

May 28, 1982

MEMORANDUM FOR: D. Okrent, Chairman  
ACRS Subcommittee on Midland Plant Units 1 & 2

FROM: D. Fischer, Reactor Engineer

SUBJECT: PROJECT STATUS REPORT FOR THE ACRS SUBCOMMITTEE  
MEETING ON MIDLAND PLANT UNITS 1 & 2 - JUNE 2, 1982,  
WASHINGTON, D.C.

Attached is a project status report for the subject meeting. The purpose of the meeting is to review the application of Consumers Power Company for a license to operate the Midland Plant Units 1 & 2.

The meeting will begin at 4:00 p.m. on June 2nd and will be held in Room 1046 (tentative), at 1717 H St., NW., Washington, D.C. Attendance by the following ACRS members and consultants is anticipated and hotel reservations have been made as indicated. If anyone is unable to make the meeting, please call us or the hotel and cancel your reservations so that we are not billed.

D. Okrent	Lombardy	6/1
W. Mathis	Army-Navy	6/1
D. Moeller	Army-Navy	6/1
C. Siess	Park Central	6/1
E. Epler	Park Central	6/2
W. Lipinski	Makes own	

Attachment:  
Project Status Report

cc: ACRS Members  
R. Fraley  
M. Libarkin  
J. McKinley  
G. Quittschreiber  
E. Epler  
W. Lipinski

8510080033 850930  
PDR FOIA  
BRUNNER85-602 PDR

FOIA-85-602  
B/70

OFFICE							
SURNAME							
DATE							

MIDLAND PLANT UNITS 1 & 2  
OPERATING LICENSE REVIEW  
JUNE 2, 1982  
PROJECT STATUS REPORT

PURPOSE:

The purpose of this meeting is to review the application of Consumers Power Company for a license to operate the Midland Plant Units 1 & 2.

BACKGROUND:

Pertinent facts concerning the Midland Project are included in my May 17, 1982 project status report for the ACRS Subcommittee Meeting on Midland Plant Units 1 & 2 - May 20-21, 1982. That project status report contained:

- . a description of the plant site
- . a description of the plant
- . comments on plant elevation and design water levels
- . a status of the ACRS review
- . a list of open items and licensee conditions

Attachments to the May 17th status report included:

- . a map of the Midland
- . a diagram of Midland's reactor coolant system
- . a table comparing Midland features with those of Rancho Seco, Oconee, and Turkey Point
- . past ACRS letters
- . Staff response to comments made in past ACRS letters
- . Dr. Siess' report of the Ad Hoc Subcommittee on foundation problems and remedial actions at Midland Plant Units 1 & 2
- . Consultant reports
  - Dr. R. Foster, Comments on Midland's DES and Emergency Plan
  - Mr. P. Davis, Evaluation of Aux. Feedwater Reliability at Midland
  - Dr. P. Pomeroy, Comments on Midland Seismic Site Specific Response Spectra
  - Mr. J. Hickman, Comments on Midland's Aux. Feedwater Design
- . Statement of Ms. Mary Sinclair

Copies of the status report for the May 20-21 Subcommittee Meeting are available upon request.

OPEN ITEMS:

The status of open items and licensing conditions has not changed since my last status report. As presented by the NRC Staff during the May 20-21 Subcommittee Meeting, these items are listed on Attachment 1 to this report.

MIDLAND PLANT SUBCOMMITTEE MEETINGS TO REVIEW CONSUMERS OL APPLICATION

On April 29, 1982 an ACRS Ad Hoc Subcommittee met to discuss the remedial actions for soils-related structural settlement problems at the Midland site. Of particular note in this report is the Ad Hoc Subcommittee's recommendation (accepted by the full ACRS during the May Full Committee meeting) that the Midland Plant Subcommittee review:

1. The adequacy of the seismic input criteria and
2. The seismic Site Specific Response Spectra and its relation to the proposed permanent site dewatering as a means of reducing the probability of liquefaction due to an earthquake.

During the May 20-21 Midland Plant Subcommittee Meeting the following topics were discussed:

- . The status of the NRC Staff's OL review
- . The quality of design and construction
- . Human factors review of the control room
- . Alternative shutdown panel
- . Instrumentation to detect inadequate core cooling
- . AC/DC system reliability
- . Process steam
- . Seismic issues (including seismic input criteria, seismic site specific response spectra, and liquefaction)
- . Probabilistic risk assessment
- . Auxiliary feedwater system reliability
- . Utility organization, management, and training
- . Emergency operating procedures
- . System high point vents
- . Emergency planning
- . Radiation protection program
- . Environmental issues at Midland
- . Potential for ground water contamination



Several items which were scheduled to be discussed during the May 20-21 meeting were deferred until the June 2nd Subcommittee Meeting. These topics include:

- . Items from previous ACRS letters
- . Methods to reduce common cause failure
- . Integrated control system
- . Seismic and environmental qualification of equipment important to plant safety
- . DHR system operation
- . Bolting and other high strength material
- . Fire protection
- . Habitability

Industrial Security will be discussed at the June 2nd Subcommittee Meeting since we have the facilities in Washington to hear this proprietary presentation.

The tentative schedule for the June 2nd Subcommittee Meeting was issued on May 25, 1982.

#### ADDITIONAL INFORMATION FOR THE JUNE 2 SUBCOMMITTEE MEETING

The NRC Staff's Midland Plant Project Manager, Mr. Darl Hood, has compiled a list of ACRS concerns from past ACRS letters. This list, Attachment 2, is complete and should obviate your review of chapter 19 in the OL SER. Mr. Hood references the section(s) of the OL SER which addresses each ACRS concern. For each concern, he summarizes:

- . the ACRS concern
- . the CP SER response to the ACRS concern
- . the OL SER section that relates to the ACRS concern

Familiarity with Attachment 2 should allow us to move more quickly through the "ITEMS FROM PREVIOUS ACRS LETTERS" section of the June 2nd Subcommittee Meeting.

#### ADDITIONAL INFORMATION FOR THE JUNE 4 FULL COMMITTEE MEETING

Attached to this project status report is a memorandum from Mr. Hood to me dated April 7, 1982 (Attachment 3) that discusses the Midland breakdown in quality assurance with respect to soils activities. The testimony filed June 6 1981 referred to in this memorandum is voluminous. Rather than transmit it to you, I would like to tell you what is in it. If you would like to see all or part of this testimony, please let me know. The June 6th, 1981 NRC Staff testimony contains:



1. Testimony of Eugene J. Gallagher with respect Quality Assurance Program Implementation Prior to December 6, 1979;

Attached to Mr. Gallagher's testimony are those documents listed on Attachment 4. The conclusion of his testimony states "The quality assurance deficiencies related to soil construction activities under and around safety relates structures and systems arising from improper implementation of the quality assurance program provide adequate bases to modify the construction permits by suspending those soil construction activities."

2. NRC Staff testimony of James G. Keppler with respect to the quality assurance implementation prior to December 6, 1979;

Significant attachments to this testimony include:

- Midland Summary Report - an overall assessment of the Midland construction project to Feb. 15, 1979
- Midland Construction Status Report as of Oct. 1, 1979
- March 15, 1979; Summary of Feb. 23, 1979 and March 5, 1979 meeting
- March 12, 1979; Midland Diesel Generator Building and Plant Area Fill

3. NRC Staff testimony with respect to quality assurance;
4. Testimony of Joseph D. Kane with respect to the quality assurance program implementation prior to December 6, 1979;
5. Testimony of Darl S. Hood with respect to the quality assurance program implementation prior to December 6, 1979;
6. NRC Staff testimony with respect to implementation of quality assurance for soils work and remedial measures after December 6, 1979;

The testimony includes as an attachment major summary findings in the areas of management effectiveness, piping and supports, QA/QC program assessment, civil (soils) activities, and electrical work.

7. NRC Staff testimony of Darl S. Hood, Jeffrey K. Kimball and Eugene Gallagher on Stamiris contention 1;
8. NRC Staff testimony of Darl Hood, Joseph Kane, Frank Rinaldi and Eugene Gallagher on Stamiris contention 2; and
9. NRC Staff testimony with respect to intervenor Stamiris contention number 3.

I have extracted Ms. Stamiris' three contentions from the applicable testimony and have included them as Attachment 5.

As a result of the above listed testimony the conclusions of Attachment 6 were reached. Mr. Hood adequately summarized these conclusions in his April 7th memo to me when he said "The applicant subsequently agreed, by joint stipulation with the Staff, not to contest the Staff's findings that a QA breakdown in the soils area existed as of December 6, 1979. The stipulation went on to note that changes had been made to the organization and procedures, and that the Staff now finds these areas to be acceptable."

I also have a copy of the ASLB's Findings of Fact and Conclusions of Law (dated December 30, 1981 and supplement thereto dated March 26, 1982). The supplement addresses the same subjects addressed in the original findings - quality assurance and management attitude. Specific subjects addressed in the supplement include (1) SALP (2) The MPQAD reorganization (3) Quality control inspector qualifications and (4) Audit Report F-77-32. The conclusions reached in the December 30, 1981 findings were not changed. (Attachment 7).

The two Systematic Assessment of Licensee Performance (SALP) reviews which have been completed on Midland are attached (Attachment 8 and 9). Consumers has responded to the latter of these two reviews in a submittals dated May 17th 1982 (Attachment 10). Attachment 11 is a Midland Project Quality Assurance Program update Executive Summary. If you are interested in reviewing Midland's Quality Assurance Program in detail, a two volume description of it is available.

As a result of the most recent SALP report, Mr. Keppler (Region III Administrator) is reevaluating the testimony he made to the ASLB. This reevaluation will be completed in mid June. Selected I&E inspection reports are included as Attachment 12.

# HIGHLAND SER OPEN ITEM STATUS

APPROXIMATE DATE

NEXT ACTION

R OPEN

EM NO.

DESCRIPTION OF ITEM

1.	NEARBY EXPLOSIVE HAZARDS	STAFF/APPLICANT MEETING	JULY 82
2.	TURBINE MISSILES	STAFF COMPLETE REVIEW	JUNE 82
3.	TORNADO MISSILE PROTECTION	STAFF/APPLICANT MEETING	JUNE 82
4.	ANALYSIS OF RCS AND CORE COMPONENTS	APPLICANT SUBMIT ANALYSIS	MARCH 83
5.	SOILS SETTLEMENT ISSUE	APPLICANT SUBMITTAL	ONGOING
6.	SEISMIC AND ENVIRONMENTAL QUALIFICATION OF EQUIPMENT	STAFF CONDUCT SITE AUDITS	JUNE 82/SEPT 82
7.	NATURAL CIRCULATION COOLDOWN ANALYSES	APPLICANT SUBMIT ANALYSIS	AUG 82
8.	HPI LINE MAKEUP NOZZLE CRACKING	APPLICANT SUBMITTAL	JULY 82
9.	REACTOR VESSEL HEAD VENT	APPLICANT SUBMITTAL	JUNE 82
10.	SECONDARY SYSTEM CONTAINMENT VALVE TESTING	STAFF COMPLETE REVIEW	JUNE 82
11.	LEAK TESTING OF DHR AND RBCHS CONTAINMENT VALVES	STAFF COMPLETE REVIEW	JUNE 82
12.	APPENDIX R (FIRE PROTECTION)	APPLICANT SUBMIT APP R COMPARISON	MAY 82
13.	APW RING HEADER DISTORTION	APPLICANT SUBMITTAL	AUG 82
14.	EMERGENCY PREPAREDNESS PLAN	STAFF/APPLICANT MEETING	MAY 82
15.	CONTROL ROOM DESIGN REVIEW	APPLICANT SUBMIT REPORT	DEC 82
16.	SHUTDOWN DECAY HEAT REMOVAL REQUIREMENTS	APPLICANT SUBMIT RELIABILITY ANALYSIS	JUNE 82

ATTACHMENT



MIDLAND SER LICENSE CONDITION STATUS

<u>NO.</u>	<u>LICENSE CONDITION</u>	<u>NEXT ACTION</u>	<u>DATE</u>
1.	GROUNDWATER MONITORING	STAFF REVIEW CONTROL PLAN	JUNE 82
2.	ITEMIZED DOCUMENTATION OF INADEQUATE CORE COOLING INSTRUMENTATION	APPLICANT SUBMIT DESIGN DETAILS	DEC 82
3.	TESTING OF RELIEF AND SAFETY VALVES	APPLICANT PROVIDE TEST RESULTS	JULY 83
4.	INSERVICE INSPECTION PROGRAM	APPLICANT SUBMIT PROGRAM	JULY 84
5.	AFW LEVEL CONTROL DETAILS	APPLICANT PROVIDE TEST RESULTS	SEPT 83
6.	POSTACCIDENT SAMPLING	APPLICANT SUBMIT PROCEDURES	MAR 83
7.	CONTROL OF HEAVY LOADS	APPLICANT IMPLEMENT NUREG-0612, PART I	JULY 83
8.	SECONDARY WATER CHEMISTRY MONITORING AND CONTROL PROGRAM	APPLICANT SUBMIT PROGRAM	AUG 82
9.	B&W PLANT EXPERIENCE ON SHIFT DURING STARTUP	APPLICANT SUBMIT RESUMES	JAN 83
10.	EMERGENCY OPERATING PROCEDURES PER ATOG PROGRAM	APPLICANT SUBMIT ATOE GUIDELINES	SEPT 82
11.	SMALL-BREAK LOCA MODEL	APPLICANT SUBMIT B&W GENERIC PROGRAM	SEPT 82

## ACRS Items of November 18, 1976 Supplemental Midland Report

In a letter dated October 14, 1976, the Licensing Board for a Midland hearing which began on August 16, 1976, returned the original ACRS report of June 18, 1970 to the ACRS for clarification. The clarification sought by the Board was with reference to a paragraph on "other problems related to large water reactors" identified by the Regulatory Staff and the ACRS, and which the committee considered applicable to the Midland Plant.

