

TO: Region III (Chicago)

CYs: to: J. Keppler
J. Harrison
R. F. Warnick

JUN 3 1983

From: Linda Underwood, RM/BM
(492-4977)

(4 PAGES)

MEMORANDUM FOR: Sandy Showman, Administrative Assistant
to Commissioner Gilinsky

FROM: Edwin G. Triner, Director
Division of Budget and Analysis
Office of Resource Management

SUBJECT: BACKGROUND INFORMATION FOR COMMISSIONER GILINSKY'S
TRIP TO MIDLAND 1 AND 2

Attached is the background information you requested on Midland 1 and 2 for Commissioner Gilinsky's trip.

The information was primarily obtained from the NRC Region III Section Chief, the ELD case attorney, and the Licensing Project Manager.

Due to the curtailment of time, we were unable to prepare the background information on other plants in the area routinely provided with our reports. Our search for information on Midland was also hampered due to the fact that the major Midland personnel are attending the Midland hearings currently in progress and were not readily available.

If you have any questions, please contact me.

Original Signed by
L Edwin G. Triner

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PDR FOIA PDR
RICEB4-96

Edwin G. Triner, Director
Division of Budget and Analysis
Office of Resource Management

Attachment:
As stated

bcc: L. Barry, RM
J. Roe, DEDO
E. Triner, RM/B
J. Clark, RM/BMA
L. Underwood, RM/BMA
RM/B RJF (6)
RM/BMA R/F Chron/Subj
D. Hood, NRR
R. Cook (Res. Insp. - Midland)
J. Harrison, R III
J. Keppler, R III
R. Warnick, R III

NRMB

cc:
D. Garner
J. Milhoan
H. Chesnut
D. Droggitis
T. Rehm

*6-3-83
10:00
KB*

| | | | | | | |
|---------|--------------|--------|--------|--|--|--|
| OFFICE | RM/BMA | RM/BMA | RM/B | | | |
| SURNAME | Underwood:js | Clark | Triner | | | |
| DATE | 6/2/83 | 6/2/83 | 6/3/83 | | | |

MIDLAND

| | <u>Unit 1:</u> | <u>Unit 2</u> |
|---|--|----------------------------|
| Utility: | Consumers Power Company | Same |
| Location: | SW Boundary of Midland, Michigan Midland County, Michigan | " " |
| Docket No.: | 50-329 | 50-330 |
| CPPR Date: | 12/15/72 | 12/15/72 |
| Power Level (MWe; MWt): | 504 MWe 2452 MWt (Core) | 852 MWe 2452 MWt (Core) |
| Reactor Type: | PWR | " |
| Architect/Engineer: | Bechtel | " |
| Nuclear Steam Supply System (NSSS) Vendor: | Babcock & Wilcox | " |
| Constructor: | Bechtel | " |
| NRC Licensing Project Manager: (Telephone) | D. Hood (492-8474) | Same " |
| NRC Resident Inspector: (Telephone) | R. Cook (517) 631-8150 | " " |
| NRC Region III Section Chief: (Telephone) | J. Harrison (8-384-2635) | " |

Licensing Schedule for Pending OL Application

| | | |
|---|------------------------------|-------|
| Issue SSER: | 3rd Suppl. Sched. August '83 | Same |
| Start of Hearing: | 11/15/82 | " |
| Commission Decision on Full- Power License: | 1/85 | 9/84 |
| Applicant's Construction Completion Date:* | 2/85 | 10/84 |
| Applicant's Percent Con- struction Complete: | 85% | 85% |

* The NRC Caseload Forecast Panel recently visited (4/19-21/83) the Midland site. Official NRC results have not yet been published. However, the NRC's estimate for date of construction completion varies significantly from that of the applicant's.

MIDLAND (Continued)

The Midland station's soil problem was noted when the partially constructed diesel generator was settling at a much faster rate than anticipated. Further study uncovered similar problems in portions of several other buildings.

