activities

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Martin B. Jones, Jr.

Sworn and Subscribed Before Me This 17th Day of March 1983

Betty J. Metz
Notary Public

My Commission Expires 10/10/84

* I have served as a consultant to Becon Construction Co., a subsidiary of Bechtel, during 1982. None of this work was related to the Midlands project, or any other nuclear work.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Donald Davis

My name is Donald Davis. I am employed by TERA Corporation as Member Senior Review Team

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

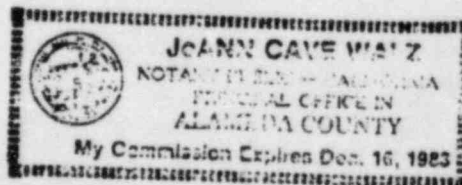
Don K. Davis

Sworn and Subscribed Before Me This 16th Day of March 1983

Joann Cave Maiz
Notary Public

My Commission Expires 12/16/83

* with the exception of the Midland Independent Design and Construction Verification Program



Funds in which D.K. Davis has an interest

1. Franklin Tax-Free - California
2. Inter Capital Liquid Asset
3. TERA Deferred Compensation (Retirement)

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF WILLIAM J. HALL

My name is William J. Hall. I am employed by TERA Corporation
as Consultant.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel,** or Babcock and Wilcox.

* with the exception of the Midland Independent Design and Construction Program.

Signed

** a son-in-law employed by Pechtcl, Gaithersburg, MD

William J. Hall
William J. Hall

Sworn and Subscribed Before Me This 17th Day of March 1983

Louis A. Dallas
Notary Public

My Commission Expires 2/6/85

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert Wilson

My name is Robert Wilson. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by ~~Consumers Power Company, Bechtel, or Babcock and Wilcox Company~~. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

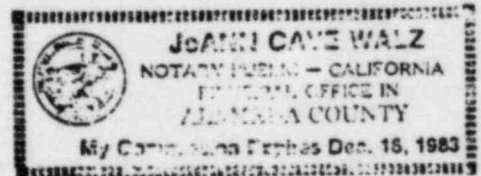
Signed

* with the exception of the Midland Independent Design and Construction Verification Program.

Robert Wilson

Sworn and Subscribed Before Me This 17th Day of March 1983

JoAnn Cave Walz
Notary Public
My Commission Expires 12/15/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert Cudlin

My name is Robert Cudlin. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached.† I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox. **

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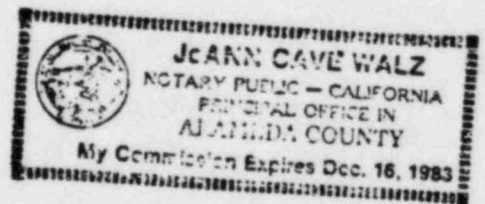
Signed

Robert J. Cudlin

Sworn and Subscribed Before Me This 17 Day of March 1983

Joann Cave Walz
Notary Public

My Commission Expires 12/16/83



- * First Jersey Securities
- ** Brother, Joseph Cudlin, is currently employed by B&W as Manager, Analysis Technology.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Henry J. George

My name is Henry George. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Henry J. George

Sworn and Subscribed Before Me This 17th Day of March 1983

Kirk Lee Pott
Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Joseph Martore

My name is J. MARTORE. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Joseph Martore

Sworn and Subscribed Before Me This 18th Day of March 1983

David La Roth
Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert C. Snyder

My name is Robert C. Snyder. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of ~~Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware.~~ A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Robert C. Snyder

Sworn and Subscribed Before Me This 17th Day of March 1983

Andee Lee Robb
Notary Public

My Commission Expires My Commission Expires July 1, 1988

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Michael B. Aycock

My name is Michael B. Aycock. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Michael B. Aycock

Sworn and Subscribed Before Me This 17th Day of March 1983

Linda Lee Robb
Notary Public

My Commission Expires My Commission Expires July 1, 1985

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Christian Mortgat

My name is Christian Mortgat. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

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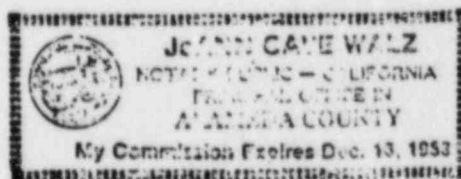
Signed

Christian Mortgat

Sworn and Subscribed Before Me This 17 Day of March 1983

J. C. Walsh
Notary Public

My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Jorma Arros

My name is Jorma Arros. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

* with the exception of the Midland Independent Design and Construction Verification Program.

Signed

Jorma Arros

Sworn and Subscribed Before Me This 17 Day of March 1983

JoAnn Cave Walz
Notary Public

My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Kenneth W. Campbell

My name is Kenneth W. Campbell. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Kenneth W. Campbell

Sworn and Subscribed Before Me This 18th Day of March 1983

And Lee Roth
Notary Public

My Commission Expires My Commission Expires July 1, 1985

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Normand A. Berube

My name is Normand A. Berube. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Normand A. Berube

Sworn and Subscribed Before Me This 18th Day of March 1983

Lynda Lee Roth
Notary Public :

My Commission Expires My Commission Expires July 1, 1985

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Frederick Berthrong

My name is Frederick Berthrong. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company.* I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

* with the exception of the Midland Independent Design and Construction Verification Program.

Signed

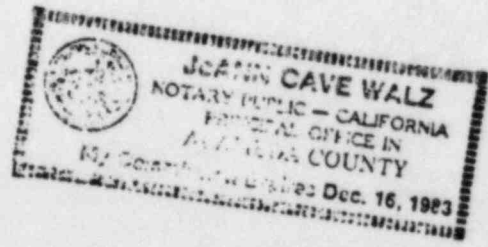
Frederick Berthrong

* I was employed by Bechtel Power Corporation (Jan. 1972 - Sept 1977) but performed no services on the Midland Project.

Sworn and Subscribed Before Me This 17 Day of March 1983

Joann C. Walz
Notary Public

My Commission Expires 12/6/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Richard MacDonald

My name is Richard MacDonald. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

*

Signed

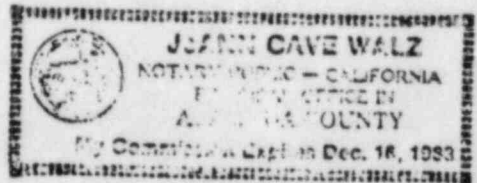
* with the exception of the Midland Independent Design and Construction Verification Program.

Richard R. MacDonald

Sworn and Subscribed Before Me This 17th Day of March 1983

J. C. Walsh
Notary Public

My Commission Expires 12/16/83



* I was employed by Bechtel Power Corporation (1971-79) for 8 1/2 years as Mechanical Engineering Supervisor Assistant to the Manager of Engineering, and Project Engineer on small projects. I was never directly involved on the Midland Project or with Consumers Power or Babcock and Wilcox
PRM


STATEMENT OF INDEPENDENCE

AFFIDAVIT OF DONALD B. TULODIESKI

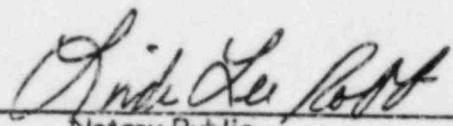
My name is DONALD B. TULODIESKI. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company.** I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 17th Day of March 1983


Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

** Employed by Babcock & Wilcox Co. from 1973 to 1978. Final Position was Project Manager for Toledo Edison, Davis Besse Units.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Gary Smith

My name is Gary Smith. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Gary Smith

Sworn and Subscribed Before Me This 17th Day of March 1983

Sandra Winsor
Notary Public

My Commission Expires 2-17-85

SANDRA WINSOR, Notary Public
in and for the State of Texas
My Commission Expires 2-17-85

*With the exception of the Midland Independent Design and Construction Verification Project.

A. G. Edwards, Daily Cash Accumulation Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Douglas Witt

My name is Douglas Witt. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

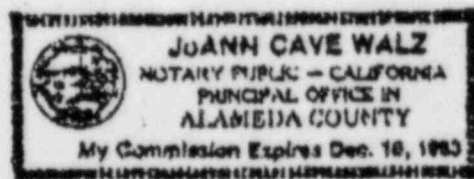
* with the exception of the Midland Independent Design and Construction Verification Program.

Signed

Douglas Witt

Sworn and Subscribed Before Me This 18 Day of March 1983

Juann Cave Walz
Notary Public
My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Randy Cleland

My name is Randy Cleland. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Randy Cleland

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires _____

TERRY GAMBLE, Notary Public
In and for the State of Texas
My Commission Expires 8-17-86

*With the exception of the Midland Independent Design and Construction Verification Project.

University Savings Association Money Master Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF George J. Triguila, Jr.

My name is George J. Triguila, Jr. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

George J. Triguila, Jr.

Sworn and Subscribed Before Me This 18th Day of March 1983

André Lee Poff
Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Stephen Schreurs

My name is Stephen Schreurs. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Stephen E Schreurs

Sworn and Subscribed Before Me This 17th Day of March 1983

Dwight Lee Robt
Notary Public

My Commission Expires My Commission Expires July 1, 1985

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Farzin Ramezanbeigi

My name is Farzin Ramezanbeigi. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

* with the exception of the Midland Independent Design and Construction Verification Program.

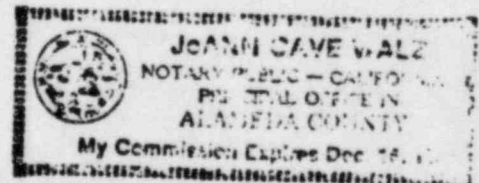
Signed

Farzin Ramezanbeigi

Sworn and Subscribed Before Me This 17 Day of March 1983

Joann Cave Wall
Notary Public

My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF CHRISTIAN NELSON

My name is CHRISTIAN NELSON. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Christian Nelson

Sworn and Subscribed Before Me This 17th Day of March 1983

David Lee Robb
Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Monte J. Wise

My name is Monte J. Wise. I am employed by TERA Corporation as Asst. Tech. Reviewer.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

* with the exception of the Midland independent design and construction verification program,

Signed

Monte J. Wise

Sworn and Subscribed Before Me This 17 Day of March 1983

Charles H. Gardner
Notary Public

My Commission Expires at death

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Mehmet Celebi

My name is Mehmet Celebi. I am employed by TERA Corporation as Associate Technical Reviewer

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company.* I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

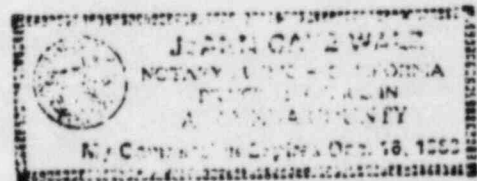
Mehmet Celebi

*except for the Midland Independent Design and Construction Verification Program at TERA.

Sworn and Subscribed Before Me This 17 Day of March 1983

J. C. Daby
Notary Public

My Commission Expires 12/16/83



**I was employed by Bechtel Power Corporation, San Francisco between January 1978 to May 1979 as an Engineering Specialist and between August 1982-December 1982 on a Casual Project Engineer status.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF ALBERT MANTORE

My name is ALBERT MANTORE. I am employed by TERA Corporation as ASSOC. TECHNICAL REVIEWER.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Albert V. Mantore

Sworn and Subscribed Before Me This 17 Day of March 1983

[Signature]
Notary Public

My Commission Expires

MY COMMISSION EXPIRES OCTOBER 15, 1988.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF LOU FUSCO

My name is LOU FUSCO. I am employed by TERA Corporation
as ASSOC. TECH REVIEWER

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

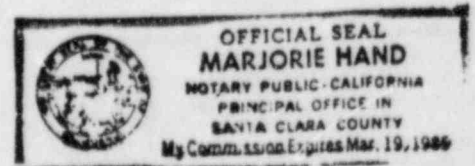
Signed

Lou Fusco

Sworn and Subscribed Before Me This 17 Day of March 1983

Marjorie Hand
Notary Public

My Commission Expires March 19, 1985



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF JAMES I OWENS

My name is JAMES I OWENS. I am employed by TERA Corporation as ASSOCIATE TECHNICAL REVIEWER

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

James I Owens

Sworn and Subscribed Before Me This 17th Day of March 1983

Margaret R. Carrison
Notary Public

My Commission Expires My Commission expires December 23, 1984

* WITH THE EXCEPTION OF THE
MIDLAND INDEPENDENT DESIGN AND
CONSTRUCTION VERIFICATION PROGRAM.