In response to the Board's request, the ACRS issued a "Supplemental Report on Midland Plant Units 1 and 2" dated November 18, 1976. In July 1977, the NRC Staff issued Supplement 2 to the SER for the CP review (hereafter referred to as the CP-SER) to provide an updated status and identify resolutions of the eleven items identified by the ACRS reply. These items have also been addressed in the recent OL-SER as indexed in Chapter 19. A summary of these OL-SER discussions for the eleven items follows.

### ITEMS FROM 11/18/76 ACRS SUPPLEMENTAL REPORT

	<u>SER REFERENCE</u>
2.1 SEPARATION OF PROTECTION AND CONTROL EQUIPMENT	7.7.3, APP C (USI A-47)
2.2 VIBRATION AND LOOSE-PARTS MONITORING	4.4.4.2
2.3 POTENTIAL FOR AXIAL KENON OSCILLATIONS	4.3.2.5
2.4 BEHAVIOR OF CORE-BARREL CHECK VALVES IN NORMAL OPERATION	4.4.2.3, (2.4 of SUPP 2 to CP-SER)
2.5 FUEL-HANDLING ACCIDENT	15.5.6, 9.4.2
2.6 EFFECTS OF BLOWDOWN FORCES ON CORE INTERNALS	3.9.2.3, 3.9.2.2
2.7 ASSURANCE THAT LOCA RELATED FUEL ROD FAILURES WILL NOT INTERFERE WITH ECCS	4.2.3.3
2.8 EFFECT ON PRESSURE VESSEL INTEGRITY OF ECCS INDUCED THERMAL SHOCK	5.3.5, APP C (USI A-11 & 49)
2.9 ENVIRONMENTAL QUALIFICATION OF EQUIPMENT	3.11
2.10 INSTRUMENTATION TO FOLLOW THE COURSE OF AN ACCIDENT	TABLE 1.1 6.2.8, 7.5, 11.5, 12.3
2.11 IMPROVED QA AND ISI FOR PRIMARY SYSTEM	5.2.4

## 2.1 SEPARATION OF PROTECTION AND CONTROL EQUIPMENT

Source: ACRS Report on 3-Mile Island, January 17, 1968.

Concern centered around the applicant's proposed use of signals from protection instruments for control purposes. ACRS recommended applicant explore possibility of making safety instruments independent of control functions.

In Supplement 2 of the CP-SER, we noted that Consumers Power Company would follow IEEE-279 dated August 1968, and would develop detailed criteria and procedures for the installation of the protection and emergency power system for BOP & NSSS scopes. These were submitted for staff review and approval prior to installation.

In OL-SER, Section 7.7.3, we note the analyses being performed by the applicant of control systems that share a common power source or common instrument line (ICS, evaporator steam demand development, NNI) to assure that failure in these power sources or sensors will not result in consequences more severe than those in Chapter 15. This is also associated with our review of RG 1.97. These analyses will be addressed in an SER Supplement.

In OL-SER, Section 7.7.4, we discuss the applicant's response to IE Information Notice 79-22 (Sept. 79) which asked whether the harsh environment from a high energy line break might cause control system malfunctions and consequences more severe than Chapter 15 analyses. Our review of the applicant's evaluation accepts the finding that consequences beyond Chapter 15 analyses would not occur.

In OL-SER, Section 7.5.2, we address the applicant's response to IE Bulletin 79-27 which questions the adequacy of plant procedures for accomplishing shutdown upon loss of power to any electrical bus supplying power for instruments and controls. We note in Section 7.5.2 our acceptance of the applicant's evaluation finding that loss of power to any one of the buses would not prevent reaching and maintaining cold shutdown.

Finally, this safety implication of control systems is discussed in Appendix C of OL-SER by USI-A-47. Midland, like other plants, will be subject to the ultimate resolution of this USI.

## 2.2. VIBRATION AND LOOSE PARTS MONITORING

Source: ACRS Report on Palisades (1/27/70)

ACRS recommended studies of means of inservice monitoring for vibration or the presence of loose parts in the pressure vessel and other parts of the primary system, and implementation of such means as found practical and appropriate.



In Section 4.4.4.2 of OL-SER, we note that the applicant has described the LPMS that will be used at Midland. We have evaluated the system to RG 1.133 Revision 1 and compared it with procedures used on other plants and find it acceptable. Further review matters for this system will involve Tech. Specs. for the LCO and surveillance requirements, alarm settings, baseline data acquisition, and assurance of obtaining quality data.

The precritical vibration monitoring program for Midland is discussed in Section 3.9.22 of the OL-SER. We have reviewed and accepted the program to RG 1.20. The program recognizes Oconee Unit 1 tests as valid prototypes for the internals and recognizes Davis-Besse Unit 1 as a limited valid prototype for the surveillance specimen holder tube design.

## 2.3 POTENTIAL FOR AXIAL XENON OSCILLATIONS

Source: ACRS Report on 3-Mile Island, January 17, 1968.

This item references continuing studies on the possible use of part-length rods for stabilizing potential xenon oscillations.

As noted in Section 4.3.2.5 of the OL-SER, this issue was resolved by start-up tests for the Oconee Unit 1 reactor. A diagonal (combination of axial and azimuthal oscillation was induced, and the reactor was monitored for 72 hours. The azimuthal component of the oscillation was damped, but the axial component was divergent. At about 70 hours into the transient, the part-length rods were used to suppress the axial imbalance, which was reduced to near zero where it was kept.

## 2.4 BEHAVIOR OF CORE-BARREL CHECK VALVES IN NORMAL OPERATION

Source: ACRS Report on 3-Mile Island, January 17, 1968.

The Committee requested experimental verification that vibrations would not unseat these valves during normal operation. The concern was that there was a potential for these valves to open during normal operation allowing excessive core bypass flow.

Core bypass flow is discussed in 4.4.2.3 of OL-SER. Resolution of this item by tests on a previous operating plant is discussed in Section 2.4 of Supplement 2 to the CP-SER.

## 2.5 CONSEQUENCES OF FUEL HANDLING ACCIDENTS

Source: Hutchinson Island, March 12, 1970

In this item, the Committee referred to the possible need for a charcoal filtration system in the fuel handling building.

The Midland spent fuel pool area ventilation system is discussed in OL-SER Section 9.4.2. In the event of a radioactive release such as from a fuel-handling accident, redundant radiation detectors in the exhaust duct isolate the normal ventilation system and automatically start the safety-related standby exhaust system. The standby exhaust system consists of two 100%

capacity trains, each having an air filtration unit and an exhaust fan. The system meets RG 1.13 and limits radioactive releases to acceptable levels by air filtration and by maintaining a negative pressure in the area to limit exfiltration. Meets GDC 61. Also meets Position C2 of RG 1.52 and Positions C1 and C2 of RG 1.140.

Radiological consequences of a fuel handling accident are discussed in OL-SER Section 15.5.6 and are well within guidelines values of 10 CFR 100.

## 2.6 EFFECTS OF BLOWDOWN FORCES ON CORE INTERNALS

Source: ACRS Report on 3-Mile Island, January 17, 1968.

Committee recommended Staff review the effects of blowdown forces on core internals and the development of appropriate load combinations and deformation limits.

Section 3.9.2.3 of OL-SER discusses the applicant's analyses of the reactor internals and unbroken loops of the RCPB, including supports, for the combined effects of asymmetric LOCA loads and the SSE. These analyses are presently underway and the results are to be presented to the Staff by April 1983. The applicant's analysis will utilize previous analyses for Davis-Besse 2 and 3 with appropriate adjustments. The Staff has accepted the applicant's approach and will report on the results in a supplement to the SER.

## 2.7 ASSURANCE THAT LOCA RELATED FUEL ROD FAILURES WILL NOT INTERFERE WITH ECCS

Source: ACRS Report on 3-Mile Island, January 17, 1968.

The Committee desired to emphasize the importance of work to assure that fuel rod failure from LOCAs will not affect significantly the ability of ECCS to prevent clad melting.

This concern was resolved by the generic rulemaking hearing on acceptance criteria for ECCS, which resulted in 10 CFR 50.46 and Appendix K to 10 CFR Part 50.

The models and evaluation of fuel clad ballooning and flow blockage are discussed in OL-SER Sections 4.2.3.3(3) and 6.3.4 which indicates compliance with 10 CFR 50.46 and Appendix K, Part 50.

## 2.8 EFFECT ON PRESSURE VESSEL INTEGRITY OF ECCS INDUCED THERMAL SHOCK

Source: Oconee, July 11, 1967

The Committee recommended the Staff review analyses of possible effects upon pressure vessel integrity arising from thermal shock induced by ECCS operation.

The issue of pressurized thermal shock is discussed in OL-SER Section 5.3.5 and Appendix C (USI A-49). The potential for adverse effects increase with time as degradation of material properties accrue due to irradiation. The USI-49 issue should be resolved for operating PWRs within 4 calendar years. The Staff believes that the Midland vessels will not be jeopardized by thermal shock for at least 4 calendar years. By that time guidelines from resolution of A-49 will be available for Midland. The Staff's assessment for Midland has been made recognizing that for Midland Unit 1 the limiting reactor vessel

beltline material is circumferential weld (WF 70) between the upper and lower shell forgings. The rate of increase in RT<sub>NDT</sub> for Midland was estimated using the methods of RG 1.99, Revision 1.

## 2.9 ENVIRONMENTAL QUALIFICATION OF EQUIPMENT

Source: Palisades, January 27, 1970

The Committee recommended that attention be given to the long term ability of vital components, such as electrical equipment and cables, to withstand the environment of the containment after a LOCA.

The status of the Staff's evaluation of the Midland program for environmental qualification of mechanical and electrical equipment is discussed in OL-SER Section 3.11. As noted therein, the review is being performed using the guidance of NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment". The review is continuing and upon completion will be addressed in a supplement to the SER. The applicant provided a revised submittal on April 30, 1982. The Staff anticipates an audit in mid-June 1982.

The seismic equipment qualification program is addressed in OL-SER Section 3.10. As noted there, the review is continuing. The applicant's seismic report is to be submitted in July 1982 and an audit by our SQRT is scheduled for September 1982.

## 2.10 INSTRUMENTATION TO FOLLOW THE COURSE OF AN ACCIDENT

Source: Hutchinson Island, March 12, 1970

This item relates to the development of systems to control the buildup of hydrogen in the containment, and of instrumentation to monitor the course of events in the event of a LOCA.

Section 6.2.5 of the OL-SER discusses the Midland hydrogen recombiners and the hydrogen monitoring system. The Staff reviewed the design to GDC 41, 42, and 43; 10 CFR 50.44; and RG 1.7, Revision 2 and found it to be acceptable. The design is also discussed in Appendix C (USI \* 18) of the OL-SER.

Section 7.5 of the OL-SER discusses accident monitoring instruments. As listed in Table 1.1 of the OL-SER, the post TMI requirements include II.F.1 "Accident Monitoring Instrumentation" (Sections 6.2.8, 7.5, 11.5, and 12.3); II.F.2 "Instrumentation for Detection of Inadequate Core Cooling" (Section 4.4.4.1); and II.F.3 "Instrumentation for Monitoring Accident Conditions (RG 1.97, Rev. 2)" (Section 7.5.3). In OL-SER Section 7.5.4 the Staff finds the information systems important to safety, including accident monitoring instrumentation are consistent with the plant safety analyses and show substantial compliance with RG 1.97, Rev. 2.

## 2.11 IMPROVED QA AND ISI OF PRIMARY SYSTEM

Source: Oconee July 11, 1967.

The Committee emphasized the importance of QA in fabrication of the primary system and inspection during service life.

Code requirements were exceeded during the fabrication of the Midland reactor



vessel by the performance of ultrasonic examinations of welds in addition to the code required radiography. Also, since originally initiating this concern at Oconee in 1967, compliance with new requirements of codes and Regulatory Guides have provided improved quality assurance for the fabrication of the primary system.

Since 1967, considerable improvements have been made in the preservice and inservice inspection requirements for the primary system. Examples include:

- A. Issuance of the ASME Section XI Code.
- B. Issuance of Appendix I to the ASME Section XI Code (this appendix improved and standardized vessel ultrasonic examinations).
- C. Issuance of Appendix III to the ASME Section XI Code (this appendix improved and standardized piping ultrasonic examinations).

These requirements have been (and are being) implemented during the preservice inspection at the Midland Plant. They also will be implemented during inservice inspections if they are not superseded by more effective requirements.

SER sections which discuss this issue are: 5.2.1.1, 5.2.1.2, 5.2.3, 5.2.4 and 5.4.2.1.

May 7, 1982

Professor David Okrent  
University of California at  
Los Angeles  
School of Engineering and  
Applied Sciences  
5532 Boelter Hall  
Los Angeles, California 90024

Dear Professor Okrent:

In response to Mr. Fischer's letter<sup>(1)</sup> dated April 13, 1982, I have briefly reviewed the studies and correspondence he supplied related to the Midland Plant Auxiliary Feedwater System (AFWS) design. There appears to be surprising similarity between the unavailabilities calculated by the Pickard, Lowe and Garrick (PL&G) Study<sup>(2)</sup> using both plant-specific data and the NRC generic data (NUREG-0611).<sup>(3)</sup> The evaluation done by Roscoe<sup>(4)</sup> found no basis for suggesting different unavailabilities. Thus, there appears to be general agreement on what represents a reasonable estimate of the AFWS unavailability and thus appears to be no great motivation for the ACRS to delve into this.