Because of continuing quality assurance problems at the construction site, the NRC's Region III office established a special section for inspecting construction at Midland in mid-1982. The section includes a supervisor, two region-based inspectors, and two resident inspectors.

The NRC staff is requiring Consumers Power Company to undertake three independent reviews of construction activities at Midland: a quality assurance program review for the repair and modification activities for the soil and foundation problems; a review of ongoing construction and Consumers Power inspection activities; and a design and construction review of specific safety systems in the plant. Stone and Webster Engineering Company has been approved by Region III for the soil and foundation work review; TERA Corporation has been approved by the NRC for the independent design and construction verification program for one of three systems in the review scope; the review organization for the other task, overview of ongoing construction and the construction completion program, has not yet been approved.

Consumers Power Company stopped a major portion of safety-related construction at Midland in December 1982, partially as a result of NRC inspection findings which identified a number of quality assurance and construction problems related to installation of electrical, mechanical and civil components in the diesel generator building and the action of QC supervisors instructing QC inspectors to suspend inspections of excessive deficiencies. The inspection findings resulted in a \$120,000 fine issued on February 8, 1983.

Essentially all safety-related work which was under the control of Bechtel was stopped.

Consumers Power has developed a Construction Completion Program which involves a reinspection of completed safety-related construction by site personnel, changes in the quality assurance organization, and retraining and recertification of quality control inspectors. NRC Region III is still reviewing the details of this program, and the construction activities stopped in December have not been resumed.

Work conducted by the Zack Company on the heating, ventilation and air-conditioning (HVAC) was stopped by the licensee because of problems with the documentation of the qualification of welders. A special inspection of allegations regarding the HVAC system is expected to be completed in September 1983.

Modifications relating to the remedial soils program requires underpinning of the foundation for a portion of the Auxiliary building (electrical penetration area) and the feedwater isolation valve pits. Part of the service water pump structure is also to be underpinned and stiffening of the borated water storage tank foundations is to be performed. Work in the soils area is continuing.

MIDLAND (Continued)

Work continues on the B&W nuclear steam supply system.

Hearings regarding quality assurance at the Midland plant were thought to be completed in July 1981. In view of the concern about the QA at Midland, the staff wrote the Board on June 29, 1982 to request the previous QA testimony be supplemented. The ASLB granted the staff's motion to reopen the record on QA matters.

Hearings on QA matters were held April 26 through May 6, 1983 and reconvened on June 1 and will continue through June 10, 1983. Hearings are expected to reconvene again on June 27 through July 1, 1983. Final hearings on QA matters may possibly continue in the fall.

Because of the soils compaction problem which led to settlement of the diesel generator building, Consumers Power had earlier requested a hearing on the soils issue problem.

The Licensing Board has not yet set a schedule for proposed findings on modifications to the license relating to the soil issues. It is anticipated they will be scheduled in September 1983. Following this submission of proposed findings the staff will resume the Operating Licensing proceedings.



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

June 8, 1982

| PRINCIPAL STAFF | |
|-----------------|----------|
| DIR | |
| D/D | ✓ No NAS |
| A/D | MS |
| OP/PI | |
| DEATI | |
| DEP&OS | File ✓ |

Midland

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. This application was also considered at Subcommittee meetings held on April 29, 1982 in Washington, D. C., on May 20-21, 1982 in Midland, Michigan and on June 2, 1982 in Washington, D. C. On May 20, 1982 members of the Subcommittee toured the plant. In the course of these meetings the Committee had the benefit of discussions with representatives and consultants of Consumers Power Company, Babcock and Wilcox Company, Bechtel Corporation, the Nuclear Regulatory Commission Staff, and members of the public. The Committee also had the benefit of the documents listed below.

The ACRS reported on June 18, 1970 regarding the construction permit application for the Midland Plant; on September 23, 1970 regarding several amendments to the application; and on November 18, 1976 regarding applicable generic matters.