3/17/83

A LIST OF MUTUAL FUNDS
IN WHICH I HAVE AN
INTEREST BUT OVER WHICH
I HAVE NO CONTROL IS

- 1) 44 WALL STREET FUND INC
- 2) MUTUAL SHARES CORP

Jacob (Owner)

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Edward M. Beck

My name is Edward M. Beck. I am employed by TERA Corporation as Associate Technical Reviewer.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 17 Day of March 1983

Elizabeth T. Wentz
Notary Public

My Commission Expires 11-1-1985

*with the exception of the Midland Independent Design and Construction Verification Program

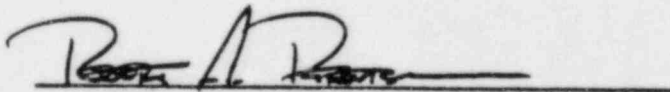
STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert Reneau

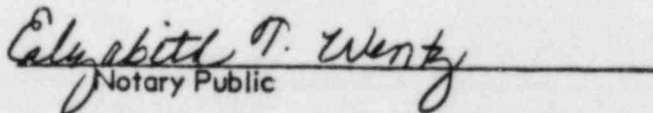
My name is Robert Reneau. I am employed by TERA Corporation as Associate Technical Reviewer.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 17 Day of March 1983


Notary Public

My Commission Expires 11-1-1985

*with the exception of the Midland Independent Design and Construction Verification Program

Daily Cash Accumulation Fund Inc.
3600 S. Yosemite Street
Denver, Colorado 80237

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Joseph Penzien

My name is Joseph Penzien. I am employed by TERA Corporation as Associate Technical Reviewer

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

* with the exception of the Midland Independent Design and Construction Verification Program.

Joseph Penzien

Sworn and Subscribed Before Me This 17 Day of March 1983

Michael S. Gabbay
Notary Public

My Commission Expires April 14, 1985



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Daniele Veneziano

My name is Daniele Veneziano. I am employed by TERA Corporation as Associate Technical Reviewer

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Daniele Veneziano

Sworn and Subscribed Before Me This 17 Day of March 1983

Gloria M. McCauley
Notary Public

My Commission Expires August 10, 1984

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF S. N. BRISCOMBE

My name is Stephen N. Prisco. I am employed by TERA Corporation as Associate Technical Reviewer.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, *Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, *Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

S. N. Prisco

Sworn and Subscribed Before Me This 17th Day of March 1983

Marjorie Hand
Notary Public

My Commission Expires March 19, 1985



- * Employed by Bechtel Power Corporation, Construction Staff, 1977-79. Performed Review Activity on site for three days in 1979. Work consisted of reviewing electrical design, notes and details, for constructability.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Richard W. Keller

My name is Richard W. Keller. I am employed by TERA Corporation
as Assistant Technical Reviewer.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Richard W. Keller

* with the exception
of the Midland independent
design and construction
verification program,

Sworn and Subscribed Before Me This 17th Day of March 1983

Charles H. Sturgis
Notary Public

My Commission Expires at death

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF LOREN STANLEY

My name is Loren Stanley. I am employed by TERA Corporation as ASSOC. TEL. REVIEWER.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Loren Stanley

Sworn and Subscribed Before Me This 17th Day of March 1983

Marjorie Hand
Notary Public

My Commission Expires March 19, 1985



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF EDWARD D. SCHRULL

My name is EDWARD D. SCHRULL. I am employed by TERA Corporation as ASSOCIATE TECHNICAL REVIEWER.

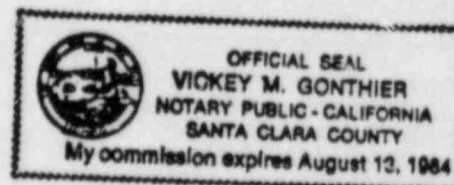
I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Edward D. Schrull

Sworn and Subscribed Before Me This 17th Day of March 1983

Vickey M. Gonthier
Notary Public



My Commission Expires 8-13-84

*With the exception of the Midland Independent Design Construction Verification Program.


STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Luis E. Flores

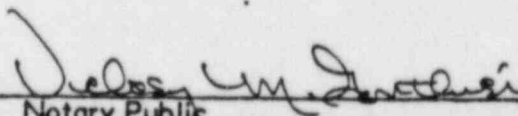
My name is Luis E. Flores. I am employed by TERA Corporation as Associate Technical Reviewer.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

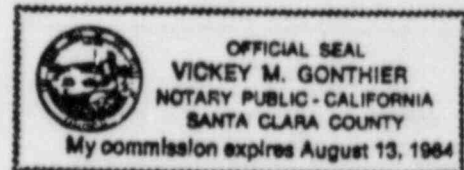
Signed



Sworn and Subscribed Before Me This 17th Day of March 1983


Notary Public

My Commission Expires 8-13-84



*With the exception of the Midland Independent Design Construction Verification Program.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF DAVID B. HAMEL

My name is DAVID B. HAMEL. I am employed by TERA Corporation as ASSOCIATE TECHNICAL REVIEWER,

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

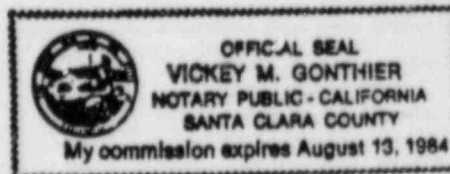
Signed

David B. Hamel

Sworn and Subscribed Before Me This 17th Day of March 1983

Vickey M. Gonthier
Notary Public

My Commission Expires 8-13-84



*With the exception of the Midland Independent Design Construction Verification Program.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF HARRY L. BROXSON

My name is HARRY L. BROXSON. I am employed by TERA Corporation as ASSOCIATE TECHNICAL REVIEWER

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such fund in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

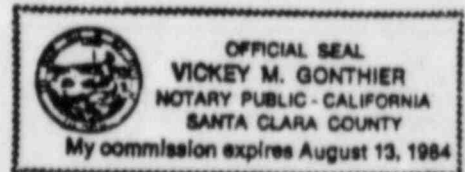
Signed

Harry L. Broxson

Sworn and Subscribed Before Me This 17th Day of March 1983

Vickey M. Gonthier
Notary Public

My Commission Expires 8-13-84



*With the exception of the Midland Independent Design Construction Verification Program.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Lawrence Wight

1. My name is Lawrence Wight. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project*, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

* with the exception of the Midland Independent Design and Construction Verification Program.

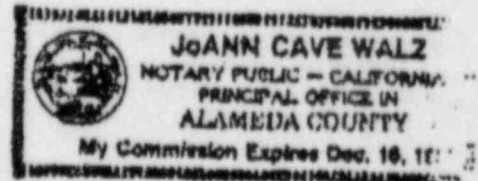
Signed

Lawrence Wight

Sworn and Subscribed Before Me This 18 Day of March 1983

JoAnn Cave Walz
Notary Public

My Commission Expires 12/16/83



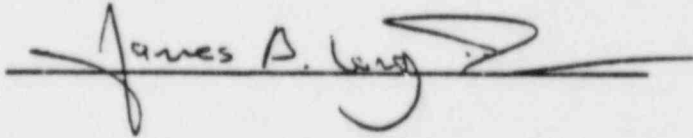
STATEMENT OF INDEPENDENCE

AFFIDAVIT OF JAMES A. LONG, III

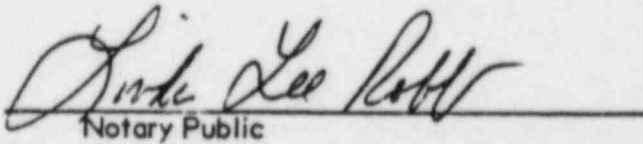
My name is James A. Long, III. I am employed by TERA Corporation.

I am under consideration for assignment to the team which will conduct an independent overview of the Construction Completion Program at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 18th Day of March 1983


Notary Public

My Commission Expires My Commission Expires July 1, 1986

* with the exception of the Midland Independent Design and Construction Verification Program

EXPLANATORY NOTE FOR ATTACHMENT 2:

Several individual affidavits are not presently included as part of attachment 2 due to logistics. These affidavits will be submitted under separate cover.

KEY PERSONNEL

CONSTRUCTION COMPLETION PROGRAM OVERVIEW

● **PROJECT DIRECTION**

JOHN BECK, M.S., PRINCIPAL-IN-CHARGE

NUCLEAR POWER PLANT OPERATIONS AND CORPORATE MANAGEMENT, LICENSING, ENGINEERING AND PROJECT MANAGEMENT

- VICE PRESIDENT, TERA CORPORATION
- 18 YEARS NUCLEAR EXPERIENCE
- FORMERLY EXECUTIVE VICE PRESIDENT, VERMONT YANKEE NUCLEAR POWER CORPORATION; SERVED AS CHIEF OPERATING OFFICER
- FORMERLY DIRECTOR OF ENGINEERING, YANKEE ATOMIC ELECTRIC COMPANY

HOWARD LEVIN, M.S., PROJECT MANAGER

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN AND CONSTRUCTION, EQUIPMENT QUALIFICATION, OPERATING REACTOR SAFETY, LICENSING, PROJECT MANAGEMENT

- 9 YEARS NUCLEAR EXPERIENCE/11 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NRC AND STONE & WEBSTER

KEY PERSONNEL

(continued)

● SENIOR REVIEW TEAM

WILLIAM J. HALL, PH.D., UNIVERSITY OF ILLINOIS

ENGINEERING ANALYSIS AND DESIGN, STRUCTURAL ENGINEERING, STRUCTURAL MECHANICS AND DYNAMICS, SOIL MECHANICS, FRACTURE MECHANICS, ENGINEERING CRITERIA DEVELOPMENT FOR MAJOR PROJECTS

- 39 YEARS EXPERIENCE IN NUCLEAR, MILITARY, AND COMMERCIAL FIELDS
- CONSULTANT TO NRC, NATIONAL LABS, TERA CORPORATION, AND OTHERS ON NUCLEAR SAFETY ISSUES
- LONG ASSOCIATE OF LATE NATHAN M. NEWMARK

DONALD DAVIS, TERA

NUCLEAR SAFETY AND LICENSING, PLANT AND REACTOR SYSTEMS, THERMAL-HYDRAULIC ANALYSIS, ACCIDENT ANALYSIS

- 15 YEARS NUCLEAR EXPERIENCE/18 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NRC AND HITTMAN ASSOCIATES

ROBERT WILSON, M.S.