However, the NRC-Consumers Power correspondence<sup>(5,6,7,8)</sup> that follows raises several questions that have broader implications than just for Midland or just for AFWSs. They, in fact, raise questions that will need to be addressed in a much broader context as the safety goal is implemented.

Basically, the Midland AFWS issue as I understand it, is that a  $10^{-4}$  to  $10^{-5}$  AFWS unreliability criterion has been placed into the Standard Review Plan (SRP) subsequent to the PL&G Study. The PL&G Study arrives at an AFWS unavailability of  $1.4 \times 10^{-4}$  median (plant-specific data) or  $2.0 \times 10^{-4}$  mean (plant-specific data) or  $1.2 \times 10^{-4}$  (NRC data). All of which slightly miss the  $10^{-4}$  criterion. From the NRC correspondence, it appears abundantly clear that they conclude that a third AFWS train (Midland has a two-train system) is needed to "bring the system into an acceptable unreliability range ( $10^{-4}$  to  $10^{-5}$  per demand)." Consumers Power appears to have several arguments<sup>(6)</sup>:

- (1) The basis for the criterion is not provided.
- (2) The methodology for the calculation to determine compliance to the criterion is not provided.
- (3) Consumers Power's calculations, because they are conservative, reflect an adequate system.
- (4) Their system is comparable to AFWSs of plants already judged acceptable.

May 7, 1982

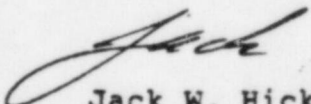
- (5) They have alternate decay heat removal methods which, when considered, provide an overall decay heat removal capability that meets the SRP criterion.
- (6) They are willing to make electric power and control system changes which should make the system acceptable.
- (7) A third train requirement at this late date would impose a severe hardship.

These appear to be issues that transcend the Midland AFWS question and suggest issues that will arise when implementing the quantitative guidelines of the safety goal. Among these are:

- (1) Do the quantitative guidelines reflect means, medians, percentiles, or what?
- (2) Does the method for doing the calculations need to be specified by NRC?
- (3) To what extent should NRC supplied generic data vs. plant-specific data be used?
- (4) What does it mean if the quantitative guidelines are only missed by 20% when the uncertainties in the calculation are much larger.
- (5) Should quantitative guidelines be allocated down to the functional level and/or system level and put in the SRP?
- (6) When should an ALARA criterion be used?
- (7) Do the quantitative guidelines have to be met in specified ways (i.e., is a third AFW train the only acceptable way to meet  $10^{-4}$ )?

All in all, these seem like important policy issues. Looking at them in some detail in the Midland AFWS context may provide some insights important to the broader question of safety goal implementation.

Sincerely,



Jack W. Hickman, Supervisor  
Nuclear Fuel Cycle Systems  
Safety Division 4412

Copy to:

USNRC D. F. Fischer  
4410 D. J. McCloskey

Attachment: References



## References

- (1) NRC letter from D. F. Fischer to P. R. Davis and J. W. Hickman, dated April 13, 1982, Midland Plant Auxiliary Feedwater System Reliability.
- (2) Midland Plant Auxiliary Feedwater System Reliability Analysis, prepared for Consumers Power Company by Pickard, Lowe and Garrick, Inc. (PL&G), October 1980.
- (3) Generic Evaluation of Feedwater Transients and Small Break Loss-of-Coolant Accidents in Westinghouse-Designed Operations Plants, NUREG-0611, USNRC, January 1980.
- (4) Midland Plant Auxiliary Feedwater System Reliability Analysis Evaluation, NUREG/CR-2368, SAND81-2164, Sandia National Laboratories, B. J. Roscoe, August 1981.
- (5) NRC letter from R. Tedesco to J. Cook (CPC), dated October 22, 1981, re transmittal of Preliminary SER draft, Section 10.4.9, "Auxiliary Feedwater System."
- (6) CPC letter from J. Cook to R. Tedesco (NRR), dated November 12, 1981, re CPC response to open items of preliminary draft SER, Section 10.4.9.
- (7) Letter from CPC to H. Denton, dated March 1, 1982, forwarding Babcock & Wilcox system analysis of loss of feedwater accident and PL&G auxiliary feedwater reliability.
- (8) NRC letter from R. Tedesco to J. Cook (CPC), dated March 26, 1982, re Midland Plant Auxiliary Feedwater System Design.

ML231

## Sandia National Laboratories

Albuquerque, New Mexico 87185

May 7, 1982

DCF

Professor David Okrent  
University of California at  
Los Angeles  
School of Engineering and  
Applied Sciences  
5532 Boelter Hall  
Los Angeles, California 90024

RECEIVED  
ADVISORY COMMITTEE ON  
REACTOR SAFEGUARDS, U.S. NRC.

MAY 14 1982

AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

A

Dear Professor Okrent:

In response to Mr. Fischer's letter<sup>(1)</sup> dated April 13, 1982, I have briefly reviewed the studies and correspondence he supplied related to the Midland Plant Auxiliary Feedwater System (AFWS) design. There appears to be surprising similarity between the unavailabilities calculated by the Pickard, Lowe and Garrick (PL&G) Study<sup>(2)</sup> using both plant-specific data and the NRC generic data (NUREG-0611).<sup>(3)</sup> The evaluation done by Roscoe<sup>(4)</sup> found no basis for suggesting different unavailabilities. Thus, there appears to be general agreement on what represents a reasonable estimate of the AFWS unavailability and thus appears to be no great motivation for the ACRS to delve into this.

However, the NRC-Consumers Power correspondence<sup>(5,6,7,8)</sup> that follows raises several questions that have broader implications than just for Midland or just for AFWSs. They, in fact, raise questions that will need to be addressed in a much broader context as the safety goal is implemented.

Basically, the Midland AFWS issue as I understand it, is that a  $10^{-4}$  to  $10^{-5}$  AFWS unreliability criterion has been placed into the Standard Review Plan (SRP) subsequent to the PL&G Study. The PL&G Study arrives at an AFWS unavailability of  $1.4 \times 10^{-4}$  median (plant-specific data) or  $2.0 \times 10^{-4}$  mean (plant-specific data) or  $1.2 \times 10^{-4}$  (NRC data). All of which slightly miss the  $10^{-4}$  criterion. From the NRC correspondence, it appears abundantly clear that they conclude that a third AFWS train (Midland has a two-train system) is needed to "bring the system into an acceptable unreliability range ( $10^{-4}$  to  $10^{-5}$  per demand)." Consumers Power appears to have several arguments<sup>(6)</sup>:

- (1) The basis for the criterion is not provided.
- (2) The methodology for the calculation to determine compliance to the criterion is not provided.
- (3) Consumers Power's calculations, because they are conservative, reflect an adequate system.
- (4) Their system is comparable to AFWSs of plants already judged acceptable.

FOIA-85-602

B/62

Midland-2

5

~~ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED~~  
~~DATE 10/10/01 BY 1045~~  
~~EXCEPT WHERE SHOWN OTHERWISE~~  
~~ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED~~  
~~DATE 10/10/01 BY 1045~~  
~~EXCEPT WHERE SHOWN OTHERWISE~~  
Do Not Remove from ACRS Office

Professor David Okrent

-2-

May 7, 1982

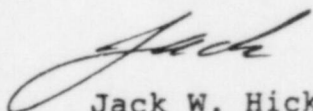
- (5) They have alternate decay heat removal methods which, when considered, provide an overall decay heat removal capability that meets the SRP criterion.
- (6) They are willing to make electric power and control system changes which should make the system acceptable.
- (7) A third train requirement at this late date would impose a severe hardship.

These appear to be issues that transcend the Midland AFWS question and suggest issues that will arise when implementing the quantitative guidelines of the safety goal. Among these are:

- (1) Do the quantitative guidelines reflect means, medians, percentiles, or what?
- (2) Does the method for doing the calculations need to be specified by NRC?
- (3) To what extent should NRC supplied generic data vs. plant-specific data be used?
- (4) What does it mean if the quantitative guidelines are only missed by 20% when the uncertainties in the calculation are much larger.
- (5) Should quantitative guidelines be allocated down to the functional level and/or system level and put in the SRP?
- (6) When should an ALARA criterion be used?
- (7) Do the quantitative guidelines have to be met in specified ways (i.e., is a third AFW train the only acceptable way to meet  $10^{-4}$ )?

All in all, these seem like important policy issues. Looking at them in some detail in the Midland AFWS context may provide some insights important to the broader question of safety goal implementation.

Sincerely,



Jack W. Hickman, Supervisor  
Nuclear Fuel Cycle Systems  
Safety Division 4412

Copy to:  
USNRC D. F. Fischer  
4410 D. J. McCloskey

Attachment: References



## References

- (1) NRC letter from D. F. Fischer to P. R. Davis and J. W. Hickman, dated April 13, 1982, Midland Plant Auxiliary Feedwater System Reliability.
- (2) Midland Plant Auxiliary Feedwater System Reliability Analysis, prepared for Consumers Power Company by Pickard, Lowe and Garrick, Inc. (PL&G), October 1980.
- (3) Generic Evaluation of Feedwater Transients and Small Break Loss-of-Coolant Accidents in Westinghouse-Designed Operations Plants, NUREG-0611, USNRC, January 1980.
- (4) Midland Plant Auxiliary Feedwater System Reliability Analysis Evaluation, NUREG/CR-2368, SAND81-2164, Sandia National Laboratories, B. J. Roscoe, August 1981.
- (5) NRC letter from R. Tedesco to J. Cook (CPC), dated October 22, 1981, re transmittal of Preliminary SER draft, Section 10.4.9, "Auxiliary Feedwater System."
- (6) CPC letter from J. Cook to R. Tedesco (NRR), dated November 12, 1981, re CPC response to open items of preliminary draft SER, Section 10.4.9.
- (7) Letter from CPC to H. Denton, dated March 1, 1982, forwarding Babcock & Wilcox system analysis of loss of feedwater accident and PL&G auxiliary feedwater reliability.
- (8) NRC letter from R. Tedesco to J. Cook (CPC), dated March 26, 1982, re Midland Plant Auxiliary Feedwater System Design.

5711 Summerset Drive  
Midland, MI 48640  
December 14, 1982

ML268

DCF

RECEIVED  
ADVISORY COMMITTEE ON  
REACTOR SAFEGUARDS, U.S.N.R.C.

DEC 21 1982

AM  
7,8,9,10,11,12,1,2,3,4,5,6 PM

A

Dr. David Okrent, Professor  
School of Engineering and Applied Science  
University of California  
Los Angeles, CA

Dear Dr. David Okrent:

Dave Fisher of the Washington ACRS office has told me that you wanted to be kept informed of developments at the Midland nuclear plant site.

Since there have been significant developments that have occurred here in the past several months, I believe you should be apprised of them.

On October 29, 1982, Mr. James Keppler, NPC director of Region III, provided his latest testimony with respect to Quality Assurance at Midland. Mr. Keppler noted that he had given the Midland Licensing Board his assurance for the licensee's QA program for remedial soils work and the remainder of construction in July, 1981.

However, in April, 1982, he found that the licensee was rated Category III, the lowest acceptable rating given by the SALP review process. As a result of this rating, Mr. Keppler realized he had to alter his testimony of reasonable assurance for the Board. (The Category III rating was not mentioned by Mr. Margulio when he gave a report for Consumers Power Co. to the ACRS Committee in Washington, D.C. on June 2, 1982.)

Mr. Keppler's testimony refers to the assessment of several chief directors of inspection at Midland, C.E. Norelius and R. L. Spessard, as well as chief Resident Inspector, R. J. Cook. These attachments contained many negative findings along with specific reasons for them. These findings were covered in the local and area press. (Copies of some of the news stories are enclosed.)

The negative SALP review also prompted Mr. Keppler to add more resources to overseeing Midland activities, and he created the Office of Special Cases (OSC) for NRC field activities at Midland (and Zimmer).

This inspection team only recently completed a phase of their work. Their findings indicated serious problems over a wide range of activities. As a result, Consumers Power Co. has decided to halt work on almost all safety-related work. All the safety equipment will be removed from the two containment buildings, the diesel generator building and the auxiliary building. Everything is to be reinspected and reinstalled. (News accounts of this action are enclosed.)

FOIA-85-602

B/84

MIDLAND

~~APPS OFFICE COPY~~

~~APPS OFFICE COPY~~

Page Two

Dr. David Okrent

December 14, 1982

It is expected that this action may significantly delay the plants' completed construction.

This past week, the soil settlement hearings continued. They dealt primarily with the diesel generator building. Among the disclosures that were significant, was the fact that Dr. Peck, a Bechtel soil consultant, admitted under questioning by Judge Bechhoefer that the surcharge program of the diesel generator building, which was undertaken after the building was under construction and with the lack of adequate soil compaction, was unprecedented at any other building site. Also, a major difference of opinion developed between NRC staff and consultants. Joseph Kane, NRC geotechnical specialist and H.N. Singh, consultant for the NRC from the Army Corps of Engineers, did not agree with other NRC structural engineers or consultants on the manner in which the geotechnical data that was provided was used in constructing their model as to the structural integrity of the building.

Although the soil settlement hearings which are in progress are supposed to be the route for determining the adequacy of the remedial fixes that have been proposed, the NRC is allowing tunneling under the turbine building to begin December 13, 1982, before the outstanding CA issues have been heard, and before James Keppler has testified on his reasonable assurance to the Board. It appears that the NRC is separating the theoretical adequacy of the technical fixes from the practical adequacy of implementing the quality assurance. This has always been the problem at Midland and continues to be the most significant problem.