The Midland Plant site is located on the south bank of the Tittabawassee River adjacent to the southern city limits of Midland. The main industrial complex of the Dow Chemical Company lies within the city limits directly across the river from the site. There are about 2000 industrial workers within one mile of the site, and the estimated 1980 population was about 51,400 residents within five miles of the site. This makes the Midland site one of the more densely populated sites at distances close to the Plant.

Each of the two Midland units employs a Babcock and Wilcox designed nuclear steam supply system rated at 2468 Mwt with a stretch power rating of 2552 Mwt. The Midland Plant is unique in that the heat generated will be used not only to produce electricity but also to produce process steam for the Dow Chemical Company plant via a tertiary system.

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

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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.

Our reservation concerning seismic design relates to the lack of adequate assurance that the Midland Plant will be capable of accomplishing shutdown heat removal for low probability earthquakes more severe than the safe shutdown earthquake (SSE). The Midland seismic design basis at the construction permit stage corresponded to a MMI VI, peak ground acceleration of 0.12g, employing a modified Housner spectrum. For the operating license review, the NRC Staff has reevaluated the original seismic design basis and the Applicant and the NRC Staff have agreed on the use of site-specific analyses which have led to increases in the design response spectra for frequencies above about 2 cycles/sec.

Historically, no earthquakes stronger than the newly proposed SSE have occurred within 200 miles of the Plant. However, expert opinion differs widely on the exceedance frequency of the proposed SSE and on the severity at the site of earthquakes whose likelihood is less than 1 in 10^4 or 1 in 10^5 per year.

June 8, 1982

The Applicant is currently reevaluating by selective audit the seismic capability of the plant, as originally designed, to withstand the revised SSE. Measures taken to assure safe shutdown in the event of an earthquake include the use of dewatering to reduce the potential for soil liquefaction. We recommend that all systems and components important to decay heat removal be carefully evaluated for their ability to accomplish necessary functions in the unlikely event of lower-probability, more severe earthquakes in order to provide the necessary degree of assurance. This matter should be resolved in a manner satisfactory to the NRC Staff. We wish to be kept informed about the resolution of this matter. We believe that any recommendations for changes in the plant resulting from this evaluation should be implemented by the end of the second refueling outage.

The Applicant has agreed to provide core exit thermocouples, a hot-leg-level measurement system, and subcooled margin monitors as instrumentation to detect inadequate core cooling. Consumers Power Company also plans to include a remotely operable vent on top of both inlet loops to the steam generators; however, Consumers has not committed to supply a high point vent on the reactor vessel head. This matter should be resolved in a manner satisfactory to the NRC Staff. The ACRS recommends that the Applicant review further the potential for providing indications of water content or level within the reactor vessel.

The staff of the Applicant includes many personnel who have had nuclear power plant experience. However, operating experience with this B&W type power reactor is limited, and the NRC Staff is requiring that at least one person having experience on a large commercial PWR be included on each shift for one year. We support the NRC Staff position.

The Applicant's experience with the operation of nuclear power plants should, in principle, place Consumers in a favorable position to provide continuing, careful oversight of the operations at the Midland Plant. In view of some prior adverse operating experience at the Palisades Plant however, we recommend that the NRC Staff institute an augmented audit of operations at Midland, at least during the early years of operation at power.

We have reviewed the evaluation made of the tertiary process steam system for use by Dow Chemical Company. This system appears not to impose any unacceptable impacts either on the safe operation of the Midland Plant or on the people working at the Dow Chemical Company.

The Applicant has undertaken an effort to have a probabilistic risk assessment (PRA) performed for the Midland Plant and stated that the results will be available in the fall of 1982. We believe it desirable to have plant-specific PRAs performed for each commercial nuclear power plant and that

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it is particularly appropriate for the Midland Plant because of its relatively high, close-in population density. We wish to have the opportunity to review the Midland PRA with assistance from the NRC Staff, and to offer comments or recommendations as appropriate. We do not believe that this review need delay licensing of the Midland Plant for operation.

Recently, questions have come to light in connection with B&W plants concerning the availability of natural circulation in the presence of an interrupted or continuing small break loss-of-coolant accident. We wish to see a proposed NRC Staff resolution of this issue.