NUCLEAR POWER PLANT OPERATIONS, ENGINEERING AND DESIGN, LICENSING, CONTRACT ADMINISTRATION, PROJECT MANAGEMENT, PUBLIC RELATIONS

- SENIOR VICE PRESIDENT, TERA CORPORATION
- 16 YEARS NUCLEAR EXPERIENCE
- FORMERLY SUPERVISOR OF NUCLEAR ENGINEERING, SMUD

KEYPERSONNEL

(continued)

- LEAD TECHNICAL REVIEWERS

CURT STALEY, M.S., LEAD STRUCTURAL REVIEWER AND
CONSTRUCTION VERIFICATION PROGRAM MANAGER

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN,
CONSTRUCTION PROJECT MANAGEMENT AND CONTROL

- 14 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL, GENERAL DYNAMICS, CHEMICO

FRANK DOUGHERTY, M.S., M.B.A., LEAD MECHANICAL REVIEWER

NUCLEAR POWER PLANT MECHANICAL DESIGN, QUALITY ASSUR-
ANCE, SAFETY AND RELIABILITY ANALYSIS, SYSTEM
DESIGN/CRITERIA DEVELOPMENT

- 14 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH EDS AND SARGENT & LUNDY

RICHARD SNAIDER, M.B.A., LEAD SYSTEMS REVIEWER

NUCLEAR POWER PLANT OPERATIONS, MAINTENANCE AND
DESIGN, SYSTEMS ENGINEERING, LICENSING PROJECT MANAGE-
MENT, MECHANICAL ENGINEERING

- 15 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH JERSEY CENTRAL POWER & LIGHT AND NRC

LIONEL BATES, M.S., LEAD ELECTRICAL REVIEWER

NUCLEAR POWER PLANT ELECTRICAL, INSTRUMENTATION AND
CONTROL SYSTEMS DESIGN, EQUIPMENT QUALIFICATION, PLANT
OPERATIONS AND MAINTENANCE

- 10 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NUTECH, WESTINGHOUSE, SAN DIEGO GAS AND
ELECTRIC COMPANY, AND OMTEC

KEY PERSONNEL

(continued)

- LEAD SITE ACTIVITIES

MARTIN JONES

NUCLEAR POWER PLANT CONSTRUCTION MANAGEMENT, QUALITY CONTROL, TRAINING, START-UP, ELECTRICAL ENGINEERING

- 22 YEARS NUCLEAR EXPERIENCE
- FORMERLY MANAGER OF CONSTRUCTION AND QUALITY CONTROL, SOUTH CAROLINA ELECTRIC AND GAS COMPANY

- PROJECT QUALITY ASSURANCE

CHARLES LEMON

NUCLEAR POWER PLANT ENGINEERING, QUALITY ASSURANCE, LICENSING, COMPUTER SYSTEMS APPLICATION

- 12 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

MARK POLIT

NUCLEAR POWER PLANT LICENSING, EQUIPMENT QUALIFICATION, INSTRUMENTATION AND CONTROL, SYSTEMS ENGINEERING

- 3 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH OMTEC AND NUTECH

- DESIGN REVIEW TEAM PERSONNEL

ROBERT CUDLIN, M.S., J.D.

NUCLEAR SAFETY AND LICENSING, REACTOR SAFEGUARDS, PLANT AND CONTAINMENT SYSTEMS, EQUIPMENT QUALIFICATION

- 9 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC, SENATE SUBCOMMITTEE ON NUCLEAR REGULATION

KEY PERSONNEL

(continued)

● DESIGN REVIEW TEAM PERSONNEL

HENRY GEORGE, M.S.

QUALITY ASSURANCE, TRAINING, NUCLEAR PLANT SYSTEMS, PROCEDURES, PROJECT MANAGEMENT, MECHANICAL ENGINEERING

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC AND ARMY

CHRISTIAN MORTGAT, PH.D.

ENGINEERING MECHANICS, EARTHQUAKE ENGINEERING

- 5 YEARS NUCLEAR EXPERIENCE/9 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH WOODWARD-CLYDE

LOREN STANLEY

NUCLEAR POWER PLANT LICENSING, DESIGN REVIEW, SAFETY-RELATED COMPONENT DETERMINATIONS, PROBABILISTIC RISK ASSESSMENT, INSTRUMENTATION, SYSTEM DESIGN AND ANALYSIS

- 26 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH GENERAL ELECTRIC COMPANY, OMTEC AND QUADREX CORPORATION

RICHARD KELLER, M.S.

ELECTRICAL, INSTRUMENTATION, AND CONTROL SYSTEMS DESIGN, NUCLEAR POWER PLANT OPERATIONAL ANALYSIS, PLANT PROTECTION SYSTEMS/ENGINEERED SAFETY FEATURES EVALUATION, PROBABILISTIC RISK ASSESSMENT

- 15 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH AEROJET NUCLEAR, STOLLER AND SYSTEM DEVELOPMENT CORPORATION

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

MEHMET CELEBI, PH.D.

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN AND CONSTRUCTION, QUALITY ASSURANCE

- 16 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL, EDAC

JORMA ARROS, PH.D. (CANDIDATE)

ENGINEERING MECHANICS

- 5 YEARS NUCLEAR EXPERIENCE/8 YEARS ENGINEERING EXPERIENCE

KENNETH CAMPBELL, PH.D.

SOIL MECHANICS, EARTHQUAKE ENGINEERING

- 10 YEARS ENGINEERING EXPERIENCE

EDWARD SCHRULL

REACTOR SAFETY SYSTEMS, NUCLEAR LICENSING, RELIABILITY AND RISK ASSESSMENT, INSTRUMENTATION AND CONTROL, COMPUTER ANALYSES

- 9 YEARS NUCLEAR EXPERIENCE
- CURRENTLY WITH EIGEN ENGINEERING
- FORMERLY WITH OMTEC, QUADREX AND NUTECH

STAN FABIC, PH.D.

THERMAL-HYDRAULIC AND HYDRO-ELASTIC ANALYSIS, COMPUTER METHODS DEVELOPMENT (AUTHORED BLOWDN-2, WHAM, GASRAD, MULTIFLEX), PIPE RUPTURE ANALYSIS, CONTAINMENT ANALYSIS

- 24 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC, WESTINGHOUSE, AND KAISER ENGINEERS

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

NORMAND BERUBE, M.S.

DESIGN AND ANALYSIS OF MECHANICAL SYSTEMS, THERMAL-HYDRAULICS, HEAT TRANSFER, ENGINEERING, ANALYSIS

- 11 YEARS ENGINEERING EXPERIENCE

JOSEPH MARTORE, M.S., M.B.A.

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN AND CONSTRUCTION, EQUIPMENT QUALIFICATION, OPERATING REACTOR SAFETY, LICENSING, PROJECT MANAGEMENT

- 8 YEARS NUCLEAR EXPERIENCE/10 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NRC AND STONE & WEBSTER

JOHN ANGELO, M.S.

DESIGN, OPERATION, MAINTENANCE, INSTALLATION, TESTING AND INSPECTION OF POWER PLANT SYSTEMS AND COMPONENTS, NUCLEAR SAFETY AND LICENSING

- 20 YEARS NUCLEAR EXPERIENCE/33 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH GENERAL ELECTRIC, ARMY REACTORS, NRC

FARZIN RAMEZANBEIGI

STRUCTURAL AND MECHANICAL ENGINEERING, USAGE AND INTERPRETATION OF STRUCTURAL/MECHANICAL COMPUTER CODES

SUSAN SLY

CIVIL/MECHANICAL DESIGN AND CONSTRUCTION, INSTALLATION AND INSPECTION

- 4 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

KEY PERSONNEL

(continued)

● DESIGN REVIEW TEAM PERSONNEL

JAMES LONG

ENGINEERING MANAGEMENT, NUCLEAR SAFETY AND LICENSING

- 16 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC, NAVY

RICHARD MACDONALD, M.B.A.

ENGINEERING, CONSTRUCTION, OPERATION, MAINTENANCE AND PROJECT MANAGEMENT SYSTEMS, NUCLEAR PLANT START-UP AND OPERATIONS

- 11 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

CHRISTIAN NELSON

NUCLEAR POWER PLANT SAFETY AND LICENSING, SEISMIC DESIGN, OPERATIONAL ANALYSIS, PLANT INSPECTION PROGRAM DEVELOPMENT

- 12 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC

JOSEPH PENZIEN, PH.D., UNIVERSITY OF CALIFORNIA (BERKELEY)

STRUCTURAL ENGINEERING, EARTHQUAKE ENGINEERING, REINFORCED CONCRETE RESPONSE

- 37 YEARS ENGINEERING EXPERIENCE
- CURRENTLY DIRECTOR OF EARTHQUAKE ENGINEERING RESEARCH CENTER AT UNIVERSITY OF CALIFORNIA, BERKELEY

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

DANIELE VENEZIANO, PH.D., MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENGINEERING STATISTICAL ANALYSIS, PROBABILISTIC ANALYSIS,
CIVIL ENGINEERING

- PROFESSOR OF CIVIL ENGINEERING

MICHAEL AYCOCK

NUCLEAR POWER PLANT SYSTEMS, OPERATING PROCEDURES,
LICENSING AND PROJECT MANAGEMENT

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC

GEORGE TRIGILIO

NUCLEAR RADWASTE SYSTEM DESIGN AND ANALYSIS, PROJECT
MANAGEMENT

- FORMERLY WITH BROWN & ROOT, STONE & WEBSTER AND
HITTMAN NUCLEAR DEVELOPMENT CORPORATION

LENNY LAAKSO, M.S.

STRUCTURAL/MECHANICAL ANALYSIS AND DESIGN OF NUCLEAR
POWER PLANT BUILDINGS AND EQUIPMENT, SPECIFICATIONS,
PLANNING AND SCHEDULING

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH STONE AND WEBSTER, CHAS. T. MAIN

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

LOUIS FUSCO, JR.

NUCLEAR SYSTEMS ENGINEERING AND LICENSING, EQUIPMENT QUALIFICATION, ENGINEERING AND PROJECT MANAGEMENT, NUCLEAR POWER PLANT OPERATIONS AND MANAGEMENT

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NUS, EDS, NAVY

STEPHEN SCHREURS

DESIGN AND ANALYSIS OF RADWASTE PROCESSING SYSTEMS, COMPUTER SYSTEMS APPLICATION, PROJECT MANAGEMENT

- 9 YEARS NUCLEAR EXPERIENCE

DOUGLAS M. WITT, M.S.

NUCLEAR POWER PLANT SYSTEMS AND MECHANICAL DESIGN, SAFETY ANALYSIS, EQUIPMENT DESIGN, LICENSING, HELBA, THERMAL-HYDRAULICS

- 12 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH SARGENT AND LUNDY, EDS NUCLEAR

- CONSTRUCTION REVIEW TEAM PERSONNEL

JAMES OWENS

NUCLEAR AND FOSSIL POWER PLANT DESIGN AND CONSTRUCTION NUCLEAR STEAM SUPPLY SYSTEMS DESIGN AND CONSTRUCTION, PROJECT MANAGEMENT, CONTROL SYSTEMS, SAFEGUARDS, LICENSING

- 32 YEARS NUCLEAR EXPERIENCE
- FORMERLY GENERAL MANAGER - PRODUCTION ENGINEERING AND CONSTRUCTION AND PROJECT MANAGER SUMMIT NUCLEAR POWER STATION, DELMARVA POWER AND LIGHT COMPANY

KEY PERSONNEL

(continued)

● CONSTRUCTION REVIEW TEAM PERSONNEL

LUIS FLORES

NUCLEAR POWER PLANT LICENSING, OPERATIONS, SYSTEMS ENGINEERING, INSTRUMENTATION AND CONTROL SYSTEMS, FAILURE ANALYSIS

- 9 YEARS NUCLEAR EXPERIENCE
- CURRENT WITH EIGEN ENGINEERING
- FORMERLY WITH OMTEC AND GENERAL ELECTRIC COMPANY

MONTE WISE

ENGINEERING AND PROJECT MANAGEMENT, PRESERVICE/INSERVICE INSPECTION, NDE, NUCLEAR POWER PLANT OPERATIONS AND MANAGEMENT, QUALITY ASSURANCE, EQUIPMENT QUALIFICATION

- 25 YEARS NUCLEAR EXPERIENCE
- FORMERLY SUPERINTENDENT OF LACROSSE BWR
- FORMERLY WITH SW RESEARCH AND GENERAL ELECTRIC

PATRICK LONGSTRETH, B.S., M.B.A.