It appears that the whole point of the hearings can, in effect, be overruled by the staff. If that is the case, the efficacy of nuclear licensing as it now is implemented must be questioned and the role of the Licensing Board reviewed.

In related local matters, the City Council of Saginaw (Saginaw is 15 miles downwind and downriver from the Midland nuclear plants) has passed a resolution opposing the operation of the Midland nuclear plants. Tittabawassee Township has filed an appeal of the nuclear plant water permit because no further development could take place downriver from the nuclear plant. The Tittabawassee is a small river and The Dow Chemical Co. and the nuclear plants would use all the disposal capacity. Tittabawassee Township has just opened an industrial development park. Ingersoll Township which is next to the nuclear plants has also passed a resolution opposing the nuclear plants. The Midland County Commissioners also have deep concerns about the adequacy of the emergency evacuation procedures. (See news story.)

We appreciate the continued interest of the ACRS in the Midland nuclear plant project.

Yours sincerely,

*Mary Sinclair*

Mary Sinclair

cc: Senators Levin and Riegle, Congressmen Donald Albosta and John Dingell, Dr. Henry Meyers, David Fisher



# NRC gives examples to back criticism

Related story, page 3  
By PAUL RAU  
Daily News staff writer

In recently filed testimony, the U.S. Nuclear Regulatory Commission gave several examples to justify its harsh criticism of the Midland nuclear plant project.

For example, the NRC described two occurrences to back its claim that "slipshod workmanship" is tolerated at the nuclear plant.

Electrical cables, particularly in the control room, are at times allowed to dangle on the floor in walk areas despite the fact the ends of the partially installed cables are uncovered, senior NRC resident inspector Ronald Cook said in an attachment to the NRC's written testimony.

The testimony is to be used in an upcoming portion of the federal hearing on the plant's soil problems.

"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," Cook wrote.

In the second example, Cook said NRC inspectors found that some drop-in anchors used to attach components to concrete walls were improperly installed and "obviously did not adhere to the installation procedures."

He said Consumers protested that this was not a valid finding of non-conformance because plant quality control (QC) inspectors had not yet inspected the anchors.

"The NRC inspectors treat this as indicative that slipshod workmanship is tolerated in the hopes that QC will find the mistakes," Cook wrote.

TO SUPPORT its claim that Bechtel Power Corp., the plant's prime contractor, is uncooperative and seems to be running the project rather than Consumers, the NRC cited two more examples.

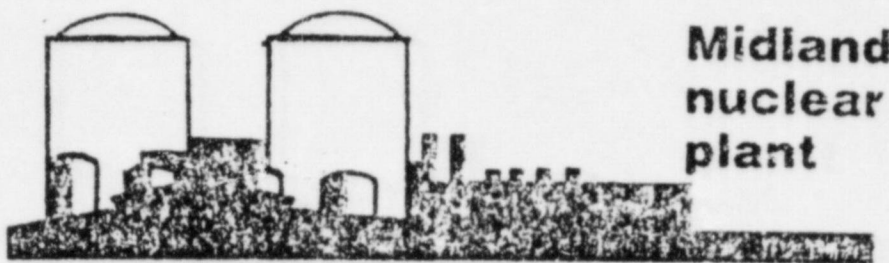
In one, Cook said, an NRC inspector asked Consumers and Bechtel to provide resumes of workers involved in work to correct soil and foundation problems. The inspector was told the records would not be provided because they were personal.

Cook noted there is an obligation to the NRC to supply a precise number of qualified persons for the soil work, and said the information ultimately was obtained by appealing to Consumers' upper management.

"However, this indicates an implied unwillingness of the constructor (Bechtel) to share information with the NRC and sometimes with the licensee (Consumers)," Cook wrote.

"Historically, one of the NRC questions has been, 'Who is running the job — Bechtel or Consumers?'" Cook said, adding that a second example "would allow one to believe it is Bechtel."

The example involved a form that the NRC insisted Consumers generate to coordinate the installation of instruments needed for the soil work. The form was written by Consumers and approved by



the NRC, but on two occasions Bechtel indicated it did not want to use the form, Cook said.

"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," Cook wrote.

AN EXAMPLE cited by the NRC of Consumers' "argumentative" nature was the utility's response to an NRC report called Systematic Assessment of Licensee Performance (SALP), which grades the regulatory performance of utilities building nuclear plants.

The latest SALP said Consumers was weak in several areas. The utility responded with a rebuttal document at least as long as the SALP report itself.

"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," Cook said.

ANOTHER PORTION of the testimony written by two other NRC officials said James W. Cook, the Consumers vice president in charge of the Midland project, is an "extremely capable and dynamic individual" but that these attributes may be causing confusion because Cook is too involved in details of plant operations.

Consumers has declined comment on the NRC testimony, and said it will respond with its own testimony during the soil hearing.

But at a news conference Tuesday, Cook responded to the testimony that addressed him personally.

"My policy is to be involved to the extent one person is able to be," Cook said. He said such personal involvement by upper management is essential to satisfactorily complete any nuclear project.

Cook also said there was "some confusion in the way that (NRC testimony) was written," and that Consumers will attempt to clarify the situation in its testimony, which has not yet been filed.

# Safety problems sparked A-plant layoffs

By DAVID EVERETT  
Free Press Staff Writer

The 1,040 layoffs announced this week at Consumers Power Co.'s Midland Nuclear Power Plant were sparked by potentially serious safety problems discovered recently by federal inspectors, officials said Friday.

The problems, centered in the plant's emergency generator system, are serious enough for Consumers to also order a reinspection of most nuclear safety work at the \$3.39 billion project and to re-investigate most of its quality control personnel, according to the U.S. Nuclear Regulatory Commission.

THE NRC discovered the flaws in quality control and equipment installation in October and November during an inspection of the diesel generator building. The generator is designed to supply emergency

power to the nuclear reactors.

The inspectors' findings include:

- A large backlog of quality control inspections in the diesel generator building and other safety areas.
- Problems with verifying whether the proper type of steel was used in the building.
- Differences between construction in the building and construction drawings.
- Lack of required separation between some electrical cables used for safety and other purposes.

Consumers' response to the discoveries was the layoffs, plus plans to re-investigate the quality control personnel and to re-inspect most of the safety-related work done in 12 years of construction.

The laid-off workers, including electricians, pipefitters, ironworkers and laborers, are employed by Bechtel Power Corp.,

Consumers' primary construction firm at Midland.

The re-inspection will mean clearing materials from most of the safety areas, Consumers officials said. The re-investigation will require additional testing and perhaps retraining of quality control workers.

**THE PROBLEMS** in the diesel generator building are serious, NRC spokesman Jan Strasma said from the agency's Chicago office.

"If you have problems like this in one area, you become concerned there might be similar problems in other areas," he added.

The Jackson-based utility, which supplies electricity to most of outstate Michigan, detailed a new team inspection and construction plan Friday as part of its response to the NRC allegations.

"Given the state's economic conditions,

we realize the layoffs are creating a hardship for the people involved," utility spokesman Michael Koschik said. "From the standpoint of our commitment to building a plant that's going to be safely operated, we feel that we have taken the most positive step."

The Midland plant has suffered major construction problems since work began in 1969. Federal officials once described the project as one of the most troublesome in the nation.

The worst problem has been improper soils foundation work. A federal licensing board is examining that problem, discovered in 1978 when the same diesel generator building involved in the current controversy was found to be settling into the ground more than expected.

See A-PLANT, Page 9A

## A-plant safety problems reported

A-PLANT, from Page 1A

THE PLANT is supposed to provide electricity for the Consumers network and steam for the massive Dow Chemical complex next to the site. Consumers officials acknowledge that the 1983 and 1984 deadlines for each reactor to be operating may not be met. The project is 85 percent complete.

Consumers also announced this week it had to lay off 151 welders at the Midland plant because a testing subcontractor had not properly verified their qualifications. The welders, who work on heating, ventilating and air conditioning for the Chicago-based Zack Co., were not properly certified by the testing firm, Photon Testing Inc., the utility said.

The welding done by the workers in question will be checked, Koschik said. An unrelated NRC investigation of Zack's work at Midland is continuing.

This week's layoffs leave about 4,000 workers at the Midland site. The NRC's review of Consumers' plans to fix the soils problems is delaying most work in that area of the plant, but non-nuclear work is proceeding. Also, the layoffs and inspections are not expected to affect work on the nuclear reactor and its steam system, the NRC said.

Hearings into the soils problems resume Monday in Midland. Other hearings will be held on Consumers' request for a license to operate the plant.



## Nuclear plant safety reinspection ordered

By PAUL RAU  
Daily News staff writer

In a new plan to finish the Midland nuclear plant, Consumers Power Co. has ordered a reinspection of virtually all safety-related work at the plant.

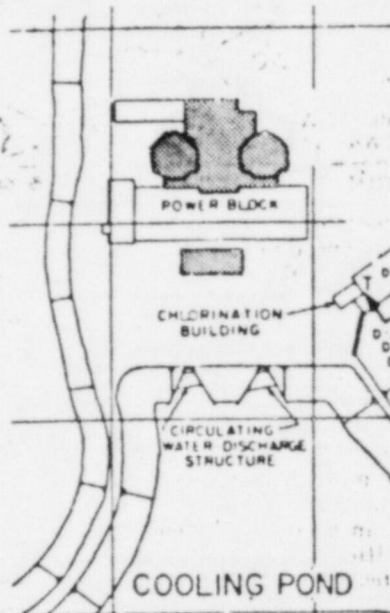
Construction work on most safety-related aspects of the plant has halted while the reinspection takes place, leading to the layoff of 1,040 Bechtel Power Corp. workers this week. The safety-related work will resume when the reinspection is complete, Consumers said.

The new plan — described to U.S. Nuclear Regulatory Commission staff by Consumers Thursday — stemmed from a recent NRC inspection of the plant's safety-related diesel generator building.

NRC Region III spokesman Jan Strasma said the inspection found that the as-built state of the diesel generator building and its systems do not match construction drawings; that questions were raised about the material traceability of structural steel used in the generator building, which is evidence of a Quality Assurance problem; and that questions were raised about the separation of electrical cable trays.

In addition, Strasma said the inspection revealed a large back-log of plant-wide Quality Control (QC) inspections.

Strasma said the most significant aspect of the inspection was that "we



**NUCLEAR PLANT** buildings where reinspection of safety-related work will take place are shaded. The two rounded structures are the containment buildings. Between them is the auxiliary building. The diesel generator building is the rectangular area.

THE FIRST PHASE of the new system

already installed, and the forward look is the formation of new construction teams to finish the plant, which is now 85 percent complete.

The major objectives of the plan are to provide more efficient control over the plant's completion, and to improve the project's performance in meeting the regulations and expectations of the NRC, according to plant site manager Donald B. Miller.

To implement the plan, Miller said in a news release that it was necessary to reduce the manual workforce by more than 1,000 persons, leaving about 4,000 persons at work on the Midland plant. As a result of the layoffs, the Bechtel workforce was nearly halved from 2,200 to 1,200 workers. Bechtel is the plant's engineer-architect and the prime contractor; no Consumers, non-manual or subcontractor employees were let go, with the exception of 151 Zack Co. welders, who are expected to return to work.

Both Consumers and the NRC agree the recent NRC inspection of the diesel generator building "indirectly" led to the layoffs.

Shafer said the NRC inspection continues and may not be completed until year's end.

Another factor behind the layoffs is that the entire Bechtel workforce was not needed to finish building the remaining



# How much warning is enough?

**EDITOR'S NOTE:** This is the second of three articles on an emergency plan and warning system for the Midland nuclear power plant. The third article will explain the federal government's role in evaluating the plan and the warning system.

By PAUL RAY  
Daily News staff writer

How much is enough when it comes to warning the population around the Midland nuclear plant of an accident involving radiation release and possibly evacuation?

And, at what point does the responsibility for buying, installing and maintaining warning systems shift from Consumers Power Co. to the communities that want extra protection?

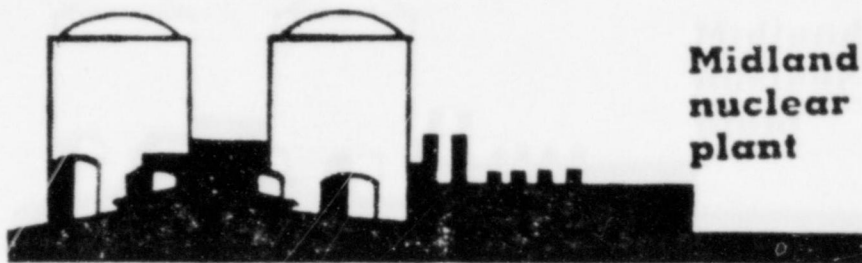
These questions are now being grappled with. The answers aren't entirely clear yet, but some firmly entrenched positions are being taken.

AT LEAST two officials, in addition to Midland County Emergency Services Director W. Michael Freer, believe the 108 warning sirens Consumers is buying won't be adequate by themselves.

"I don't think that's enough," Freer said of the sirens. "I think we need complementary warning capability in the system." Such additions might include pagers, in-home monitors to warn of accidents or messages on cable television stations.

Robert B. Chatterton, Midland Township supervisor and chairman of a steering committee set up to assist Freer, has advocated that all homes in the 10-mile Emergency Planning Zone (EPZ) surrounding the nuclear plant be equipped with alarm monitors that could be set off by a radio signal from the plant.