The Applicant described an extensive systems interactions study being undertaken for the Midland Plant. We wish to be informed of the results of this study.

We believe that, in view of the population density near this plant, additional prudence is appropriate for the Midland Plant in the resolution of the ATWS issue and other Unresolved Safety Issues.

We endorse the participation of Dow Chemical Company plant personnel in emergency procedures developed on the basis of an assumed failure at the Midland Plant. Similarly, there should be active participation by Midland Plant personnel in emergency procedures developed on the basis of an assumed failure at the Dow Chemical plant. The Applicant and the NRC Staff should promote continued coordination of these types of relationships, as well as those involving appropriate state and local groups to assure that the capability for an effective emergency response is developed and maintained.

With regard to the eleven items identified in the ACRS Supplemental Report on Midland Plant, Units 1 and 2 dated November 18, 1976, we have the following comments. The issues related to vibration and loose-parts monitoring, potential for axial xenon oscillations, behavior of core-barrel check valves during normal operation, fuel handling accidents, effects of blowdown forces on core internals, LOCA-related fuel rod failures, and improved quality assurance and in-service inspection for the primary system have all been resolved or are in a confirmatory stage of being resolved. Separation of protection and control equipment has been accomplished in an appropriate manner; however, the safety implications of control systems remains an Unresolved Safety Issue directly applicable to Midland. Resolution awaits completion of the NRC Staff Task Action Plan A-47. The effect of ECCS induced thermal shock on pressure vessel integrity has been resolved in part; however, the Unresolved Safety Issue on pressurized thermal shock will apply. Environmental qualification of equipment remains a generic

June 8, 1982

issue which is under review by the NRC Staff and whose resolution will apply to the Midland Plant. Instrumentation to follow the course of an accident has been resolved in part by the development of revised Regulatory Guide 1.97. We do not believe that licensing of the Midland Plant for operation need await further resolution of any of the eleven issues discussed above.

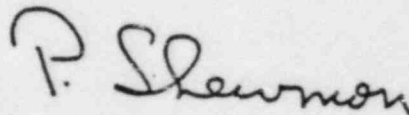
The various other matters identified by the NRC Staff as open or confirmatory in the Safety Evaluation Report should be resolved in a manner satisfactory to the NRC Staff. We wish to be kept advised concerning resolution of the turbine missile issue.

The ACRS believes that, subject to satisfactory completion of construction and staffing and if due regard is given to the comments above, the Midland Plant, Units 1 and 2 can be operated at power levels up to 5 percent of full power with reasonable assurance that there is no undue risk to the health and safety of the public.

We defer our recommendation regarding operation at full power until we have had the opportunity to review the plan for an audit of plant quality and the proposed resolution of the question regarding natural circulation in the presence of a small break LOCA.

Dr. Kerr did not participate in the Committee's review of this matter.

Sincerely,



P. Shewmon
Chairman

References:

1. Consumers Power Company, "Midland Plant Units 1 and 2 - Final Safety Analysis Report" including Amendments 1-43
2. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report Related to the Operation of Midland Plant, Units 1 and 2," NUREG-0793, dated May 1982
3. U.S. Nuclear Regulatory Commission, "NRC Licensee Assessments," NUREG-0834, dated August 1981
4. Letter from J. Cook, Consumers Power Company, to J. Keppler, NRC, Subject: Midland Project Response to Draft SALP Report, dated May 17, 1982
5. Letter from J. Cook, Consumers Power Company, to J. Keppler, NRC, Subject: Midland Project Quality Assurance Program Update, dated April 30, 1981