PROJECT AND CONSTRUCTION MANAGEMENT, ADMINISTRATION, CONTROL AND PLANNING, CONTRACTING

- 15 YEARS PROJECT AND CONSTRUCTION MANAGEMENT EXPERIENCE
- FORMERLY WITH BECHTEL

KEY PERSONNEL

(continued)

● CONSTRUCTION REVIEW TEAM PERSONNEL

STEPHEN BRISCOMBE

CONSTRUCTION MANAGEMENT, SITE CONSTRUCTION SERVICES, CONSTRUCTION SUPERVISION, ELECTRICAL CONSTRUCTION TECHNIQUES, PROCEDURES AND SPECIFICATION DEVELOPMENT, DESIGN REVIEW, QUALITY CONTROL

- 17 YEARS NUCLEAR EXPERIENCE/25 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH GE AND BECHTEL

SIDNEY BROWN

ENGINEERING AND CONSTRUCTION MANAGEMENT, COST AND SCHEDULING, QUALITY CONTROL, FIELD ENGINEERING

- 17 YEARS NUCLEAR EXPERIENCE/30 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH BECHTEL

LEONARD STOUT

DESIGN, CONSTRUCTION, START-UP AND OPERATIONS, PROJECT CONTROL, SCHEDULE AND COST CONTROL SYSTEMS

- 14 YEARS EXPERIENCE
- FORMERLY WITH BECHTEL

DAVID HAMEL

NUCLEAR POWER PLANT LICENSING, EQUIPMENT ENVIRONMENTAL QUALIFICATION, REACTOR DESIGN, SAFETY EVALUATION, INSTRUMENTATION AND CONTROL DESIGN, FACILITIES OPERATION, HEALTH PHYSICS, QUALITY ASSURANCE

- 16 YEARS NUCLEAR EXPERIENCE
- CURRENTLY WITH EIGEN ENGINEERING
- FORMERLY WITH NUTECH AND GENERAL ELECTRIC COMPANY

KEY PERSONNEL

(continued)

● CONSTRUCTION REVIEW TEAM PERSONNEL

FREDERICK BERTHRONG, M.S.

ENGINEERING PROJECT MANAGEMENT, PLANNING, SCHEDULING
AND FIELD ENGINEERING

- 18 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

DONALD TULODIESKI

PROJECT MANAGEMENT/CONTROL, START-UP TESTING, ENGINEER-
ING

- 17 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH B&W AND PUBLIC SERVICE ELECTRIC AND
GAS COMPANY

ALBERT MARTORE

ENGINEERING, SPECIFICATION, CONSTRUCTION FABRICATION,
CONSTRUCTION MANAGEMENT AND CONTROL, SCHEDULING,
SUPERVISION, INSPECTION

- 10 YEARS NUCLEAR EXPERIENCE/30 YEARS ENGINEERING
EXPERIENCE
- FORMERLY WITH PRESCON CORPORATION

ROBERT SNYDER

NUCLEAR POWER PLANT DESIGN AND CONSTRUCTION, PROJECT
MANAGEMENT, START-UP AND OPERATIONS

- 5 YEARS NUCLEAR EXPERIENCE/OVER 30 YEARS ENGINEERING
EXPERIENCE
- FORMERLY WITH HITTMAN ASSOCIATES AND KAISER

GARY SMITH

CIVIL ENGINEERING DESIGN AND CONSTRUCTION, PROJECT
MANAGEMENT

- 15 YEARS EXPERIENCE

KEY PERSONNEL

(continued)

• CONSTRUCTION REVIEW TEAM PERSONNEL

STANLEY KAUT

DESIGN, REVIEW, CONSTRUCTION, TESTING, OPERATION, AND LICENSING OF ELECTRICAL POWER, INSTRUMENTATION AND CONTROL SYSTEMS AND EQUIPMENT; PROJECT MANAGEMENT, DESIGN REVIEW, PLANT PROCEDURES, QUALITY ASSURANCE

- 17 YEARS NUCLEAR EXPERIENCE/20 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NUTECH, NUCLEAR SERVICES CORPORATION, AND GE

RANDY CLELAND, M.B.A.

POWER PLANT MECHANICAL DESIGN, PIPING/HANGER DESIGN AND CONSTRUCTION, REVIEW AND INSPECTION OF MECHANICAL SYSTEMS, CONSTRUCTION SUPERVISION AND MANAGEMENT, RESULTS ENGINEERINGS

- 10 YEARS POWER PLANT ENGINEERING EXPERIENCE, 2 YEARS NUCLEAR
- FORMERLY WITH CENTRAL ILLINOIS PUBLIC SERVICE COMPANY AND SARGENT AND LUNDY

EDWARD BECK

NONDESTRUCTIVE TESTING, LEVEL III IN RADIOGRAPHY, ULTRASONICS, MAGNETIC PARTICLE, LIQUID PENETRANT

- 14 YEARS NUCLEAR EXPERIENCE
- CURRENTLY WITH LAW ENGINEERING

ROBERT RENEAU

NONDESTRUCTIVE TESTING, LEVEL II IN RADIOGRAPHY, ULTRASONICS, MAGNETIC PARTICLE, LIQUID PENETRANT

- 10 YEARS NUCLEAR EXPERIENCE
- PREVIOUSLY WITH WESTINGHOUSE, CURRENTLY WITH LAW ENGINEERING

KEY PERSONNEL

(continued)

ORIN W. KILGORE

CERTIFIED LEAD AUDITOR, ANSI N45.2.23, PROJECT AND CORPORATE QUALITY ASSURANCE, CONSTRUCTION, STARTUP AND OPERATIONS. AEC LICENCED SENIOR REACTOR OPERATOR.

- 26 YEARS NUCLEAR POWER EXPERIENCE
- FORMERLY WITH TVA AND NAVY

WILLIAM D. PRYOR

CERTIFIED QUALITY ENGINEER, ASQC, ANSI N45.2.6 LEVEL III QUALITY INSPECTOR CERTIFICATIONS IN MECHANICAL, PIPING, ELECTRICAL AND INSTRUMENTATION, STARTUP, TEST AND OPERATIONS

- 23 YEARS NUCLEAR POWER EXPERIENCE

FREDERICK A. PELLEVIN

PROFESSIONAL QUALITY ENGINEER - STATE OF CALIFORNIA. DEVELOPMENT, IMPLEMENTATION, MONITORING, SUPERVISION, AND EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL PROGRAMS

- 25 YEARS NUCLEAR EXPERIENCE
- FORMERLY INVOLVED IN VARIOUS QA FUNCTIONS FROM QUALITY ENGINEER TO MANAGER OF QA ON SUCH PROJECTS AS WATERFORD 3, VOGTLE AND NINE MILE POINT UNIT 2
- WORKED FOR MAJOR NUCLEAR CONTRACTORS SUCH AS GENERAL DYNAMICS, GILBERT ASSOCIATES, STONE & WEBSTER, MERCURY COMPANY AND ZURN INDUSTRIES

Mr. John W. Beck, Vice President of TERA Corporation and Principal-in-Charge of TERA's team which is conducting the Midland IDCV program has signed an affidavit on behalf of TERA Corporation and its subsidiaries which provides a statement of corporate independence (Attachment 1). In the event that outside specialized services (e.g., nondestructive examination or material testing, etc.) are required to meet project objectives, TERA Corporation will obtain a corporate affidavit from the subcontracted organization as well as its assigned personnel.

Signed affidavits for members of TERA's team are attached (Attachment 2). In the event that additional personnel are required to meet project objectives and are assigned to the team, TERA Corporation will obtain affidavits from these individuals as well.

PROFESSIONAL QUALIFICATIONS

The personnel assigned responsibility for project direction, the Senior Review Team, lead technical review, technical review, and site activities have been selected based upon their unique technical and management qualifications and experience. Key personnel are listed along with a short description of their areas of expertise, number of years of experience and highlights of their previous employment (Attachment 3). Resumes have been provided previously to the NRC under separate cover in Appendix C of the Project Quality Assurance Plan, Revision 2, for the Midland IDCV program. (Reference: Letters from Mr. Howard A. Levin to Mr. J. G. Keppler and Mr. D. G. Eisenhut dated February 9, 1983 and February 17, 1983.)

SCOPE OF REVIEW

The scope of review of the Midland IDCV Program is documented in Project Instruction PI-3201-009, the "Engineering Program Plan (EPP)." This document is part of the Project Quality Assurance Plan and was previously transmitted under the same cover.

The IDCV approach selected is a review and evaluation of a detailed "vertical slice" of the Midland project with a focus on providing an overall assessment of the quality of the design and the constructed plant.

At this time, TERA is currently reviewing the Unit 2 auxiliary feedwater (AFW) system. This system was selected based upon criteria documented in Section 1.3 of the Engineering Program Plan which was discussed at public meetings held on October 25, 1982 at the NRC's Bethesda, Maryland office and on February 8, 1983 at Midland, Michigan. It is our understanding from these discussions that the NRC plans to expand the IDCV sample based upon candidate systems identified by CPC (Reference: Letter from Mr. J. W. Cook to Mr. H. R. Denton



and Mr. J. G. Keppler, dated December 3, 1982). We stand ready to provide you with our comments on this selection based upon the results of the Midland IDCV program to date and the attributes of the candidate systems which would in our opinion best extend the current system sample. The multi-disciplined aspect of the systems selected is critical to the effective execution of a vertical slice Midland IDCV program effort. Our experience to date suggests that the selection of the AFW system utilizing the criteria which were documented in the Engineering Program Plan was successful in that this system provides for a comprehensive "test" of the project design and construction efforts throughout many technical disciplines (e.g., electrical, instrumentation and control, civil/structural, systems and mechanical) and interfaces. An early selection would facilitate the overall efficiency and progress of the Midland IDCV program.

REPORTING AND AUDITABILITY

From project inception the Midland IDCV program has operated in accordance with the reporting requirements that are documented in Project Instruction PI-3201-008, "Preparation of Open, Confirmed and Resolved Item Reports, Finding Reports, and Finding Resolution Reports" (Also transmitted to the NRC with the PQAP.) and Section 5.0 of the Engineering Program Plan. The provisions of these documents are largely consistent with the approaches followed at other independent assessments within the nuclear industry. We seek your comments and direction relative to these documents and offer any clarifying detail that you may need.

We are acutely aware of the importance of maintaining an auditable review process. Auditable records are maintained to document substantive elements of the Midland IDCV review and evaluation process, to document technical conclusions including the status of disposition of items associated with the review process leading to findings, to document the revision of records, and to establish quality assurance measures necessary to provide adequate confidence and assurance of the quality of services. Section 4.0 of the Engineering Program Plan establishes documentation requirements for engineering evaluations, calculations, field verification, and external communications. Section 5.0 of this Plan establishes the requirements for reporting documentation. Section 6.0 of this Plan establishes the QA documentation requirements.

PROGRAM STATUS

In the interim since our last status report during the February 8, 1983 public meeting, the Midland IDCV program has progressed to the point where confirmed items have been identified. A confirmed item is judged to be an apparent finding by the review team and will require action, such as additional documentation not utilized by the team that documents the resolution of the item or additional analysis, design or construction changes or procedural changes that may be



Mr. J. G. Keppler,
Mr. D. G. Eisenhut

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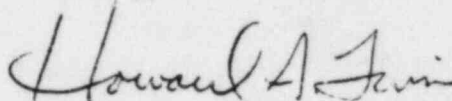
March 18, 1983

necessary to resolve the item. Confirmed Items that are later verified become findings as defined in the Engineering Program Plan and Project Instruction PI-3201-008.

To date these confirmed items have not been distributed outside the Midland IDCV program; however, to reach disposition of these items, interaction with the responsible design or construction organizations is necessary to obtain any pertinent additional information that may not have been available to the review team as well as clarification. Prior to initiating this activity we would like to discuss with you our procedure for handling these items as documented in Project Instruction PI-3201-008.

Your earliest attention to these matters will be greatly appreciated. We are prepared to immediately respond to any questions that you may have. Please contact either me at (301) 654-8960 or Mr. John Beck at (214) 871-1075.

