

ML267

December 9, 1982

MEMORANDUM FOR: ACRS Members

FROM: D. Fischer, Staff Engineer

SUBJECT: MAJOR REDUCTION IN SAFETY RELATED WORK AT MIDLAND

Consumers Power Company (CPCo) has stopped all safety related work being conducted by Bechtel at Midland. In conjunction with this action, CPCo has reduced its construction force by 1,000, leaving approximately 4000 people at work on the Midland site. The Midland plant is now 85 percent complete.

Region III performed an inspection in October-November 1982 which identified significant quality assurance and equipment installation concerns in the diesel generator building. Partially in response to the NRC findings, the Licensee is developing a new Systems Completion Plan to address these concerns and to improve the control of work activities. This Plan led to the reduction in work force. The Licensee's Plan includes reducing most safety-related construction work, recertifying all quality control personnel, and developing a program for a 100 percent reinspection of all installed safety-related components and structures. Ongoing inspection and maintenance activities, approved remedial soils work, and nuclear steam supply system work being performed by Babcock and Wilcox are not affected by the work reduction. The Licensee plans to develop engineering and construction teams, each responsible for the completion of one or more safety-systems.

According to CPCo the Systems Completion Plan approach will provide more efficient control over the completion of work at the nuclear plant. "We have initiated this completion plan to develop a more detailed assessment of the work remaining to be done on the systems in the auxiliary building, diesel generator building and containment buildings," Mr. James Cook, Vice-President CPCo, said "The program will be carried out by design and test engineers, quality assurance personnel, and construction forces who will work as coordinated teams to implement the program." Mr. Cook indicated that another major objective of the Plan is to improve the project's performance in meeting the regulations and expectations of the U.S. Nuclear Regulatory Commission.

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Mr. Cook noted that work will continue on the nuclear steam supply system, the turbine building and miscellaneous systems. He said that the first phase of the systems completion program will be to remove all construction material and temporary equipment from the buildings included in the program. Each facility will then be cleaned and the systems completion teams will carry out their reinspections on an area-by-area basis. As each area is reinspected and the results analyzed, the systems completion team will oversee the completion of any needed remaining work. The completed system will then be turned over to Consumers Power for check-out and start-up testing.

Mr. Cook explained that the Systems Completion Program work will be done in parallel with remedial soils work. The company has started part of the foundation plan, but is awaiting permission from the NRC to complete the soils work. The foundation program will resolve the plant's soils compaction problem and add seismic protection to the plant to meet more stringent earthquake protection requirements than were called for in the plant's initial design.

The Government Accountability Project (GAP) has expressed interest in the current situation at Midland and in Midland's overall QA/QC Program. Ms. Billie Garde, Director, Citizens Clinic for Accountable Government, has suggested in light of recent events that the ACRS may wish to revise (in the not too distant future) its position on Midland's QA/QC.

The Committee's comments on Midland QA/QC as stated in its June 8, 1982 letter to the Chairman are attached for your convenience.

Attachment:  
As stated

- cc: ACRS Tech. Staff
- R. Fraley
- M. Libarkin
- T. McCreless
- J. McKinley
- G. Quittschreiber
- ACRS Fellows

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

June 8, 1982

Honorable Nunzio J. Palladino  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Dr. Palladino:

SUBJECT: ACRS INTERIM REPORT ON MIDLAND PLANT, UNITS 1 AND 2

During its 266th meeting, June 3-5, 1982, the Advisory Committee on Reactor Safeguards reviewed the application of Consumers Power Company for a license to operate the Midland Plant, Units 1 and 2.

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The Midland Plant has been the subject of several major problems related to quality assurance during plant construction. One of these problems relates to the soil fill under several safety-related structures. The deficiencies relating to soil fill have led to excessive settlement and some cracking of these structures, and have also introduced questions concerning the adequacy of protection against liquefaction of the granular portions of the fill in the event of strong vibratory motion accompanying an earthquake.

The Applicant has proposed and is implementing, under close surveillance by the NRC Staff, remedial measures with regard to the foundation deficiencies. We are generally satisfied with the approach being taken, subject to confirmation of the overall quality assurance program and the seismic design basis. Both of these items are discussed below.

With regard to quality control of design and construction, the report of the NRC Staff's Systematic Assessment of Licensee Performance (SALP) review for the period July 1, 1980 to June 30, 1981 revealed deficiencies in the installation of piping and piping suspension systems, in the pulling of electrical cables, and in the handling of problems relating to soils and foundation. Deficiencies by the Applicant in the handling of soils-related matters have continued to occur, subsequent to issuance of the SALP report. We believe that the NRC Staff is handling the corrective actions for specifically identified quality assurance deficiencies in an appropriate manner.

In view of the overall concern about Midland quality assurance the NRC should arrange for a broader assessment of Midland's design adequacy and construction quality with emphasis on installed electrical, control, and mechanical equipment as well as piping and foundations. We wish to receive a report which discusses design and construction problems, their disposition, and the overall effectiveness of the effort to assure appropriate quality.