"We have to find a way to get inside the home to warn people," Chatterton said. "Now's the time to get input in. I want to



Midland  
nuclear  
plant

hear people's ideas; it may touch off something."

He said additional warning systems might be funded by public money and through utility bills after Consumers has purchased the equipment.

**ANOTHER STAUNCH ADVOCATE** of in-home warning devices to complement the sirens is Midland County commissioner Charles E. Blackhurst, chairman of the county Law Enforcement Committee.

"I'm dead serious about this warning system. I think we ought to have the best system there is. It boils down to one thing — the Midland County Board of Commissioners is responsible for the safety of the people of Midland County."

"I'll fight 'em down to the last man to get this system. Consumers Power knows how I feel. How would they like it if we told the Midland County emergency services director (Freer) to stop working on the plan? I'm not beyond that," Blackhurst said, adding he isn't sure how much support the board would give such a motion.

Blackhurst said the utility's reaction to buying in-home alarms for everyone in the 10-mile EPZ has been "very mute," while Chatterton said Consumers has been "very cooperative" and receptive to the idea while "attacking it with certain reservations."

**"I'll fight 'em down to the last man to get this (warning) system. Consumers Power knows how I feel. How would they like it if we told the Midland County emergency services director to stop working on the plan? I'm not beyond that."** — County Commissioner Charles E. Blackhurst.

**Consumers supports the use of in-home monitors in some locations, but not for everyone in the 10-mile radius around the nuclear plant. — Norman Saari, Consumers' spokesman at the nuclear plant.**

**NORMAN SAARI**, Consumers' spokesman at the nuclear plant, said the in-home monitors cost \$300 each and that inexpensive weather monitors cannot be reliably adapted to a new function, as Blackhurst envisions.

He said Consumers supports the use of in-home monitors in some locations, but not for everyone in the 10-mile radius around the nuclear plant.

"Our requirement is to meet the criteria to have a prompt public notification system. If our siren system meets that criteria, it's adequate. There is not a requirement above and beyond that," Saari said.

Freer said it isn't clear yet whether in-home pagers will be necessary. "But we reserve the prerogative in Midland County to exceed the federal criteria if we think it's in our citizens' best interests."

"If we feel it's necessary to go beyond a siren warning system, then we're going to do it," Freer added.

The sirens themselves have been bought for \$2 million by Consumers, which will be repaid by all of its electric customers in Michigan once the Midland plant goes on-line. "The impact on a bill will be less than miniscule," Saari said. "You're not going to notice those sirens on your bill."

But the question of who would pay for enhancements to the siren warning system remains unanswered, Freer said.

**BARBARA HENTON**, site emergency plan coordinator at the nuclear plant, said Consumers is fully committed to an effective warning system, but indicated that if FEMA and the NRC find that the siren-PA system alone meets the criteria, Midland and surrounding townships will be on their own as far as buying additions to the system. "Anything that falls outside what is necessary, that's optional," Ms. Henton said.

She said Chatterton's call for in-home monitors is premature. "I think he ought to wait until we get the sirens up and see how residents feel about the siren warning capability. For them to go out and purchase something they don't know they need would be a mistake."

Freer said his reservations about the sirens are based on one of three tests he attended of identical Whelen systems.

Two of the tests in Bay County, were days and Freer said. His concern arose when sirens around plant in Van Buren heard properly on a

"I was very disturbed or I should have said of the Palisades."

He said he was in the windows up a enough to see a siren being able to hear

All resident Planning Zone nuclear plant n a plant accident are under way overlapped by

# gh? Who should pay?

MDN  
Oct. 6, '82

Two of the tests, in Jackson County and Bay County, were on clear, hot, summer days and Freer said he was impressed. His concern arose from the other test, when sirens around the Palisades nuclear plant in Van Buren County could not be heard properly on a cold, winter day.

"I was very disappointed in what I heard, or I should say, didn't hear," Freer said of the Palisades siren test.

He said he was travelling in a car with the windows up and approached close enough to see a siren rotating without being able to hear it. Freer said he and

others finally heard the siren at a distance of 300 yards (the rated distance is 1 mile).

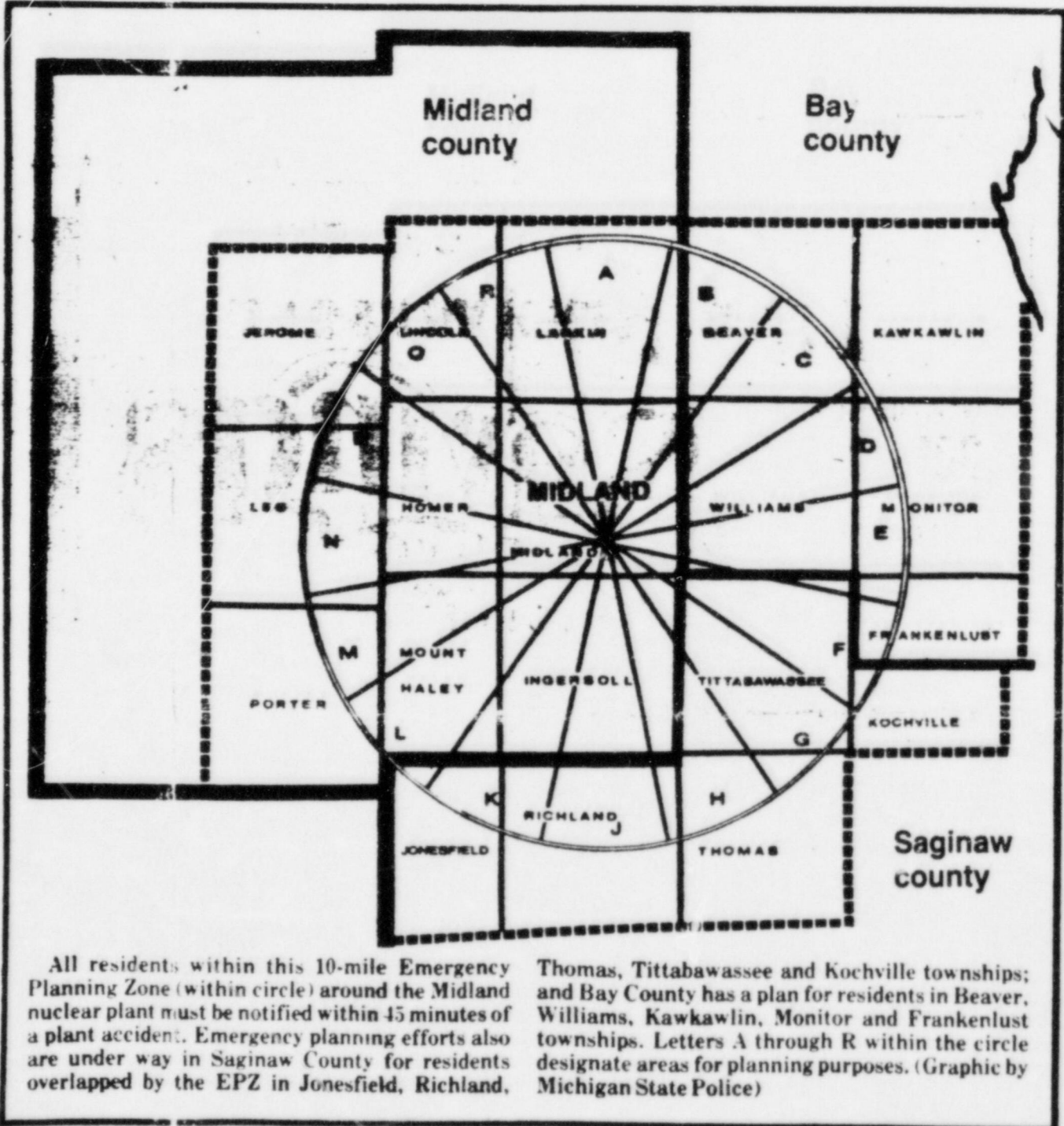
In the other tests, Freer said he could hear both sirens and voice messages 1.5 miles away.

He said the presence of wind and sound-deadening snow and the fact windows were closed against the cold reduced the performance of the Palisades sirens. "We have just a few days like that in Midland County," Freer said facetiously. "The problem I have is, what if we need to activate the system and there is a blizzard?"

THE MIDLAND PLANT siren system will be improved, Ms. Henton said, based on comments from the siren tests. For example, sirens here will be rotated at slower speeds and will be stopped at eight positions instead of four to allow better understanding of oral messages.

"Frankly, I think the problems encountered on the day of the test at Palisades won't be a problem in Midland because we've learned from the experience," Ms. Henton said.

Continued on page 3



# Amount of warning required among questions about plan

Continued from page 1

She said Consumers is counting on media to educate people how to listen to the siren-PA units.

"You have to wait until it rotates toward you to actually hear the message. It will be an educational process to get people to stand still until they hear the message," Ms. Henton said.

Spoken messages would say whether a drill or actual emergency was in progress. In the case of the latter, residents would be advised to tune their radios or televisions to certain stations for instructions.

She said Consumers is considering surveying nearby residents after a test of the Midland system to see if it was heard. "Dead" spots in critical areas may need enhancement with supplementary warn-

ing devices, she agreed.

Ms. Henton noted there already are plans to install additional warning receivers, which will carry tones and messages activated by a radio signal, in critical locations such as hospitals, radio stations, high-noise areas and for school superintendents.

CONSUMERS HOPES to have the sirens installed by late January, when NRC officials will visit, or earlier. They were to have been installed earlier, but reservations from the Palisades test caused the county to withhold its approval, Freer said.

Ms. Henton said Consumers is not dis-

mayed by the delay. "County government just moves slowly. It takes more commissions and discussions to get something accepted. It's not like a business," she said.

The sirens will be used to warn area citizens during a variety of emergencies, not just during an accident at the nuclear plant. As such, the sooner they are installed the better, Ms. Henton said.



# Midland Daily News

Vol. 125, No. 162

20 Pages

Tuesday, November 9, 1982, Midland, Michigan

25c Per Copy

## Testimony says slipshod workmanship tolerated at n-plant

By PAUL RAU  
Daily News staff writer

"Slipshod workmanship" is tolerated at the Midland nuclear plant in the hopes that quality control inspectors will find construction mistakes later, according to written testimony filed recently by the U.S. Nuclear Regulatory Commission.

The NRC officials also said that Consumers Power Co. is more "argumentative" than any other nuclear utility in eight neighboring states.

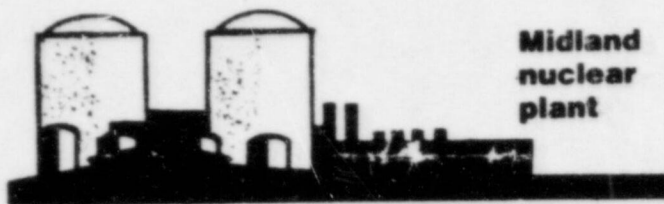
The utility would be better off concentrating on fixing construction problems at the Midland nuclear plant rather than arguing about them, according to the testimony.

Bechtel Power Corp., the plant's prime contractor, seems at times to be running the project rather than Consumers, and Bechtel has been unwilling to provide information requested by the NRC, the agency also wrote.

The memoranda, written by four NRC officials, contain some of the NRC's harshest criticism of the Midland project, and provide an illuminating look at the relationship between Consumers, Bechtel and the federal regulatory agency.

For example, Robert F. Warnick, director of the NRC's Office of Special Cases — a special unit set up to focus on problems at the Midland and 7 other nuclear plants — had this to say about Bechtel: "We are convinced that Bechtel has cost and scheduling as their foremost consideration. Quality is taking a back-seat with management."

THE RECENTLY mailed testimony appears to have shocked Consumers into requesting a delay in the time allotted to



Midland nuclear plant

respond to the NRC documents, according to an NRC attorney.

Consumers was to file testimony in response by next Monday, but an attorney representing the utility said a delay of up to a week likely will be sought. He said, however, that the extension will be sought due to the length of the NRC testimony and not its critical nature.

But NRC attorney William Paton said, "I think they (Consumers) felt our testimony was a little more adverse than they thought it would be. It was not a big plus."

The NRC testimony deals with quality assurance (QA) programs at the Midland nuclear plant, and was filed in conjunction with the Atomic Safety and Licensing Board hearing into the plant's soil problems.

The most critical portions were submitted as two attachments to the testimony of NRC Region III Administrator James Keppler. The attachments, A and B, were written by two Region III directors actively involved in inspecting the Midland plant, C.E. Norelius and R.L. Spessard, and by the plant's senior NRC resident inspector, Ronald J. Cook.

Keppler's testimony itself was favorable in that it concluded that work to fix the plant's soil problems may continue because of intense NRC scrutiny and other commitments by Consumers Power.

Asked why the attachments were filed along with Keppler's testimony, Paton said: "Full disclosure. These are the facts — that's just the way it is. Those notes exist, they were relevant to the proceeding, so they were included."

Consumers Power declined comment on the NRC testimony because it has not yet been introduced at the soil hearing.

THE MEMOS BY Norelius, Spessard and Cook were solicited by Keppler in an attempt to identify the fundamental problems at the Midland construction site. Keppler has said he cannot understand why QA programs are implemented poorly here because the programs themselves are adequate.

The memo written by Norelius and Spessard states that the Midland project is "one of the most complex and complicated ever undertaken" in Region III because two reactors are being built in

addition to another project unprecedented in the nuclear industry — the addition of new foundations below several critical buildings to correct soil problems.

This underpinning project, the two NRC officials wrote, is "probably the equivalent of building a third reactor site" and is among factors placing "a lot of pressure" on Consumers.