Sincerely,

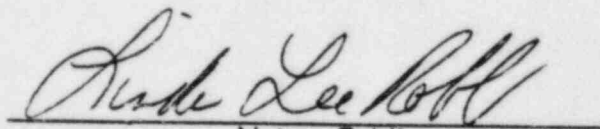


Howard A. Levin
Project Manager
Midland Independent
Design and Construction
Verification Program

cc: J. Cook, CPC
G. Keeley, CPC
D. Hood, NRC

Enclosures

Sworn and Subscribed Before Me This 18th Day of March 1983



Notary Public

My Commission Expires _____ My Commission Expires July 1, 1986



TERA CORPORATION

ATTACHMENT I

CORPORATE AFFIDAVIT STATEMENT
OF INDEPENDENCE

STATEMENT OF CORPORATE INDEPENDENCE

AFFIDAVIT OF JOHN W. BECK ON BEHALF OF TERA CORPORATION AND ITS SUBSIDIARIES

My name is John W. Beck. I am a Vice President of TERA Corporation. This statement is made on behalf of TERA Corporation and its subsidiaries.

I am currently serving in the capacity of Principal-in-Charge of the team which is conducting an Independent Design and Construction Verification (IDCV) program at the Midland Nuclear site.

Consumers Power Company (CPC) Contract No. CP10-8782-Q, executed on November 18, 1982, specifies the criteria for corporate independence and individual independence of personnel assigned to work on the IDCV program. The specified independence criteria are set forth in a letter from Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission (NRC), to the Honorable John D. Dingell, Chairman, Committee on Energy and Commerce, U.S. House of Representatives, dated February 1, 1982.

TERA Corporation has determined that the Corporation and individual members of the IDCV team satisfy the independence requirements of CPC Contract No. CP10-8782-Q and, in particular, the following criteria:

1. TERA Corporation and individuals assigned to the Midland IDCV program do not have any direct previous involvement with the Midland activities that they will be reviewing.
2. TERA Corporation and individuals assigned to the Midland IDCV program have not been previously hired by Consumers Power Company, Bechtel, or Babcock and Wilcox to perform design, construction or quality work relative to the Midland activities that they will be reviewing.
3. TERA Corporation and individuals assigned to the Midland IDCV program have not been previously employed by Consumers Power Company.
4. The individuals assigned to work on the Midland IDCV program do not have present household members employed by Consumers Power Company.

5. The individuals assigned to work on the Midland IDCV program do not have any relatives employed by Consumers Power Company.
6. TERA Corporation and individuals assigned to work on the Midland IDCV program do not own or control significant amounts of Consumers Power Company stock.

TERA Corporation has obtained affidavits for each individual currently assigned to the Midland IDCV program team. In the event that additional personnel are assigned to the team, TERA Corporation will obtain affidavits from these individuals as well.

Signed

John W. Beck

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires _____

TERRY GAMBLE, Notary Public
in and for the State of Texas
My Commission Expires 8-17-86

ATTACHMENT 2

**INDIVIDUAL AFFIDAVIT STATEMENTS
OF INDEPENDENCE**

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF John Beck

My name is John Beck. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

John W Beck

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires _____

TERRY GAMBLE, Notary Public
In and for the State of Texas
My Commission Expires 8-17-86

Murray Savings Money Market Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF HOWARD A. LEVIN

My name is HOWARD A. LEVIN. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached.* I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

* MERRILL LYNCH CMA
PACE FUND

Howard A. Levin

Sworn and Subscribed Before Me This 17th Day of March 1983

Andee Lee Cobb
Notary Public

My Commission Expires My Commission Expires July 1, 1988

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Mark Polit

My name is Mark Polit. I am employed by TERA Corporation

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

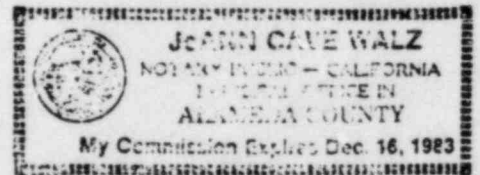
Signed

Mark Polit

Sworn and Subscribed Before Me This 17 Day of March 1983

Joann Cave Walz
Notary Public

My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Curt Staley

My name is Curt Staley. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Curt Staley

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires TERRY GAMBLE, Notary Public
in and for the State of Texas
My Commission Expires 8-17-86

** Except as follows:

- 1976-1977 Engineering Supervisor and Deputy Project Engineer, Bechtel Power Corporation, Gaithbrg, MD, for the Dickerson Steam Generation Plant, Potomic Electric Power Company.
- 1968-1974 Senior Engineer and Group Leader, Bechtel Power Corporation, San Francisco, CA, for the Limerick Generating Station, Philadelphia Electric Company.

Merrill Lynch Ready Assets Trust

Murray Savings Money Market Funds

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Frank Dougherty

My name is Frank Dougherty. I am employed by TERA Corporation.

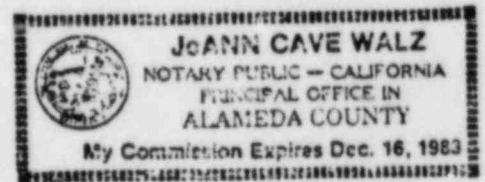
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Signed

Frank J. Dougherty

Sworn and Subscribed Before Me This 17 Day of March 1983

JoAnn Cave Walz
Notary Public
My Commission Expires 12/16/83



Mutual Funds

Merrill Lynch CMA Money Trust
Kemper Money Market
Daily Interest Fund

Mathera Fund

Energy Fund

20th Century Growth Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF RICHARD P. SNAIDER

My name is RICHARD P. SNAIDER I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Richard P. Snider

Sworn and Subscribed Before Me This 17th Day of March 1983

David Lee Robb
Notary Public

My Commission Expires My Commission Expires July 1, 1986

SNAIDER

MUTUAL FUNDS

ENERGY FUND

MERRILL-LYNCH HIGH INCOME BOND FUND

AMERICAN GENERAL PACE FUND

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Lionel D. Bates

My name is Lionel D. Bates. I am employed by TERA Corporation as Lead Technical Reviewer.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

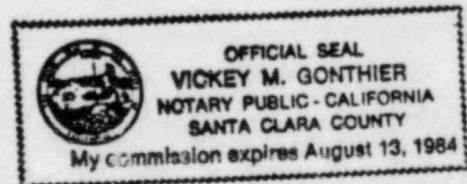
Signed

Lionel D. Bates

Sworn and Subscribed Before Me This 17th Day of March 1983

Vic M. Gonthier
Notary Public

My Commission Expires 8-13-84



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF MARTIN B. JONES, JR

My name is Martin B. Jones, Jr.. I am employed by TERA Corporation as an Associate, Lead Site Activities.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Martin B. Jones

Sworn and Subscribed Before Me This 17th Day of March 1983

Betty J. Metzger
Notary Public

My Commission Expires 10/10/84

* I have served as a consultant to Becon Construction Co., a Bechtel subsidiary, during 1982. None of this work was related to the Midlands project, or to any nuclear related work.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Donald Davis

My name is Donald Davis. I am employed by TERA Corporation as Member Senior Review Team.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

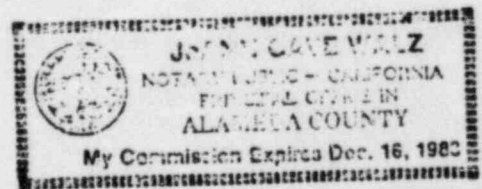
Signed

Donald Davis

Sworn and Subscribed Before Me This 16th Day of March 1983

J. C. Walsh
Notary Public

My Commission Expires 12/16/83



Funds in which D.K. Davis has an interest

1. Franklin Tax-Free - California
2. Inter Capital Liquid Asset
3. TERA Deferred Compensation (Retirement)

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF WILLIAM J. HALL

My name is William J. Hall. I am employed by TERA Corporation
as Consultant.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel,* or Babcock and Wilcox.

Signed

* with the exception of the Midland Independent Design and Construction Program.

** a son-in-law employed by Bechtel, Gaithersburg, MD

William J. Hall

William J. Hall

Sworn and Subscribed Before Me This 17th Day of March 1983

Louis A. Dallas
Notary Public

My Commission Expires 2/6/85

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert Wilson

My name is Robert Wilson. I am employed by TERA Corporation

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. ~~I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock.~~ Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

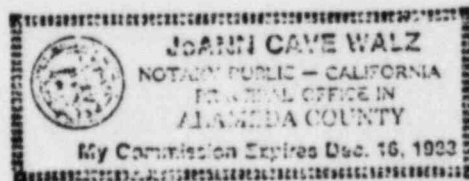
Signed

Robert Wilson

Sworn and Subscribed Before Me This 17 Day of March 1983

Joann Cave Walz
Notary Public

My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert Cudlin

My name is Robert Cudlin. I am employed by TERA Corporation.

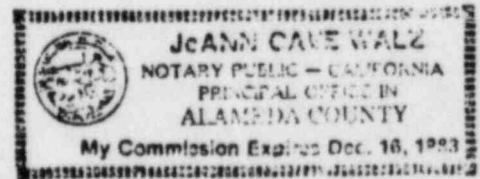
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Signed

Robert J. Cudlin

Sworn and Subscribed Before Me This 17 Day of March 1983

Jeanne Cave Walz
Notary Public
My Commission Expires 12/16/83



- * First Jersey Securities
- ** Brother, Joseph Cudlin, is currently employed by B&W as Manager, Analysis Technology.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Henry J. George

My name is Henry George. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Henry J. George

Sworn and Subscribed Before Me This 17th Day of March 1983

Andee Lee Robb
Notary Public

My Commission Expires My Commission Expires July 1, 1985

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Joseph Martore

My name is J. MARTORE. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Joseph Martore

Sworn and Subscribed Before Me This 18th Day of March 1983

And Lee Robt
Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert C. Snyder

My name is Robert C. Snyder. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Robert C. Snyder

Sworn and Subscribed Before Me This 17th Day of March 1983

And Lee Robt
Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Michael B. Ryzock


My name is Michael B. Ryzock. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 17th Day of March 1983


Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Christian Mortgat

My name is Christian Mortgat. I am employed by TERA Corporation

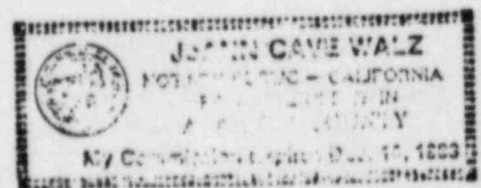
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Signed

Christian Mortgat

Sworn and Subscribed Before Me This 17 Day of March 1983

Joseph C. Walz
Notary Public
My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Jorma Arros

My name is Jorma Arros. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

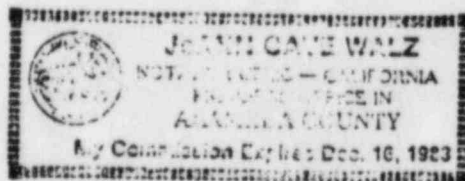
Signed

Jorma Arros

Sworn and Subscribed Before Me This 17 Day of March 1983

J. C. Daly
Notary Public

My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Kenneth W. Campbell

My name is Kenneth W. Campbell. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Kenneth W. Campbell

Sworn and Subscribed Before Me This 18th Day of March 1983

Paul DePoff
Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Normand A. Berube

My name is Normand A. Berube. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Normand A. Berube

Sworn and Subscribed Before Me This 18th Day of March 1983

Rinda Lee Roth
Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Frederick Berthrong

My name is Frederick Berthrong. I am employed by TERA Corporation

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company.* I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

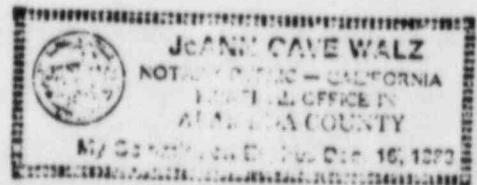
Signed

Frederick Berthrong

* I was employed by Bechtel Power Corporation (January 1972 - September 1977) but performed no services for or on the Midland Project.