June 8, 1982

6. Letter from J. Hind, NRC, to J. Cook, Consumers Power Company, Subject: Systematic Assessment of Licensee Performance (SALP), dated April 20, 1982
7. Letter from J. Cook, Consumers Power Company, to H. Denton, NRC, Subject: Summary of Soils-Related Issues at the Midland Nuclear Plant, dated April 19, 1982
8. Letter from K. Drehobl, Consumers Power Company, to D. Fischer, ACRS, Subject: Midland Project Soils Information, dated April 12, 1982
9. Statement of Ms. M. Sinclair to ACRS, dated June 4, 1982
10. Letter from B. Stamiris to Dr. D. Okrent and ACRS Members, Subject: Midland OL Review, dated May 29, 1982
11. Letter from M. Sinclair to Dr. P. Shewmon, ACRS, Subject: Midland OL Review, dated May 28, 1982
12. Statement by Dr. C. Anderson to ACRS Midland Plant Subcommittee dated May 20-21, 1982
13. Statement by Ms. M. Sinclair to ACRS Midland Plant Subcommittee dated May 20-21, 1982
14. Letter from B. Stamiris to D. Fischer and ACRS Members, Subject: Soil Settlement and QA Issues, dated May 20, 1982
15. Letter from M. Sinclair to Dr. C. Siess, ACRS, Subject: Midland Soil Settlement, dated April 26, 1982



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

OCT 29 1982

W. J. ...
(2) file

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

MEMORANDUM FOR: D. G. Eisenhut, Director, Division of Licensing, NRR

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

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

In a letter to Chairman Palladino dated June 8, 1982, entitled, ACRS Interim Report on Midland Plant, Units 1 and 2, Dr. Paul S. Shewman, Chairman of the Advisory Committee on Reactor Safeguards, requested "a report which discusses design and construction problems, their disposition, and the overall effectiveness of the effort to assure appropriate quality."

Supplement No. 1 to the Midland Safety Evaluation Report (SSER 1) indicates Region III would prepare such a report for the period from the beginning of construction through June 30, 1982. The SSER 1 also indicates that a final report will be issued on the above subjects for the period from July 1, 1982 through the completion of construction.

The enclosed report is submitted in response to the first part of above referenced request and commitments. We request it be forwarded to the ACRS. A final report will be submitted following completion of construction.

It is our understanding that NRR has lead responsibility for the disposition of some of the construction problems. This is noted in the report. (See item III, paragraphs H.10 and J.8.)

Please contact me if you have any questions.

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

Enclosure: As stated

cc w/encl:
T. Novak, NRR
D. Hood, NRR
R. Hernan, NRR
T. Harpster, IE
D. Allison, IE

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OCT 29 1982

Midland

Docket No. 50-329
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FROM: R. F. Warnick, Acting Director, Office of Special Cases
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Please contact me if you have any questions.

15/ for R. F. Warnick

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

Enclosure: As stated

cc w/encl:
T. Novak, NRR
D. Hood, NRR
R. Hernan, NRR

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| | | | | | | |
|---------|-----------------|------------|--------|---------|-------|--------|
| OFFICE | T. Harpeter, IE | RIII. 215 | Shafer | RFW | Davis | Kepler |
| SURNAME | D. Allison, IE | Gardner/ls | Shafer | Warnick | Davis | Kepler |
| DATE | | 10/28/82 | | | 10/29 | 10/29 |

Midland Nuclear Power Plant, Units 1 and 2

Docket No. 50-329-

Docket No. 50-330

REPORT ON DESIGN AND CONSTRUCTION PROBLEMS FOR PERIOD FROM
START OF CONSTRUCTION THROUGH JUNE 30, 1982

Report Requested by Advisory Committee on Reactor Safeguards

I. Introduction

The following report prepared by the NRC, through its Region III office, discusses Midland construction problems, their disposition, and the overall effectiveness of the Consumers Power Company's efforts to ensure appropriate quality. The report was prepared at the request of the Advisory Committee on Reactor Safeguards and in response to commitments made in Supplement No. 1 of the Safety Evaluation Report. The report covers the period starting with the beginning of construction up to June 30, 1982. A final report will be issued on the above subjects for the period from July 1, 1982 through the completion of construction discussing the overall quality of plant construction.