Norelius and Spessard questioned whether it is possible to adequately manage a project as complex as Midland, and recommended that Keppler consider requiring Consumers to halt work on one nuclear unit while concentrating on the other two projects — finishing the soils work and getting one nuclear unit on-line.

This recommendation was not adopted by Keppler, but others were, documents show.

Another unadopted recommendation made by Norelius and Spessard was that Consumers form a second management group — "all the way to a possible Vice President level" — that would look solely after the soils and underpinning work while the existing group concentrated on building the reactors.

Attachment A by Norelius and Spessard calls James W. Cook, the Consumers vice president in charge of the Midland project, an "extremely capable and dynamic individual." But it says these attributes may actually be causing some of the "confusion" at the Midland project.

The NRC officials said James Cook "is too much involved" in details of plant operations, and that there are times when his staff appears to be ready to take action while Cook continues to argue about the

necessity for taking the action.

OTHER POINTS in the Norelius/Spessard memo:

- Consumers' responses to Region III enforcement letters are "more lengthy and more argumentative" than responses from any other licensee in the region, which covers a dozen nuclear units under construction in eight Midwestern states.

- Repeated requests by Consumers to have the NRC 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."

- When actions are required to correct construction non-compliance, "the Midland response seems to lean toward 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 ensuring 100 percent corrective action has occurred."
- Norelius and Spessard also said Consumers are "overly conscious" and defensive about whether something is an item of non-compliance.

"This appears in part to be due to their sensitivity of what appears in the public record as official items of non-compliance. 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 the citations," they added.

IN HIS MEMO, attachment B, the NRC's Ronald Cook said Consumers "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 — regardless of the impact on plant integrity."

He cites several examples, then adds: "The above indications support the reputation the licensee has for being argumentative. Their apparent inability to accept an NRC position without diligently searching to find a 'softest' position results in numerous hours of frustrated conversations between all parties involved."

In a list of "Indicators of Questionable Licensee Performance," Ronald Cook said workers at the Midland plant have "managed to penetrate" or drill through safety-related and non-safety-related electrical duct banks, a condenser header drain line, an abandoned sewer line and a 72-inch circulating water line while performing the corrective soil work.

"All of these occurrences have happened because of a lack of control and attention to detail," Cook wrote, suggesting that reviews of the work prior to drilling were not performed because doing so would impact the construction schedule Consumers is trying to meet.



# UNIVERSITY OF SOUTHERN CALIFORNIA

UNIVERSITY PARK

LOS ANGELES, CALIFORNIA 90007

SCHOOL OF ENGINEERING  
DEPARTMENT OF CIVIL ENGINEERING

see EEP-2 D016A

June 21, 1982

Jeff Kimball  
Mail Stop P-514  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Jeff,

This is in response to your note of June 8 following our telephone conversation, but also will address the questions of Dave Okvent.

1. I should have started with

$$\log_{10} N_c = 1.1 - 1.0 m_b / \text{per year/per } 10^4 \text{ km}^2.$$

I wanted to convert  $N_c$  to  $N$ , change  $m_b$  to MMI and use  $10^3 \text{ km}^2$  not  $10^4 \text{ km}^2$ . The reasons for this are that I have programs and risk tables which are calibrated to these inputs for eastern U.S.

In going over my notes, written at Midland, I discovered a mistake! Inadvertently, I appear to have started with

$$\log_{10} N_c = 3.1 - 1.0 m_b,$$

Thus, it is not surprising that you and Dr. Holt could not duplicate my results. Please accept my sincere apologies. In as much as this must have created unnecessary work and problems, I am very sorry indeed. I am the one to blame.

Going back to the

$$\log_{10} N_c = 1.1 - 1.0 m_b / \text{per year/per } 10^3 \text{ km}^2.$$

With this, the exceedance probabilities for peak accelerations greater than .03 g are smaller than 5% for 50 years of exposure and the return periods are longer than 1000 years. Notice that I am not quoting the "actual" probabilities for this case now because I believe that the estimates derived from the tail ends of the distribution functions involved are not reliable.

FOIA-85-602

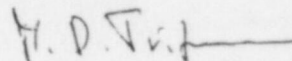
8/79

file-  
x - EEP-2  
x - midland  
x - Trefan

Jeff Kimball  
June 21, 1982  
Page Two

Regarding Dr. Okvent's question: the return period is the estimate of any average time window during which at least one peak acceleration will reach a chosen level.

Sincerely,

A handwritten signature in dark ink, appearing to read "M.D. Trifunac", with a horizontal line extending to the right.

M.D. Trifunac

MDT:mdm

P.S. Would you please be so kind to forward a copy of this letter for Dr. Holt. I do not have his address.

cc: Dr. Holt



5711 Somerset Drive  
Midland MI 48640  
May 28, 1982

ML241

DCF

Dr. Paul G. Shewmon  
Dept. of Metallurgical Engineering  
Ohio State University  
116 W. 19th Avenue  
Columbus, Ohio 43210

RECEIVED  
ADVISORY COMMITTEE ON  
REACTOR SAFEGUARDS, U.S.N.R.C.

JUN 2 1982

AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

Dist during  
266th Mtg.

Dear Dr. Shewman:

On June 4, the full Committee of the Advisory Committee on Reactor Safeguards (ACRS) will meet to make its final safety review of the Midland nuclear plants.

I would like to ask for time to make a statement at that meeting for Dr. Charles M. Anderson, a soils, foundation and structural engineering consultant and me.

I have been involved in the licensing of these nuclear plants from the very beginning in 1968. Dr. Charles M. Anderson is our consultant and an expert on soils, foundation and structural engineering and seismic analysis.

It is important for you to understand that at the ACRS subcommittee meeting in Midland, Michigan, May 20-21, our consultant, Dr. Anderson, met with unusual hostility on the part of Consumers Power Co. and was denied the kind of access to the plant that he needed as well as being denied the right to go on tour with the ACRS subcommittee.

While I realize that the ACRS review is not a part of the hearing process itself, it is nevertheless an integral and required part of the whole licensing process. I consider myself and my representatives a full party to that licensing process.

I am enclosing a letter about these matters which I wrote to Senator Carl Levin. Senator Levin has become most concerned about Midland nuclear plant problems and has indicated his interest in an independent review of nuclear plants, of the kind that we were trying to arrange at Midland with Dr. Anderson, by drafting a bill in the Senate to this effect.

I believe you should be aware of these events.

Many thanks for your attention to this matter.

Yours sincerely,

Mary Sinclair  
Mary Sinclair

FOIA-85-602

B/71

~~ACRS OFFICE COPY~~  
~~Do Not Release to Public~~  
MS/jt

cc: Mr. Ray F. Fraley, Exec. Dir., ACRS  
Senator Carl Levin

Midland  
X-OP-1.2-1

EXCERPT FROM  
MINUTES OF 266TH ACRS MEETING  
JUNE 3-5, 1982

II. Operating License Review of Midland Plant Units 1 and 2 (Open to Public)

[Note: David C. Fischer was the Designated Federal Employee for this portion of the meeting.]

[W. Kerr did not participate in the review of the Midland Plant.]

A. Report of the ACRS Subcommittee

D. Okrent reviewed the history of the Midland license for the Committee. He mentioned that the ACRS had done a particularly detailed review of Midland in 1969 and 1970 because the site was one that had a higher population density within three miles from the plant than did other proposed nuclear power stations. D. Okrent referred to a Committee letter dated November 18, 1976 which identified issues which should be considered in the OL review (see Appendix IV).

D. Okrent indicated that there are some special issues applicable to Midland. He called the Committee's attention to a history of quality control deficiencies at Midland during the construction period, noting some problems with cadwelds, bolts, and soil settling, as well as cracking at the foundation of the diesel generator building. He suggested that the Committee pay special attention to specific issues that dealt with the quality question. D. Okrent brought up a question concerning the seismic design rereview, a question of liquefaction problems with soils under many of the safety related structures and a dewatering scheme being proposed by the Applicant. Other topics mentioned for discussion were questions regarding whether a high point vent on the reactor vessel should be provided, whether provisions should be made for instrumentation to detect inadequate core cooling, whether less than favorable experience with high strength bolts required an explanation.

D. Okrent pointed out that there were no major issues regarding fire protection. He indicated that the Applicant is proposing an extensive program to evaluate systems interactions, similar to that being done at Indian Point. Although the integrated control system was modified somewhat to accommodate the process tertiary steam system he did not see a need for extensive Committee attention to these modifications. D. Okrent did point out that the Committee should decide whether to pursue the issue of turbine missiles as a specific or generic issue with regard to Midland.

D. Okrent identified several other potential issues which might be discussed as part of the Committee's Operating License Review (see Appendix IV):

*Midland 1+7*  
FOIA-85-602  
B/73

- . High copper content in the welds of the Midland 1 reactor vessel
- . The status of the ongoing probabilistic risk assessment at Midland
- . Commitment by the Applicant to install a third auxiliary feedwater pump in the nonseismic, Category-1 turbine building
- . B&W emergency operating procedures
- . Industrial security
- . Steam generator overfill protection.

C. P. Siess summarized the ad hoc Subcommittee meeting on Midland Foundation Problems and Remedial Actions which was held on April 29, 1982. The problem at Midland is inadequately compacted fill that is partly granular and partly cohesive soils. He indicated that the consequence of this inadequate compaction was the differential settlement of certain safety related structures. This produced some cracking in the walls of some reinforced concrete structures. He indicated that the Subcommittee concluded, after presentations by the Staff and their consultants, that remedial measures being taken seemed appropriate to allay any particular concern about structural adequacy. He noted that the Subcommittee was satisfied with the dewatering system proposed by the Applicant to eliminate the hazard of liquefaction. However, the question of the seismic input to the liquefaction analysis was still open since the Subcommittee had not reviewed the seismic design spectrum during its meeting.

B. Statement by Mary Sinclair

Mary Sinclair, a citizen of Midland, Michigan, read a statement on the Midland Nuclear Plants (see Appendix V). M. Sinclair described the environment in the immediate vicinity of the Midland Plants, including the siting of an elementary school "immediately across the road from the Midland facility." She explained that her purpose was to present a public perception of the role of the Advisory Committee on Reactor Safeguards. The theme of her statement was that the public has lost confidence in the nuclear power plant licensing process.

*Midland 1+2*



C. Status of the NRC Staff Review

R. Hernan, NRR Project Manager for Midland, reviewed the SER open items individually, (see Appendix VI). A list of special review areas was presented as areas of particular concern to the NRC Staff. J. Ebersole questioned how the Staff was evaluating the soils settlement issue.

J. Kane, NRC Staff, indicated that the problem had been evaluated by measured building settlement and by making borings in the in-place fill material.

R. Hernan indicated that the Staff had looked closely at the unique process steam system at the Midland plant with regard to radiation monitoring in the case of a primary to secondary system leak. J. Ebersole pointed out that there is a vastly increased probability of secondary blowdown with such a system. B&W reactors are extremely sensitive to secondary system blowdown in view of the superheat design of the steam generators. He questioned whether the NRC Staff had looked into the combination of this increased probability of secondary blowdown in conjunction with a control system failure on feedwater overfilling the steam generator. This could result in an extremely rapid depressurization and thermal shock to the Midland 1 reactor vessel which does have a high copper content. He suggested that there is an unusual potential for very large thermal transients in this system. R. L. Tedesco, NRC Staff, pointed to the safety grade overfill protection system and the fact that only one steam generator would blow down should an accident occur. J. Ebersole expressed concern about the assumptions in the NRC analysis.

M. Bender expressed concern regarding the NRC's collective judgment as to the quality of the Midland plant. He questioned whether there was an integrated, comprehensive report on the problems of quality at Midland plant. R. L. Tedesco indicated that the Staff did not plan to produce an integrated report on this subject.

D. Okrent and R. Axtmann expressed concern about emergency preparedness and emergency planning at Midland. R. Axtmann inquired whether an emergency plan would be in place before startup. R. L. Tedesco indicated that a completed emergency plan might not be in place for low power operations, but that a tested plan must be available before the plant goes into full power operation.

R. Mattson, NRC Staff, indicated that steam generators should be protected against overfill from either the main or auxiliary feedwater systems. Equipment to provide this protection should be safety grade.

*Midland 147*

D. Okrent noted that this issue is particularly important on B&W plants because of their control sensitivity and he questioned the lack of urgency expressed by the NRC Staff at issuing a backfit requirement for operating plants. D. Okrent requested a written response within the next month regarding the NRC Staff position with respect to the issue of feedwater overfill protection. J. Ebersole requested that the NRC Staff include in its report an analysis of the consequences of continuing to pump cold main feedwater into the steam generator in the event of a main steam line failure. This procedure can lead to a severe secondary transient leading to the pressurized thermal shock problem in the reactor pressure vessel.

D. Quality Control Issues

W. Little, NRC Staff, Region III, presented a tabulation of NRC criteria for assessing construction QA/QC at nuclear power plants (see Appendix VIII). As a result of the Staff's Systematic Assessment of Licensee Performance (SALP) review of Midland, the Staff had identified six areas which it plans to follow in more detail than currently required. M. Bender questioned how the Staff makes a final judgment regarding the overall plant adequacy. W. Little suggested that the Staff has to depend on its routine inspection program to assess the overall adequacy of plant construction.

J. Ebersole questioned how extensive the Staff effort would have to be in order to assure against a total failure of flow of service water. J. Kane, NRC Staff, indicated that the Staff has undertaken QA audit efforts sufficient to confirm loose fill, soft clays under pipes, the measurement of settlements and stresses on pipes. Based on an evaluation of the remedial measures taken by the Applicant, the Staff is convinced that the problems that have been identified are being adequately addressed.