Sworn and Subscribed Before Me This _____ Day of March 1983

Joel C. Daly
Notary Public
My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Richard MacDonald

My name is Richard MacDonald. I am employed by TERA Corporation

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox. *

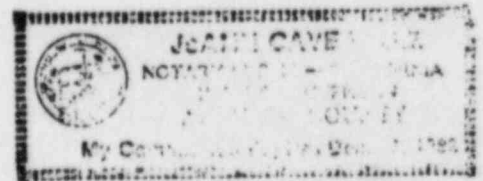
Signed

Richard R. MacDonald

Sworn and Subscribed Before Me This 17th Day of March 1983

J. L. O. Walsh
Notary Public

My Commission Expires 12/16/83



* I was employed by Bechtel Power Corporation (1971-79) for 8 1/2 years as Mechanical Engineering Supervisor, Assistant to the Manager of Engineering and Project Engineer on small projects. I was never directly involved on the Midland Project or with Consumers Power, or Babcock and Wilcox.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF DONALD B. TULODIESKI

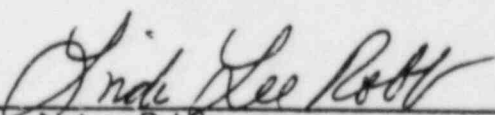
My name is DONALD B. TULODIESKI. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company.* I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 17th Day of March 1983


Notary Public

My Commission Expires My Commission Expires July 1, 1985

* Employed by Babcock & Wilcox Co. from 1973 to 1978. Final position was Project Manager for Toledo Edison, Davis Besse Units

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Gary Smith

My name is Gary Smith. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Gary Smith

Sworn and Subscribed Before Me This 17th Day of March 1983

Sandra Vinson
Notary Public

My Commission Expires 2-17-85

SANDRA VINSON, Notary Public
in and for the State of Texas
My Commission Expires 2-17-85

A. G. Edwards, Daily Cash Accumulation Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Douglas Witt

My name is Douglas Witt. I am employed by TERA Corporation,

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

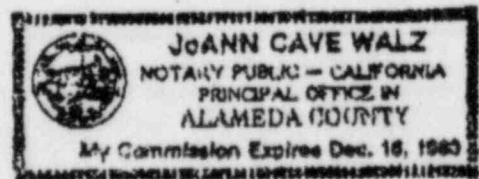
Signed

Douglas Witt

Sworn and Subscribed Before Me This 18 Day of March 1983

Joann Cave Walz
Notary Public

My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Randy Cleland

My name is Randy Cleland. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. ~~Mutual fund~~ or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Randy Cleland

Sworn and Subscribed Before Me This 17th Day of March 1983

Terry Gamble
Notary Public

My Commission Expires _____

TERRY GAMBLE, Notary Public
in and for the State of Texas
My Commission Expires 8-17-86

University Savings Association Money Master Fund

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF George J. Triglia, Jr

My name is George J. Triglia, Jr. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

George J. Triglia, Jr

Sworn and Subscribed Before Me This 18th Day of March 1983

Arthur Lee Rott
Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Stephen Schreurs

My name is Stephen Schreurs I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Stephen E. Schreurs

Sworn and Subscribed Before Me This 17th Day of March 1983

Andi Lee Roff
Notary Public

My Commission Expires My Commission Expires July 1, 1988

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Farzin Ramezanbeigi

My name is Farzin Ramezanbeigi. I am employed by TERA Corporation.

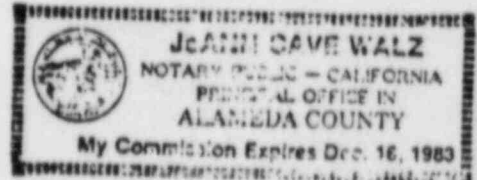
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Signed

Farzin Ramezanbeigi

Sworn and Subscribed Before Me This 17 Day of March 1983

Joanne Cave Walz
Notary Public
My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF CHRISTIAN NELSON

My name is CHRISTIAN NELSON. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Christian Nelson

Sworn and Subscribed Before Me This 17th Day of March 1983

Amber Lee Roff
Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Monte J. Wise

My name is Monte J. Wise. I am employed by TERA Corporation as Asst. Tech. Reviewer.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Monte J. Wise

Sworn and Subscribed Before Me This 17th Day of March 1983

Charles H. Gardner
Notary Public

My Commission Expires at death

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Mehmet Celebi

My name is Mehmet Celebi. I am employed by TERA Corporation as Associate Technical Reviewer

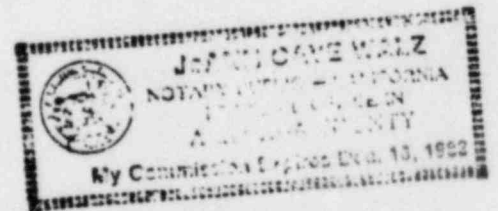
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Signed

Mehmet Celebi

Sworn and Subscribed Before Me This 17 Day of March 1983

James Oave Walz
Notary Public
My Commission Expires 12/16/83



*I was employed by Bechtel Power Corporation, San Francisco between January 1978 to May 1979 as an Engineering Specialist and between August 1982-December 1982 on a Casual Project Engineer status.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF ALBERT MARTORE

My name is ALBERT MARTORE. I am employed by TERA Corporation as ASSOC. TECHNICAL REVIEWER.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Albert V. Martore

Sworn and Subscribed Before Me This 17 Day of March 1983

Sam [Signature]
Notary Public

My Commission Expires MY COMMISSION EXPIRES OCTOBER 15, 1989.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Lou Fusco

My name is Lou Fusco. I am employed by TERA Corporation
as ASSOC. TECH. REVIEWER.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Lou Fusco

Sworn and Subscribed Before Me This 17 Day of March 1983

Marjorie Hand
Notary Public

My Commission Expires March 19, 1985



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF JAMES I OWENS

My name is JAMES I OWENS. I am employed by TERA Corporation
as ASSOCIATE TECHNICAL REVIEWER

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

James I Owens

Sworn and Subscribed Before Me This 17th Day of March 1983

Margaret R. Cameron
Notary Public

My Commission expires December 23, 1984

My Commission Expires _____

3/17/83

A LIST OF MUTUAL FUNDS
IN WHICH I HAVE AN
INTEREST BUT OVER WHICH
I HAVE NO CONTROL IS

- 1) 44 WALL STREET FUND INC
- 2) MUTUAL SHARES CORP

James J. Jones

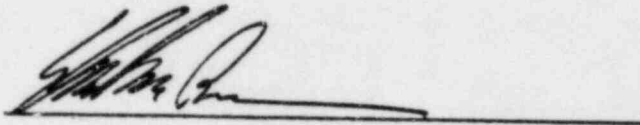
STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Edward M. Beck

My name is Edward M. Beck. I am employed by TERA Corporation as Associate Technical Reviewer.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 17 Day of March 1983

Elizabeth T. Wentz
Notary Public

My Commission Expires 11-1-1985

*with the exception of the Midland Independent Design and Construction Verification Program

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Robert Reneau

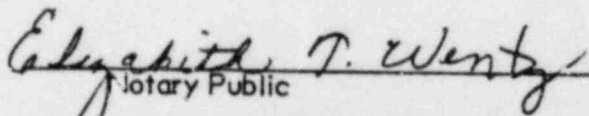
My name is Robert Reneau. I am employed by TERA Corporation as Associate Technical Reviewer.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project,* or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed



Sworn and Subscribed Before Me This 17 Day of March 1983



Notary Public

My Commission Expires 11-1-1985

*with the exception of the Midland Independent Design and Construction Verification Program

Daily Cash Accumulation Fund Inc.
3600 S. Yosemite Street
Denver, Colorado 80237

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Joseph Penzien

My name is Joseph Penzien. I am employed by TERA Corporation
as Associate Technical Reviewer

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

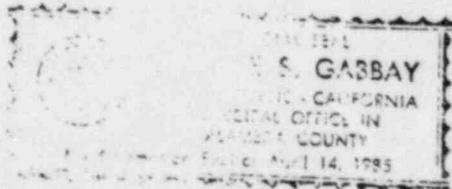
Signed

Joseph Penzien

Sworn and Subscribed Before Me This 17 Day of March 1983

Michelle S. Gabbay
Notary Public

My Commission Expires April 14, 1985



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Daniele Veneziano

My name is Daniele Veneziano. I am employed by TERA Corporation
as Associate Technical Reviewer

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Daniele Veneziano

Sworn and Subscribed Before Me This 17 Day of March 1983

Gloria M. McAvenis
Notary Public

My Commission Expires August 10, 1984

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF S. N. BRISCOMBE

My name is Stephen N. Brisco . I am employed by TERA Corporation as Associate Technical Reviewer .

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

S. N. Brisco

Sworn and Subscribed Before Me This 17th Day of March 1983

Marjorie Hand
Notary Public

My Commission Expires March 19, 1985



- * Employed by Bechtel Power Corporation, Construction Staff, 1977-79. Performed Review Activity on site for three days in 1979. Work consisted of reviewing electrical design, notes and details, for constructability.

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF RICHARD W. KELLER

My name is RICHARD W. KELLER. I am employed by TERA Corporation as ASSISTANT TECHNICAL ADVISOR.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Richard W. Keller

Sworn and Subscribed Before Me This 17th Day of March 1983

Charles S. Zagady
Notary Public

My Commission Expires at death

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF LOREN STANLEY

My name is Loren Stanley. I am employed by TERA Corporation as ASSOC. TEL. REVIEWER.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

Loren Stanley

Sworn and Subscribed Before Me This 17th Day of March 1983

Marjorie Hand
Notary Public

My Commission Expires March 19, 1985



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF EDWARD D. SCHRULL

My name is EDWARD D. SCHRULL. I am employed by TERA Corporation as ASSOCIATE TECHNICAL REVIEWER.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

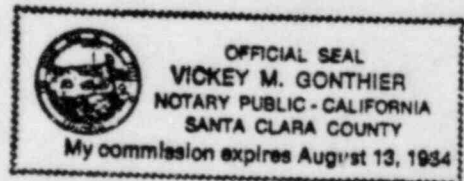
Signed

Edward D. Schrull

Sworn and Subscribed Before Me This 17th Day of March 1983

Vickey M. Gonthier
Notary Public

My Commission Expires 8-13-84




STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Luis E. Flores

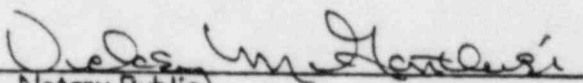
My name is Luis E. Flores. I am employed by TERA Corporation as Associate Technical Reviewer.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

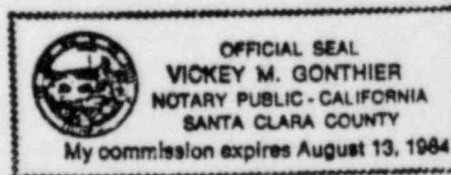
Signed



Sworn and Subscribed Before Me This 17th Day of March 1983


Notary Public

My Commission Expires 8-13-84



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF DAVID B. HAMEL

My name is DAVID B. HAMEL. I am employed by TERA Corporation as ASSOCIATE TECHNICAL REVIEWER

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

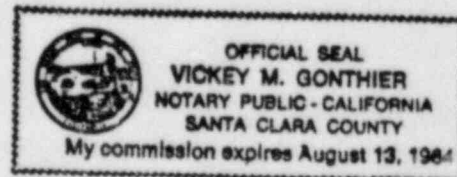
Signed

David B. Hamel

Sworn and Subscribed Before Me This 17th Day of March 1983

Vickey M. Gonthier
Notary Public

My Commission Expires 8-13-84



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF HARRY L. BROXSON

My name is HARRY L. BROXSON. I am employed by TERA Corporation as ASSOCIATE TECHNICAL REVIEWER.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

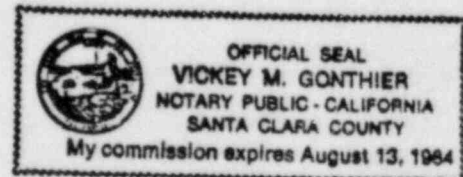
Signed

Harry L. Broxson

Sworn and Subscribed Before Me This 17th Day of March 1983

Vickey M. Gonthier
Notary Public

My Commission Expires 8-13-84



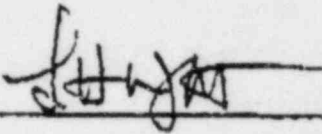
STATEMENT OF INDEPENDENCE

AFFIDAVIT OF Lawrence Wight

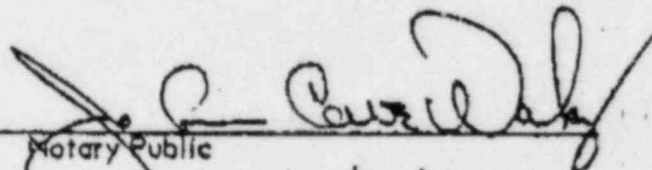
My name is Lawrence Wight. I am employed by TERA Corporation,

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

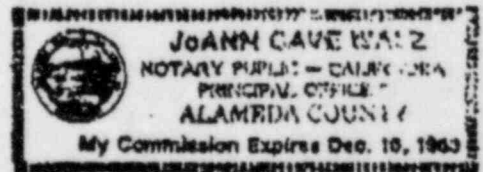
Signed



Sworn and Subscribed Before Me This 17 Day of March 1983



Notary Public
My Commission Expires 12/16/83



STATEMENT OF INDEPENDENCE

AFFIDAVIT OF JAMES A. LONG, III

My name is James A. Long, III. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent design and construction verification at the Midland Nuclear Plant site. Prior to being given this assignment, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

James A. Long

Sworn and Subscribed Before Me This 18th Day of March 1983

Andrew Lee Robb
Notary Public

My Commission Expires My Commission Expires July 1, 1985

EXPLANATORY NOTE FOR ATTACHMENT 2:

Several individual affidavits are not presently included as part of attachment 2 due to logistics. These affidavits will be submitted under separate cover.