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 | IALs/ CALs | ORDERS MODIFYING CP/ SHOW CAUSE ORDERS | SIGNIFICANT CONSTRUCTION PROBLEMS |
|------|-------------|-------------------------------|--|--------------------|-------------------------------|---|---|
| 1970 | 6 | 4 | 0 | 0 | 0 | 0 | 0 |
| 1971 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1972 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1973 | 11 | 6 | 0 | 0 | 0 | 1 (Cadvelds) | 1 (Cadvelds) |
| 1974 | 11 | 3 | 0 | 0 | 0 | 0 | 0 |
| 1975 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1976 | 9 | 17 | 1 (Rebar) | 0 | 1 (Rebar) | 0 | 1 (Rebar) |
| 1977 | 15 | 10 | 0 | 0 | 1 (Tendon Sheath) | 0 | (Bulge in Containment Liner and 2 Tendon Sheath Installation Errors) |
| 1978 | 23 | 14 | 0 | 0 | 0 | 0 | 1 (Diesel Generator Bldg. Settlement) |
| 1979 | 30 | 17 | 0 | 0 | 0 | (Diesel Generator 1 Bldg. Settlement) | 0 |
| 1980 | 37 | 21 | 0 | 1 (Zack) | 1 (Zack) | 0 | 2 (Zack HVAC & Reactor Anchor Studs) |
| 1981 | 23 | 21 | 0 | 0 | (Pipe Suspension 1 System) | 0 | 1 (Pipe Suspension System) |
| 1982 | 14 | 7 | 0 | 0 | 0 | 2 (Diesel Generator Bldg. Settlement) | 1 (Electric Cable Routing) |

III. Design and Construction Problems As Documented in NRC Inspection Reports

A. 1970

Six inspection reports were issued in 1970. In July 1970, construction activities authorized by the Midland Construction Permit Exemption commenced. A total of four items of noncompliance were identified in 1970. These items are described below:

Four items of nonconformance were identified in Inspection Report Nos. 50-329/70-06 and 50-330/70-06 concerning the installation of concrete. The nonconformances regarded: (1) concrete placement activities violated ACI Code; (2) laboratory not performing tests per PSAR; (3) sampling not per ASTM; and (4) QA/QC personnel did not act on deviations when identified. Licensee corrective actions included: (1) Bechtel to provide a report attesting to the Auxiliary Building base slab where lack of consolidation was apparent; (2) a commitment to perform tests at frequencies specified in the PSAR; and (3) a commitment to train workers and the inspection staff. This matter was discussed during the Construction Permit Hearings and is considered closed.

B. 1971-1972

Three inspections were conducted during this period. No items of noncompliance were identified. Midland construction activities were suspended pending the pre-construction permit hearings.

On December 15, 1972, the Midland Construction Permit was issued.

C. 1973

Eleven inspection reports were issued in 1973 of which two pertained to special management meetings, two to vendor inspections, one to an audit of the architect engineer, and six to onsite inspections. A total of six items of noncompliance were identified during 1973. One significant construction problem was identified involving deficiencies in cadweld splicing of rebar (see Paragraph 2). These items/problems are described below:

1. Noncompliances involving two separate Appendix B criteria with five different examples were identified during a special audit of the architect engineer's Quality Assurance Program. The noncompliances were documented in Inspection Report Nos. 50-329/73-08 and 50-330/73-08. The items of noncompliance regarded: (1) inadequate requirements for quality record retention; (2) inadequate drawing control; (3) inadequate procedures; and (4) unapproved specifications used for vendor control. Licensee corrective actions included: (1) revision of Bechtel Nuclear Quality Assurance Manual; (2) revision of Midland Internal Procedures Manual; (3) personnel instructed to audit the status of the drawing stick files weekly; (4) project administrator assigned the

responsibility for maintenance of master stick file; and (5) project engineer and staff to perform monthly surveillance of project record file. Inspection Report Nos. 50-329/74-03 and 50-330/74-03 concluded that appropriate corrective actions had been taken by the licensee relative to the identified violations.