D. Okrent requested an explanation of the six items that would require special quality assurance monitoring by the Staff. W. Little identified these as follows:

- . Remedial actions related to soils problems
- . Piping systems and supports
- . Electrical power and supply distribution
- . Instrumentation and control
- . Design control and the control of design changes
- . Reporting requirements and corrective action.

*Midland 142*

M. Bender suggested that the Staff prepare a comprehensive report identifying quality problems at the Midland site and containing an overall assessment of plant quality. R. Vollmer, NRC Staff, did not think the Staff would have any objection to preparing such a report. He indicated that, before this plant could be licensed, he expected Consumers Power to provide objective evidence that the plant had been designed and constructed in accordance with the application. M. Bender expressed concern that the construction problems found may suggest that greater care should have been taken during the construction phase. R. Vollmer thought that the audits the Staff is conducting regarding mechanical and structural details should provide sufficient assurance of the quality of construction.

E. Consumers Power Presentation Regarding Quality Assurance

D. W. Marguglio, Construction Quality Assurance Program Manager for Consumers Power Company (CPCo), described three major aspects of the quality assurance effort at the Midland site:

- . NRC's increased Inspection Program
- . External, independent audits and assessments by CPCo consultants (biennial audits)
- . CPCo performed reinspections and rereviews.

The Committee discussed the apparent buildup in the quality assurance organization and its relationship to the fill material and electrical equipment qualification issues. P. G. Shewmon questioned whether the independent audits being conducted by Consumers Power have uncovered anything in the six areas that the NRC inspection teams have been concentrating their efforts. D. Marguglio indicated that a recent review found the timeliness of quality assurance corrective actions to be quite satisfactory.

J. Ebersole pointed out that numerous significant targets are in the direct path of potential turbine missiles. He questioned the position of the NRC Staff regarding the potential problem of both a turbine stop valve and control valve failure which could lead to turbine overspeed and disc failures. He mentioned attempts by the Applicant to put two trip systems on a single set of valves as a solution to the problem. R. Klecker, NRC Division of Engineering, explained the NRC's turbine missile guidelines as shown in Standard Review Plan III.5.1.3 (see Appendix X). He compared the Applicant's values for missile generation, strike and damage probabilities with NRC's Standard Review Plan numbers.

*Midland 142*



F. Seismic Review

J. Kimball, NRR Staff Seismologist, explained the Staff's position on the Midland Plant. Two alternatives were given to the Applicant after the Applicant's analysis at the construction permit stage had been reviewed and found to require reanalysis. The Applicant decided to use the site specific spectrum to replace the 0.12g modified Housner spectrum which was the original Midland design spectrum. The Staff and Applicant agree that the 84th percentile in the Midland site specific response spectra is a conservative representation for the ground motion at the Midland site (see Appendix XI).

L. Reiter, Section Leader for Seismology in the NRR Division of Engineering, made some general comments regarding probabilistic estimates for the safe shutdown earthquake. He noted that reliance upon probabilistic estimates for very long return period earthquakes is not the way to alleviate concerns regarding earthquakes greater than the safe shutdown earthquake. In answer to a question by D. Okrent, L. Reiter indicated that one possible way to alleviate some of these concerns would be to make a study of events, the probability of which is high enough to be accurately estimated by available procedures, in order to develop a base from which to extrapolate less likely events. G. Knighton, NRC Staff, indicated that simply raising the g value for the plant site would not give confidence from the seismic point of view, as would a closer look at the capacity of the equipment or the design of the equipment to withstand more severe shaking. The Committee discussed the design of structures at nuclear plants in general with regard to their ability to withstand a seismic event.

R. Kennedy, President of Structural Mechanics Associates, consultant to Consumers Power, briefly summarized the criteria for the seismic margin review at the Midland plant (see Appendix XIII). R. Kennedy described the screening process to select structural elements, components, and distribution systems for seismic safety margin evaluation, and presented an example of analysis results for the borated water storage tank at Midland. There were no questions from the Committee.

T. R. Thiruvengadam, Consumers Power Co., reviewed the soils exploration program at Midland with regard to liquefaction potential and margins. He identified the diesel generating area, and the railroad bay area of the auxiliary building as the principal structures for which remedial measures against liquefaction were found necessary (see Appendix IX). He indicated that if these areas are dewatered and the ground water level is maintained at or below elevation 610, the structures would be safe against liquefaction for earthquakes with peak ground accelerations of 0.19g. He added that during normal operations of the dewatering system, the water level is maintained at elevation 595.

*Midland 147*

T. R. Thiruvengadam indicated that for an earthquake of magnitude 6 or 0.19g acceleration there is a factor of safety of 1.5 against the potential for liquefaction and for a 0.25g acceleration there is a factor of safety of 1.1 against the potential for liquefaction. In answer to a question by D. W. Moeller, T. R. Thiruvengadam indicated that the safety factor of 1 would imply the onset of liquefaction.

D. Okrent summarized the various views of the ACRS consultants with respect to the seismic area. R. Holt, Western Geophysical Corp., consultant for Consumers Power, attempted to clarify and reconcile Midland numbers with the numbers estimated by Drs. Trifunac and Pomeroy, ACRS consultants.

G. Inadequate Core Cooling Instrumentation and Reactor Vessel Head Vent

R. Mattson, NRC Staff, indicated that a reactor vessel head vent will be required of the Applicant before licensing. The Staff and the Applicant have continued to discuss the core exit thermocouples as a means of detecting inadequate core cooling. R. Mattson indicated that these thermocouples would be upgraded and operational prior to fuel load. He added that the hot-leg monitoring system proposed by the Applicant is inadequate and has to be upgraded to include a vessel head tap.

L. Gibson, Section Head for Safety and Analysis, Consumers Power Co., presented Consumers Power's position with regard to venting their B&W designed reactor coolant system. He indicated that Consumers Power is in agreement with B&W, that the proper way to provide venting for the B&W design is through the use of vents at the top of the hot leg and the top of the pressurizer. L. Gibson expressed Consumers Power's belief that a level indicator in the reactor head does not provide additional margin for the operator to respond to an inadequate core cooling event. He indicated that Midland procedures call for trip of the reactor coolant pumps on a loss of subcooling margin in order to avoid void formation in the pumps. D. Okrent noted that there was definitely a philosophical difference between the Staff and the Applicant. R. Mattson indicated that, regardless of the Committee's report, the Staff was prepared to go to the Hearing Board with its current position.

R. Mattson mentioned the Semiscale/MOD-V which will model the B&W reactor system. The discussion involved recent TRAC calculations made by Los Alamos involving the ability to maintain single phase natural circulation cooling in the B&W design for certain small break LOCAs. He referred to a letter from the NRC Staff to H. Meyers of the Udall Committee which explains the Los Alamos calculations

*Midland 1+2*

(see Appendix XIV) and suggested that the TMI-2 Hearing Board might require additional information regarding this matter. In response to an inquiry by D. Okrent, R. Mattson indicated that this matter was an open or outstanding issue which will be addressed in a supplement to the SER.

H. Slager, Consumers Power, provided the summary of experience at the Midland plant regarding bolting. During routine testing of reactor vessel anchor bolts, several failed in a ductile manner. They were found to be much softer than anticipated because of improper heat treatment. Because of this experience Consumers Power Company initiated a hardness testing program for all special purpose bolts. H. Slager noted that this is a QA problem which involved more than just record keeping. He indicated that the hardness test program was eventually extended to cover other bolts and similar problems were found with steam generator anchor bolts, reactor coolant snubber anchor bolts, and pipewhip restraint bolts (see Appendix IX). H. Slager indicated that Paladine Engineering Services was hired to perform an independent analysis of the Midland Reactor Vessel anchor bolts and found that the cracking mechanism was initial stress corrosion cracking followed by complete failure due to the low fracture toughness.

H. Slager explained that in order to avoid further stress corrosion cracking, Consumers decided to lower the prestress on the anchor bolts from 92 ksi to 6 ksi and add upper lateral supports to take up some of the potential seismic loads carried by the reactor vessel anchor bolts in the original design. H. Etherington suggested that it is not good engineering practice to let the design load exceed the prestress load on these bolts. The prestress load should be at least equal to the design load. T. R. Thiruvengadam indicated that that was the original intent, but the lost stiffness was now being taken up through the upper lateral supports.

Chairman Shewmon inquired whether the Staff had made any progress evaluating the use of this ASTM specification that has resulted in the placement of unsatisfactory material at two plants so far. C. D. Sellers, NRC Staff, indicated that the Staff does not have anything other than a technical assistance contract at Brookhaven that would address this matter. An NRC position addressing anchor bolt preload, material selection, hardness, inspection at receipt, and inspection in service would be formulated from the results of the Brookhaven contract.

*Midland 1+2*



J. J. Ray asked several questions pertaining to a.c./d.c. electrical system reliability. B. Harshe, Consumers Power, answered these questions as follows:

- . Analysis for stability of the grid assumed a single failure such as a breaker that did not operate, line problems coincident with the fault such that there was stability long enough for backup relaying or backup switching to take place.
- . With regard to d.c. supply, batteries are oversized and should last for approximately 4 1/2 hours under full load conditions.
- . Load shedding analyses to verify extension of the 4 1/2 hour battery lifetime in the event of a blackout have not been done yet.
- . All Consumers Power Nuclear Plants have top priority for restoration of power in the event of a blackout.
- . Consumers Power System has blackstart capability through the use of the hydro facility at Leadington, diesel generators, and gas turbines.

C. Mark pointed out the unfavorable orientation of the plant turbines and questioned the NRC Staff's procedures for determining strike and damage probabilities. P. G. Shewmon asked the NRC Staff to explain their general approach with regard to the turbine missile strike probability  $P_2$ , and the damage probability  $P_3$ .

D. W. Moeller questioned whether the Applicant had considered the Bullock Creek Elementary School in its emergency planning. W. Beckman, Consumers Power, indicated that there were actually two questions involved, the first involving the status of the Emergency Plan and the second with respect to the elementary school. He first indicated that the Midland County Emergency Plan has been reviewed by the State of Michigan. He pointed out that the school lies in Midland County and has an evacuation plan using buses. Information in answer to additional questions by D. W. Moeller concerning emergency planning are as follows:

- . Saginaw and Bay County Emergency Plans will be submitted to FEMA for review.
- . The Dow Chemical Co. and Consumers Power have reciprocal agreements regarding an accident at the nuclear power plant with plans for protecting the personnel and shutdown of certain facilities in the DOW Plant.

*Midland 1+2*

EXCERPT FROM  
MINUTES OF 266TH ACRS MEETING  
JUNE 3-5, 1982

- Dow Chemical personnel participated in an emergency drill at the nuclear power plant, but Midland plant personnel do not yet participate in drills at the chemical plant.

D. Okrent expressed concern regarding the question of small break LUCAs and possible difficulties with natural circulation for B&W plants, and the Midland plant in particular. He explained that formation of a bubble at the top of the reactor coolant system hot leg would most certainly interfere with natural circulation if the reactor coolant pumps were tripped. He expressed displeasure with the fact that this item was not mentioned in the SER and that the Committee was given insufficient information to make a technical evaluation of it. He suggested that he would be more comfortable if the Committee did not go beyond a recommendation for 5% power operation prior to resolution of this issue.

In answer to a question by C. Mark, T. J. Sullivan, Consumers Power, indicated that the subject of control room habitability in the event of noxious gas release from Dow Chemical had been addressed. In answer to a question by J. Ebersole concerning the competency of the diesel generator building to handle a transformer failure and consequent fire, R. Burg, Bechtel Power Corp., indicated that they had looked at fire and also explosion with regard to the diesel generators and that the diesel generators can be controlled remotely from the main control panel for an indefinite period of time.

JUN 14 1982

AM 7, 8, 9, 10, 11, 12, 1, 2, 3, 4, 5, 6 PM

APPROXIMATE TIME

SPEAKER

I. INTRODUCTION

8:30 a.m.	A. Subcommittee Chairman's Report	D. Okrent
8:50 a.m.	B. Comments by Members of the Public	M. Sinclair
9:00 a.m.	C. Status of the NRC Staff Review	R. Hernan
	1. SER Open Items	
	2. Licensing conditions	
9:10 a.m.	D. Discussion [ascertainment of Committee preferences (from the topics listed in Item VI) for topics to be discussed]	

II. QUALITY CONTROL ISSUES

(Does experience in Midland indicate the need for a broader review of the Quality Control?)

9:30 a.m.	A. Summary of NRC Experience and NRC Staff Position	W. Little
9:50 a.m.	B. Applicant Response	B. Marguglio
10:00 a.m.	C. Discussion	
10:15 a.m.	***** BREAK *****	

III. SEISMIC

10:25 a.m.	A. Staff Summary of Proposed Requirements and Probabilistic Estimates of Increased Sizes	L. Reiter/J. Kimball
10:35 a.m.	B. Margin Study Results (including Liquefaction)	T. R. Thiruvengadam
10:50 a.m.	C. Discussion	

IV. INADEQUATE CORE COOLING INSTRUMENTATION AND HEAD VENT

11:05 a.m.	A. Staff Position	R. Mattson
11:10 a.m.	B. Applicant Response	L. Gibson
11:15 a.m.	C. Discussion	

*Midland 1+2*



MIDLAND  
6/4/82

- 2 -

APPROXIMATE TIME

SPEAKER

V. BOLTING EXPERIENCE

H. Slager

11:20 a.m.

A. Summary by Applicant

11:30 a.m.

B. Discussion

11:35 a.m.