KEY PERSONNEL
MIDLAND INDEPENDENT DESIGN AND
CONSTRUCTION VERIFICATION PROGRAM

• PROJECT DIRECTION

JOHN BECK, M.S., PRINCIPAL-IN-CHARGE

NUCLEAR POWER PLANT OPERATIONS AND CORPORATE MANAGEMENT, LICENSING, ENGINEERING AND PROJECT MANAGEMENT

- VICE PRESIDENT, TERA CORPORATION
- 18 YEARS NUCLEAR EXPERIENCE
- FORMERLY EXECUTIVE VICE PRESIDENT, VERMONT YANKEE NUCLEAR POWER CORPORATION; SERVED AS CHIEF OPERATING OFFICER
- FORMERLY DIRECTOR OF ENGINEERING, YANKEE ATOMIC ELECTRIC COMPANY

HOWARD LEVIN, M.S., PROJECT MANAGER

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN AND CONSTRUCTION, EQUIPMENT QUALIFICATION, OPERATING REACTOR SAFETY, LICENSING, PROJECT MANAGEMENT

- 9 YEARS NUCLEAR EXPERIENCE/11 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NRC AND STONE & WEBSTER

KEY PERSONNEL

(continued)

- SENIOR REVIEW TEAM

WILLIAM J. HALL, PH.D., UNIVERSITY OF ILLINOIS

ENGINEERING ANALYSIS AND DESIGN, STRUCTURAL ENGINEERING, STRUCTURAL MECHANICS AND DYNAMICS, SOIL MECHANICS, FRACTURE MECHANICS, ENGINEERING CRITERIA DEVELOPMENT FOR MAJOR PROJECTS

- 39 YEARS EXPERIENCE IN NUCLEAR, MILITARY, AND COMMERCIAL FIELDS
- CONSULTANT TO NRC, NATIONAL LABS, TERA CORPORATION, AND OTHERS ON NUCLEAR SAFETY ISSUES
- LONG ASSOCIATE OF LATE NATHAN M. NEWMARK

DONALD DAVIS, TERA

NUCLEAR SAFETY AND LICENSING, PLANT AND REACTOR SYSTEMS, THERMAL-HYDRAULIC ANALYSIS, ACCIDENT ANALYSIS

- 15 YEARS NUCLEAR EXPERIENCE/18 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NRC AND HITTMAN ASSOCIATES

ROBERT WILSON, M.S.

NUCLEAR POWER PLANT OPERATIONS, ENGINEERING AND DESIGN, LICENSING, CONTRACT ADMINISTRATION, PROJECT MANAGEMENT, PUBLIC RELATIONS

- SENIOR VICE PRESIDENT, TERA CORPORATION
- 16 YEARS NUCLEAR EXPERIENCE
- FORMERLY SUPERVISOR OF NUCLEAR ENGINEERING, SMUD

KEYPERSONNEL

(continued)

- LEAD TECHNICAL REVIEWERS

CURT STALEY, M.S., LEAD STRUCTURAL REVIEWER AND
CONSTRUCTION VERIFICATION PROGRAM MANAGER

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN,
CONSTRUCTION PROJECT MANAGEMENT AND CONTROL

- 14 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL, GENERAL DYNAMICS, CHEMICO

FRANK DOUGHERTY, M.S., M.B.A., LEAD MECHANICAL REVIEWER

NUCLEAR POWER PLANT MECHANICAL DESIGN, QUALITY ASSUR-
ANCE, SAFETY AND RELIABILITY ANALYSIS, SYSTEM
DESIGN/CRITERIA DEVELOPMENT

- 14 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH EDS AND SARGENT & LUNDY

RICHARD SNAIDER, M.B.A., LEAD SYSTEMS REVIEWER

NUCLEAR POWER PLANT OPERATIONS, MAINTENANCE AND
DESIGN, SYSTEMS ENGINEERING, LICENSING PROJECT MANAGE-
MENT, MECHANICAL ENGINEERING

- 15 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH JERSEY CENTRAL POWER & LIGHT AND NRC

LIONEL BATES, M.S., LEAD ELECTRICAL REVIEWER

NUCLEAR POWER PLANT ELECTRICAL, INSTRUMENTATION AND
CONTROL SYSTEMS DESIGN, EQUIPMENT QUALIFICATION, PLANT
OPERATIONS AND MAINTENANCE

- 10 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NUTECH, WESTINGHOUSE, SAN DIEGO GAS AND
ELECTRIC COMPANY, AND OMTEC

KEY PERSONNEL

(continued)

- LEAD SITE ACTIVITIES

MARTIN JONES

NUCLEAR POWER PLANT CONSTRUCTION MANAGEMENT, QUALITY CONTROL, TRAINING, START-UP, ELECTRICAL ENGINEERING

- 22 YEARS NUCLEAR EXPERIENCE
- FORMERLY MANAGER OF CONSTRUCTION AND QUALITY CONTROL, SOUTH CAROLINA ELECTRIC AND GAS COMPANY

- PROJECT QUALITY ASSURANCE

CHARLES LEMON

NUCLEAR POWER PLANT ENGINEERING, QUALITY ASSURANCE, LICENSING, COMPUTER SYSTEMS APPLICATION

- 12 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

MARK POLIT

NUCLEAR POWER PLANT LICENSING, EQUIPMENT QUALIFICATION, INSTRUMENTATION AND CONTROL, SYSTEMS ENGINEERING

- 3 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH OMTEC AND NUTECH

- DESIGN REVIEW TEAM PERSONNEL

ROBERT CUDLIN, M.S., J.D.

NUCLEAR SAFETY AND LICENSING, REACTOR SAFEGUARDS, PLANT AND CONTAINMENT SYSTEMS, EQUIPMENT QUALIFICATION

- 9 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC, SENATE SUBCOMMITTEE ON NUCLEAR REGULATION

KEY PERSONNEL

(continued)

● DESIGN REVIEW TEAM PERSONNEL

HENRY GEORGE, M.S.

QUALITY ASSURANCE, TRAINING, NUCLEAR PLANT SYSTEMS, PROCEDURES, PROJECT MANAGEMENT, MECHANICAL ENGINEERING

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC AND ARMY

CHRISTIAN MORTGAT, PH.D.

ENGINEERING MECHANICS, EARTHQUAKE ENGINEERING

- 5 YEARS NUCLEAR EXPERIENCE/9 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH WOODWARD-CLYDE

LOREN STANLEY

NUCLEAR POWER PLANT LICENSING, DESIGN REVIEW, SAFETY-RELATED COMPONENT DETERMINATIONS, PROBABILISTIC RISK ASSESSMENT, INSTRUMENTATION, SYSTEM DESIGN AND ANALYSIS

- 26 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH GENERAL ELECTRIC COMPANY, OMTEC AND QUADREX CORPORATION

RICHARD KELLER, M.S.

ELECTRICAL, INSTRUMENTATION, AND CONTROL SYSTEMS DESIGN, NUCLEAR POWER PLANT OPERATIONAL ANALYSIS, PLANT PROTECTION SYSTEMS/ENGINEERED SAFETY FEATURES EVALUATION, PROBABILISTIC RISK ASSESSMENT

- 15 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH AEROJET NUCLEAR, STOLLER AND SYSTEM DEVELOPMENT CORPORATION

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

MEHMET CELEBI, PH.D.

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN AND CONSTRUCTION, QUALITY ASSURANCE

- 16 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL, EDAC

JORMA ARROS, PH.D. (CANDIDATE)

ENGINEERING MECHANICS

- 5 YEARS NUCLEAR EXPERIENCE/8 YEARS ENGINEERING EXPERIENCE

KENNETH CAMPBELL, PH.D.

SOIL MECHANICS, EARTHQUAKE ENGINEERING

- 10 YEARS ENGINEERING EXPERIENCE

EDWARD SCHRULL

REACTOR SAFETY SYSTEMS, NUCLEAR LICENSING, RELIABILITY AND RISK ASSESSMENT, INSTRUMENTATION AND CONTROL, COMPUTER ANALYSES

- 9 YEARS NUCLEAR EXPERIENCE
- CURRENTLY WITH EIGEN ENGINEERING
- FORMERLY WITH OMTEC, QUADREX AND NUTECH

STAN FABIC, PH.D.

THERMAL-HYDRAULIC AND HYDRO-ELASTIC ANALYSIS, COMPUTER METHODS DEVELOPMENT (AUTHORED BLOWN-2, WHAM, GASRAD, MULTIFLEX), PIPE RUPTURE ANALYSIS, CONTAINMENT ANALYSIS

- 24 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC, WESTINGHOUSE, AND KAISER ENGINEERS

KEY PERSONNEL

(continued)

● DESIGN REVIEW TEAM PERSONNEL

NORMAND BERUBE, M.S.

DESIGN AND ANALYSIS OF MECHANICAL SYSTEMS, THERMAL-HYDRAULICS, HEAT TRANSFER, ENGINEERING, ANALYSIS

- 11 YEARS ENGINEERING EXPERIENCE

JOSEPH MARTORE, M.S., M.B.A.

NUCLEAR POWER PLANT STRUCTURAL, MECHANICAL DESIGN AND CONSTRUCTION, EQUIPMENT QUALIFICATION, OPERATING REACTOR SAFETY, LICENSING, PROJECT MANAGEMENT

- 8 YEARS NUCLEAR EXPERIENCE/10 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NRC AND STONE & WEBSTER

JOHN ANGELO, M.S.

DESIGN, OPERATION, MAINTENANCE, INSTALLATION, TESTING AND INSPECTION OF POWER PLANT SYSTEMS AND COMPONENTS, NUCLEAR SAFETY AND LICENSING

- 20 YEARS NUCLEAR EXPERIENCE/33 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH GENERAL ELECTRIC, ARMY REACTORS, NRC

FARZIN RAMEZANBEIGI

STRUCTURAL AND MECHANICAL ENGINEERING, USAGE AND INTERPRETATION OF STRUCTURAL/MECHANICAL COMPUTER CODES

SUSAN SLY

CIVIL/MECHANICAL DESIGN AND CONSTRUCTION, INSTALLATION AND INSPECTION

- 4 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

JAMES LONG

ENGINEERING MANAGEMENT, NUCLEAR SAFETY AND LICENSING

- 16 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC, NAVY

RICHARD MACDONALD, M.B.A.