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December 9, 1982

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MEMORANDUM FOR: ACRS Members

FROM: D. C. Fischer, Staff Engineer

SUBJECT: REGION III REPORT ON MIDLAND DESIGN AND CONSTRUCTION PROBLEMS, THEIR DISPOSITION, AND OVERALL EFFECTIVENESS OF THE EFFORT TO ASSURE APPROPRIATE QUALITY

1. The ACRS Interim (5<sup>th</sup> letter) Report on Midland Plant, Units 1 and 2 dated June 8, 1982 requested in part, "a report which discusses design and construction problems, their disposition, and the overall effectiveness of the effort to assure appropriate quality." Attached is the "Summary and Conclusion of Overall Effectiveness" portion of the Staff's (Region III) report written in response to the Committee's request.
2. The body of the Staff's report (Section III, Design and Construction Problems As Documented in NRC Inspection Reports) contains a chronology, 1970 through June 30, 1982, of QA-related deficiencies identified in I&E Inspection Reports. It provides details on the significant construction problems identified in the Summary. Unfortunately, it makes extensive reference to the I&E Inspection Report numbers and fails to summarize either the noncompliances or the associated corrective action. If you would like a copy of the complete report, please do not hesitate to ask me for one. The Staff intends to submit a final report on construction QA to the ACRS covering the period from July 1, 1982 through the completion of construction.
3. The ACRS Subcommittee on Midland Plants Units 1 and 2 will address QA/QC at Midland at a future subcommittee meeting(s). The AS&LB is currently scheduled to begin hearings on Midland's construction QA in early February 1983. The ACRS discussion of QA/QC at Midland will probably be after those hearings are completed.
4. The NRC Staff's report typically lists only non-compliances identified in I&E Inspection Reports. There may be numerous QA/QC deficiencies identified by other mechanisms (e.g., 50.55e reports, nonconformance reports, audit findings, etc.). The Committee may wish to supplement this report

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with a report by the Applicant on significant Applicant identified QA/QC deficiencies, their disposition, etc. If the Committee desires such a report then it's request to Consumers Power Company should be as specific as possible. If the request is not specific, we might get an inordinant amount of information that does not address the Committee's concerns. Asking the Applicant to make this kind of self evaluation would help the Committee get a more complete picture of Midland QA/QC history.

Attachment:  
As stated

cc: ACRS Technical Staff  
ACRS Fellows  
Midland Plant Consultants W/Attach.

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## II. Summary and Conclusions of Overall Effectiveness

Since the start of construction, Midland has experienced some significant problems resulting in enforcement action (enforcement statistics are summarized in Table 1). Following the identification of each of these problems, the licensee has taken action to correct the problems and to upgrade the QA program and QA/QC staff. The most prominent action has been an overview program which has been steadily expanded to cover safety related activities. In spite of the corrective actions taken, the licensee continues to experience problems in the implementation of quality in construction.

Significant construction problems identified to date include: (1) 1973 - cadweld splicing deficiencies (Paragraph C.2); (2) 1976 - rebar omissions (Paragraph F.5); (3) 1977 - bulge in the Unit 2 Containment Liner Plate (Paragraph G.3); (4) 1977 - tendon sheath location errors (Paragraph G.4); (5) 1978 - Diesel Generator Building settlement (Paragraph H.10); (6) 1980 - allegations pertaining to Zack Company heating, ventilating, and air conditioning (HVAC) deficiencies (Paragraph J.7); (7) 1980 - reactor pressure vessel anchor stud failures (Paragraph J.8); (8) 1981 - piping suspension system installation deficiencies (Paragraph K.4); and (9) 1982 - electrical cable misinstallations (Paragraph L.2).

Consumers Power has on repeated occasions not reviewed problems to the depth required for full and timely resolution. Examples are: (1) rebar omissions (1976); (2) tendon sheath location errors (1977); (3) Diesel Generator Building settlement (1978); and (4) Zack Company HVAC deficiencies (1980). In each of these cases the NRC, in its investigation, has determined that the problem was of greater significance than first reported or that the problem was more generic than identified by Consumers Power Company.

The Region III inspection staff believes problems have kept recurring at Midland for the following reasons: (1) Overreliance on the architect-engineer, (2) failure to recognize and correct root causes, (3) failure to recognize the significance of isolated events (4) failure to review isolated events for their generic application, and (5) lack of an aggressive quality assurance attitude.

A history of the Midland design and construction problems and their disposition, as identified and described in NRC inspection reports, is contained in the following section (III). This history is for the period from the beginning of construction through June 30, 1982.

Table 1

## ENFORCEMENT STATISTICS

YEAR	INSPECTIONS		NONCOMPLIANCES/ DEVIATIONS		HEADQUARTERS NOTICE OF VIOLATION		CIVIL PENALTIES	TALS/ CALLS	ORDERS MODIFYING CP/ SIGN CAUSE ORDERS	SIGNIFICANT CONSTRUCTION PROBLEMS
	INSPECTIONS	DEVIATIONS	NOTICE OF VIOLATION	DEVIATIONS	NOTICE OF VIOLATION					
1970	6	4	0	0	0	0	0	0	0	0
1971	2	0	0	0	0	0	0	0	0	0
1972	1	0	0	0	0	0	0	0	0	0
1973	11	6	0	0	0	0	0	1 (Cablewelds)	1 (Cablewelds)	1 (Cablewelds)
1974	11	3	0	0	0	0	0	0	0	0
1975	1	0	0	0	0	0	0	0	0	0
1976	9	17	1 (Rebar)	0	0	0	0	1 (Rebar)	0	1 (Rebar)
1977	12	10	0	0	0	0	0	1 (Tendon Sheath)	0	(Bulge in Containment Liner and 2 Tendon Sheath Installation Errors)
1978	23	14	0	0	0	0	0	0	0	1 (Diesel Generator Bldg. Settlement)
1979	30	17	0	0	0	0	0	(Diesel Generator 1 Bldg. Settlement)	0	0
1980	37	21	0	0	1 (Zack)	1 (Zack)	0	0	0	2 (Zack HVAC & Reactor Anchor Studs)
1981	23	21	0	0	0	0	0	0	0	1 (Pipe Suspension System)
1982	14	7	0	0	0	0	0	2 (Diesel Generator 1 Bldg. Settlement)	1	1 (Electric Cable Routing)