VI. OTHER POSSIBLE TOPICS FOR DISCUSSION

A. Fire Protection

B. Systems Interaction

C. Integrated Control System

D. Turbine Missiles

E. High Copper Vessel

F. Process Steam

G. ATWS

H. AC/DC Systems Reliability

I. Probabilistic Risk Assessment

J. Auxiliary Feedwater System Reliability

K. Organization, Management, and Training

L. Emergency Operating Procedures

M. Industrial Security

N. Items from Previous ACRS Letters

O. SG Overfill Protection

P. Natural Circulation in the Event of a SBLOCA

Q. Other

MIDLAND PROJECT QUALITY ASSURANCE

PRESENTATION TO ACRS

JUNE 4, 1982

CONSUMERS POWER COMPANY

B W MARGUGLIO

NRC INSPECTIONS: °

- ° INCREASED INSPECTION PROGRAM
- ° TEAM INSPECTION--MAY, 1981
- ° RESIDENT INSPECTOR SINCE 1978



EXTERNAL AUDITS AND ASSESSMENTS:

- ° BIENNIAL QUALITY ASSURANCE AUDIT--1976--  
NUCLEAR AUDIT & TESTING COMPANY
- ° BIENNIAL QUALITY ASSURANCE AUDITS--1978 & 1980--  
MANAGEMENT ANALYSIS COMPANY
- ° SPECIAL QUALITY ASSESSMENT--1981--  
MANAGEMENT ANALYSIS COMPANY
- ° RE-REVIEW OF SUPPLIER RADIOGRAPHIC FILM--  
HARTFORD STEAM BOILER
- ° PRESERVICE INSPECTION AUDITS
- ° FUTURE BIENNIAL QUALITY ASSURANCE AUDITS
- ° FUTURE INPO ASSESSMENTS

REINSPECTIONS AND RE-REVIEWS:

- ° RE-REVIEW OF ENVIRONMENTAL AND SEISMIC QUALIFICATION TESTS
- ° RE-REVIEW OF FSAR
- ° RE-REVIEW OF DOCUMENTS WHICH UNOFFICIALLY COULD HAVE ALTERED DESIGN REQUIREMENTS
- ° SPECIAL RE-REVIEW FOR DESIGN SPECIFICITY AND TOLERANCING
- ° SEISMIC MARGIN ANALYSIS
- ° CONTROL ROOM DESIGN RE-REVIEW FOR HUMAN FACTORS
- ° SPECIAL DESIGN RE-REVIEW BY BECHTEL CORPORATE
- ° RE-REVIEW OF BECHTEL PROCUREMENT PACKAGES
- ° RE-REVIEW OF SUPPLIER QUALITY RECORDS (NSSS & AE)
- ° RE-ASSESSMENT OF LOW ALLOY, QUENCHED & TEMPERED BOLTS--  
7/8" & ABOVE

REINSPECTIONS AND RE-REVIEWS (CONT'D):

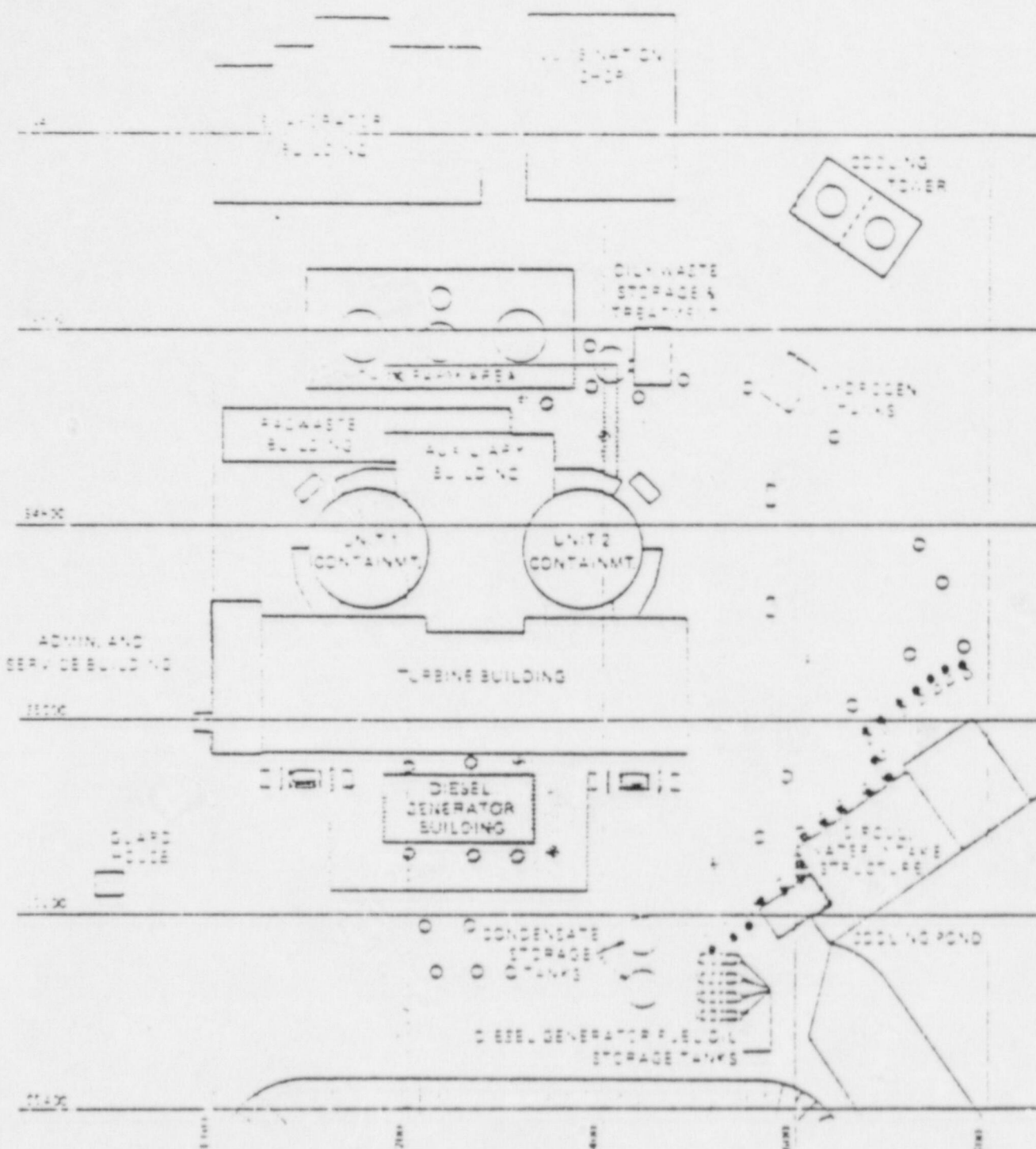
- ° SPECIAL OVERINSPECTION OF SUPPLIED ELECTRICAL EQUIPMENT FOR WORKMANSHIP
- ° 100% RE-REVIEW OF B&W FIELD-ORIGINATED RADIOGRAPHS
- ° SAMPLING RE-REVIEW OF BECHTEL FIELD-ORIGINATED RADIOGRAPHS
- ° RE-REVIEW OF CONSTRUCTION PROCEDURES
- ° RE-REVIEW OF QUALITY CONTROL INSTRUCTIONS
- ° MIDLAND PROJECT QUALITY ASSURANCE DEPARTMENT REINSPECTIONS
- ° SPECIAL CABLE INSTALLATION REINSPECTION
- ° OVERVIEW OF BECHTEL SUPPLIER AUDITS



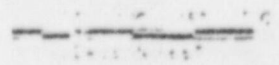
CONCLUSIONS:

- ° RECOGNIZED PAST PROBLEMS
- ° STRENGTHENED QA PROGRAM
- ° GAINED EXTENSIVE KNOWLEDGE OF PLANT
- ° IMPROVED QUALITY OF CURRENT WORK
- ° EXPECT TO MEET ALL REQUIREMENTS

SEISMIC ISSUES



- EXPLANATION
- INTERCEPTOR WELL
  - BACKFILL INTERCEPTOR WELL
  - AREA WELL
  - MONITORING WELL



CONSUMERS POWER COMPANY  
MIDLAND UNITS 1 AND 2

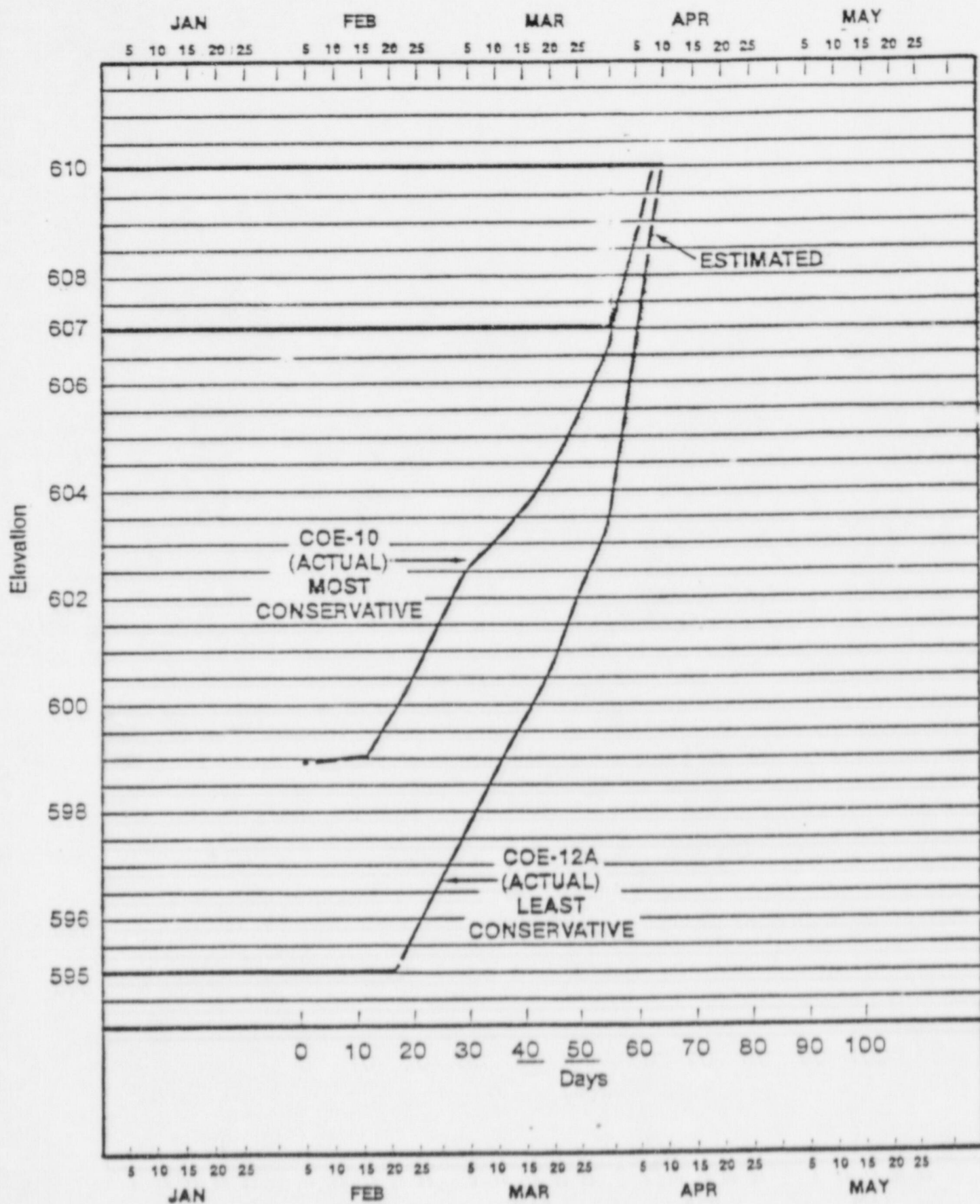
PLAN OF PERMANENT  
DEWATERING SYSTEM

FIGURE 1

MIDLAND UNITS 1 AND 2  
ACRS 4-27-82

G-2504-37





EVALUATION OF LIQUEFACTION POTENTIAL  
UNDER DIESEL GENERATOR BUILDING  
SEED'S STANDARD PENETRATION TEST METHOD  
FOR EARTHQUAKE MAGNITUDE  $M = 6$   
AND GROUND WATER LEVEL AT ELEV. 610.00

ACCELERATION

FACTOR OF SAFETY

0.19 g

1.5

0.25 g

1.1

BOLTING AND OTHER HIGH STRENGTH MATERIAL



# **MIDLAND LOW-ALLOY QUENCHED AND TEMPERED BOLTING**

- **UNIT 1 REACTOR VESSEL ANCHOR BOLTS**
- **PIPE WHIP RESTRAINT BOLTS**
- **STEAM GENERATOR ANCHOR BOLTS**
- **REACTOR COOLANT PUMP SNUBBER ANCHOR  
BOLTS**
- **LOW-ALLOY QUENCHED AND TEMPERED BOLT  
SURVEY**

# **UNIT 1 REACTOR VESSEL ANCHOR BOLTS**

- **THREE BOLTS FAILED WITHIN 8 MONTHS OF PRELOADING**
- **CRACKING MECHANISM - STRESS CORROSION CRACKING FOLLOWED BY FRACTURE DUE TO LOW TOUGHNESS**
- **PRELOAD - APPROXIMATELY 92 KSI**
- **HARDNESS - AS HIGH AS 48 HRC**
- **RESOLUTION**
  - **Lower Prestress - 6 KSI Max**
  - **Upper Lateral Supports**
  - **Limit Accident Loads for 70% of Proof Load**