ENGINEERING, CONSTRUCTION, OPERATION, MAINTENANCE AND PROJECT MANAGEMENT SYSTEMS, NUCLEAR PLANT START-UP AND OPERATIONS

- 11 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

CHRISTIAN NELSON

NUCLEAR POWER PLANT SAFETY AND LICENSING, SEISMIC DESIGN, OPERATIONAL ANALYSIS, PLANT INSPECTION PROGRAM DEVELOPMENT

- 12 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC

JOSEPH PENZIEN, PH.D., UNIVERSITY OF CALIFORNIA (BERKELEY)

STRUCTURAL ENGINEERING, EARTHQUAKE ENGINEERING, REINFORCED CONCRETE RESPONSE

- 37 YEARS ENGINEERING EXPERIENCE
- CURRENTLY DIRECTOR OF EARTHQUAKE ENGINEERING RESEARCH CENTER AT UNIVERSITY OF CALIFORNIA, BERKELEY

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

DANIELE VENEZIANO, PH.D., MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ENGINEERING STATISTICAL ANALYSIS, PROBABILISTIC ANALYSIS,
CIVIL ENGINEERING

- PROFESSOR OF CIVIL ENGINEERING

MICHAEL AYCOCK

NUCLEAR POWER PLANT SYSTEMS, OPERATING PROCEDURES,
LICENSING AND PROJECT MANAGEMENT

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NRC

GEORGE TRIGILIO

NUCLEAR RADWASTE SYSTEM DESIGN AND ANALYSIS, PROJECT
MANAGEMENT

- FORMERLY WITH BROWN & ROOT, STONE & WEBSTER AND
HITTMAN NUCLEAR DEVELOPMENT CORPORATION

LENNY LAAKSO, M.S.

STRUCTURAL/MECHANICAL ANALYSIS AND DESIGN OF NUCLEAR
POWER PLANT BUILDINGS AND EQUIPMENT, SPECIFICATIONS,
PLANNING AND SCHEDULING

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH STONE AND WEBSTER, CHAS. T. MAIN

KEY PERSONNEL

(continued)

- DESIGN REVIEW TEAM PERSONNEL

LOUIS FUSCO, JR.

NUCLEAR SYSTEMS ENGINEERING AND LICENSING, EQUIPMENT QUALIFICATION, ENGINEERING AND PROJECT MANAGEMENT, NUCLEAR POWER PLANT OPERATIONS AND MANAGEMENT

- 8 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH NUS, EDS, NAVY

STEPHEN SCHREURS

DESIGN AND ANALYSIS OF RADWASTE PROCESSING SYSTEMS, COMPUTER SYSTEMS APPLICATION, PROJECT MANAGEMENT

- 9 YEARS NUCLEAR EXPERIENCE

DOUGLAS M. WITT, M.S.

NUCLEAR POWER PLANT SYSTEMS AND MECHANICAL DESIGN, SAFETY ANALYSIS, EQUIPMENT DESIGN, LICENSING, HELBA, THERMAL-HYDRAULICS

- 12 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH SARGENT AND LUNDY, EDS NUCLEAR

- CONSTRUCTION REVIEW TEAM PERSONNEL

JAMES OWENS

NUCLEAR AND FOSSIL POWER PLANT DESIGN AND CONSTRUCTION NUCLEAR STEAM SUPPLY SYSTEMS DESIGN AND CONSTRUCTION, PROJECT MANAGEMENT, CONTROL SYSTEMS, SAFEGUARDS, LICENSING

- 32 YEARS NUCLEAR EXPERIENCE
- FORMERLY GENERAL MANAGER - PRODUCTION ENGINEERING AND CONSTRUCTION AND PROJECT MANAGER SUMMIT NUCLEAR POWER STATION, DELMARVA POWER AND LIGHT COMPANY

KEY PERSONNEL

(continued)

● CONSTRUCTION REVIEW TEAM PERSONNEL

LUIS FLORES

NUCLEAR POWER PLANT LICENSING, OPERATIONS, SYSTEMS ENGINEERING, INSTRUMENTATION AND CONTROL SYSTEMS, FAILURE ANALYSIS

- 9 YEARS NUCLEAR EXPERIENCE
- CURRENT WITH EIGEN ENGINEERING
- FORMERLY WITH OMTEC AND GENERAL ELECTRIC COMPANY

MONTE WISE

ENGINEERING AND PROJECT MANAGEMENT, PRESERVICE/INSERVICE INSPECTION, NDE, NUCLEAR POWER PLANT OPERATIONS AND MANAGEMENT, QUALITY ASSURANCE, EQUIPMENT QUALIFICATION

- 25 YEARS NUCLEAR EXPERIENCE
- FORMERLY SUPERINTENDENT OF LACROSSE BWR
- FORMERLY WITH SW RESEARCH AND GENERAL ELECTRIC

PATRICK LONGSTRETH, B.S., M.B.A.

PROJECT AND CONSTRUCTION MANAGEMENT, ADMINISTRATION, CONTROL AND PLANNING, CONTRACTING

- 15 YEARS PROJECT AND CONSTRUCTION MANAGEMENT EXPERIENCE
- FORMERLY WITH BECHTEL

KEY PERSONNEL

(continued)

● CONSTRUCTION REVIEW TEAM PERSONNEL

STEPHEN BRISCOMBE

CONSTRUCTION MANAGEMENT, SITE CONSTRUCTION SERVICES, CONSTRUCTION SUPERVISION, ELECTRICAL CONSTRUCTION TECHNIQUES, PROCEDURES AND SPECIFICATION DEVELOPMENT, DESIGN REVIEW, QUALITY CONTROL

- 17 YEARS NUCLEAR EXPERIENCE/25 YEARS ENGINEERING EXPERIENCE
 - FORMERLY WITH GE AND BECHTEL
-

SIDNEY BROWN

ENGINEERING AND CONSTRUCTION MANAGEMENT, COST AND SCHEDULING, QUALITY CONTROL, FIELD ENGINEERING

- 17 YEARS NUCLEAR EXPERIENCE/30 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH BECHTEL

LEONARD STOUT

DESIGN, CONSTRUCTION, START-UP AND OPERATIONS, PROJECT CONTROL, SCHEDULE AND COST CONTROL SYSTEMS

- 14 YEARS EXPERIENCE
- FORMERLY WITH BECHTEL

DAVID HAMEL

NUCLEAR POWER PLANT LICENSING, EQUIPMENT ENVIRONMENTAL QUALIFICATION, REACTOR DESIGN, SAFETY EVALUATION, INSTRUMENTATION AND CONTROL DESIGN, FACILITIES OPERATION, HEALTH PHYSICS, QUALITY ASSURANCE

- 16 YEARS NUCLEAR EXPERIENCE
- CURRENTLY WITH EIGEN ENGINEERING
- FORMERLY WITH NUTECH AND GENERAL ELECTRIC COMPANY

KEY PERSONNEL

(continued)

- CONSTRUCTION REVIEW TEAM PERSONNEL

FREDERICK BERTHRONG, M.S.

ENGINEERING PROJECT MANAGEMENT, PLANNING, SCHEDULING
AND FIELD ENGINEERING

- 18 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH BECHTEL

DONALD TULODIESKI

PROJECT MANAGEMENT/CONTROL, START-UP TESTING, ENGINEER-
ING

- 17 YEARS NUCLEAR EXPERIENCE
- FORMERLY WITH B&W AND PUBLIC SERVICE ELECTRIC AND
GAS COMPANY

ALBERT MARTORE

ENGINEERING, SPECIFICATION, CONSTRUCTION FABRICATION,
CONSTRUCTION MANAGEMENT AND CONTROL, SCHEDULING,
SUPERVISION, INSPECTION

- 10 YEARS NUCLEAR EXPERIENCE/30 YEARS ENGINEERING
EXPERIENCE
- FORMERLY WITH PRESCON CORPORATION

ROBERT SNYDER

NUCLEAR POWER PLANT DESIGN AND CONSTRUCTION, PROJECT
MANAGEMENT, START-UP AND OPERATIONS

- 5 YEARS NUCLEAR EXPERIENCE/OVER 30 YEARS ENGINEERING
EXPERIENCE
- FORMERLY WITH HITTMAN ASSOCIATES AND KAISER

GARY SMITH

CIVIL ENGINEERING DESIGN AND CONSTRUCTION, PROJECT
MANAGEMENT

- 15 YEARS EXPERIENCE

KEY PERSONNEL

(continued)

● CONSTRUCTION REVIEW TEAM PERSONNEL

STANLEY KAUT

DESIGN, REVIEW, CONSTRUCTION, TESTING, OPERATION, AND LICENSING OF ELECTRICAL POWER, INSTRUMENTATION AND CONTROL SYSTEMS AND EQUIPMENT; PROJECT MANAGEMENT, DESIGN REVIEW, PLANT PROCEDURES, QUALITY ASSURANCE

- 17 YEARS NUCLEAR EXPERIENCE/20 YEARS ENGINEERING EXPERIENCE
- FORMERLY WITH NUTECH, NUCLEAR SERVICES CORPORATION, AND GE

RANDY CLELAND, M.B.A.

POWER PLANT MECHANICAL DESIGN, PIPING/HANGER DESIGN AND CONSTRUCTION, REVIEW AND INSPECTION OF MECHANICAL SYSTEMS, CONSTRUCTION SUPERVISION AND MANAGEMENT, RESULTS ENGINEERINGS

- 10 YEARS POWER PLANT ENGINEERING EXPERIENCE, 2 YEARS NUCLEAR
- FORMERLY WITH CENTRAL ILLINOIS PUBLIC SERVICE COMPANY AND SARGENT AND LUNDY

EDWARD BECK

NONDESTRUCTIVE TESTING, LEVEL III IN RADIOGRAPHY, ULTRASONICS, MAGNETIC PARTICLE, LIQUID PENETRANT

- 14 YEARS NUCLEAR EXPERIENCE
- CURRENTLY WITH LAW ENGINEERING

ROBERT RENEAU

NONDESTRUCTIVE TESTING, LEVEL II IN RADIOGRAPHY, ULTRASONICS, MAGNETIC PARTICLE, LIQUID PENETRANT

- 10 YEARS NUCLEAR EXPERIENCE
- PREVIOUSLY WITH WESTINGHOUSE, CURRENTLY WITH LAW ENGINEERING

KEY PERSONNEL

(continued)

ORIN W. KILGORE

CERTIFIED LEAD AUDITOR, ANSI N45.2.23, PROJECT AND CORPORATE QUALITY ASSURANCE, CONSTRUCTION, STARTUP AND OPERATIONS. AEC LICENCED SENIOR REACTOR OPERATOR.

- 26 YEARS NUCLEAR POWER EXPERIENCE
- FORMERLY WITH TVA AND NAVY

WILLIAM D. PRYOR

CERTIFIED QUALITY ENGINEER, ASQC, ANSI N45.2.6 LEVEL III QUALITY INSPECTOR CERTIFICATIONS IN MECHANICAL, PIPING, ELECTRICAL AND INSTRUMENTATION, STARTUP, TEST AND OPERATIONS

- 23 YEARS NUCLEAR POWER EXPERIENCE

FREDERICK A. PELLEVIN

PROFESSIONAL QUALITY ENGINEER - STATE OF CALIFORNIA. DEVELOPMENT, IMPLEMENTATION, MONITORING, SUPERVISION, AND EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL PROGRAMS

- 25 YEARS NUCLEAR EXPERIENCE
- FORMERLY INVOLVED IN VARIOUS QA FUNCTIONS FROM QUALITY ENGINEER TO MANAGER OF QA ON SUCH PROJECTS AS WATERFORD 3, VOGTLE AND NINE MILE POINT UNIT 2
- WORKED FOR MAJOR NUCLEAR CONTRACTORS SUCH AS GENERAL DYNAMICS, GILBERT ASSOCIATES, STONE & WEBSTER, MERCURY COMPANY AND ZURN INDUSTRIES