2. One significant construction problem was identified during 1973. It involved cadweld splicing deficiencies and resulted in the issuance of a Show Cause Order. Details are as follows:

A routine inspection, conducted on November 6-8, 1973, identified eleven examples of four noncompliance items relative to rebar cadwelding operations. The noncompliances were documented in Inspection Report Nos. 50-329/73-10 and 50-330/73-10. These items were summarized as: (1) untrained cadweld inspectors; (2) rejectable cadwelds accepted by QC inspectors; (3) records inadequate to establish cadwelds met requirements; and (4) inadequate procedures.

As a result, the licensee stopped work on cadweld operations on November 9, 1973, which in turn stopped rebar installation and concrete placement work. The licensee agreed not to resume work until the NRC reviewed and accepted their corrective action. A Show Cause Order was issued on December 3, 1973, formally suspending cadwelding operations. On December 6-7, 1973, Region III and Headquarters personnel conducted a special inspection and determined that construction activities could be resumed in a manner consistent with quality criteria. Licensee corrective actions included: (1) the revision of the Bechtel specification to reflect requalification requirements; (2) development of instructions requiring that work specifications be reviewed prior to Class 1 work; (3) the establishment of provisions for Consumers Power QA review of work procedures; and (4) the establishment of procedures for the audit of Class 1 work.

The Show Cause Order was modified on December 17, 1973 allowing resumption of cadwelding operations based on inspection results. The licensee answered the Show Cause Order on December 29, 1973 committing to revise and improve the QA manuals and procedures and make QA/QC personnel changes.

On September 25, 1974, the Hearing Board found that the licensee was implementing its QA program in compliance with regulations and that construction should not be stopped.

D. 1974

Eleven inspection reports were issued in 1974 of which one pertained to a vendor inspection, one to an inspection at the licensee's corporate offices, and nine to onsite inspections. Three items of noncompliance were identified during 1974. These items are described below:

1. One noncompliance was identified in Inspection Report No. 50-329/74-01 and 50-330/74-01 concerning the use of unapproved procedures during the preparation of containment building liner plates for erection. Licensee corrective actions included: (1) intensive review of liner plate records for accuracy; (2) issuance of nonconformance report; (3) requirement imposed that unapproved copies of procedures transmitted to the site be marked "advance copy;" and (4) identification of procedure approval status. The licensee's actions in regards to this matter were reviewed and the noncompliance closed by the NRC as documented in Inspection Report Nos. 50-329/74-01 and 50-330/74-01.
2. One noncompliance was identified in Inspection Report Nos. 50-329/74-04 and 50-330/74-04, concerning the use of a weld method which was not part of the applicable weld procedure. Licensee corrective actions included: (1) issuance of a nonconformance report; (2) repair of subject welds; (3) reinstruction of welders; and (4) increased surveillance of containment liner plate field fabrications. The licensee's actions in regards to this matter were reviewed and the noncompliance closed by the NRC as documented in Inspection Report Nos. 50-329/74-04 and 50-330/74-04.
3. One noncompliance was identified in Inspection Report Nos. 50-329/74-11 and 50-330/74-11 concerning the failure of QC inspections to identify nonconforming rebar spacing. This violation is discussed further in the 1976 section of this report, Paragraph F.5.

E. 1975

Seven inspection reports were issued in 1975 of which one pertained to a meeting in Region III, one to an inspection at the licensee's corporate offices, and five to onsite inspection.

No noncompliances were identified in 1975, however, the licensee in March and August of 1975 identified additional rebar deviations and omissions. This matter is further discussed in the 1976 section of this report, Paragraph F.5.

F. 1976

Nine inspection reports were issued in 1976 pertaining to nine onsite inspections. A total of seventeen items of noncompliance were identified during 1976. One significant construction problem was identified involving rebar omissions/placement errors and the issuance of a Headquarters Notice of violation (see Paragraph 5). These items/problems are described below:

1. Three items of noncompliance were identified in Inspection Report Nos. 50-329/76-01 and 50-330/76-01. These items regarded: (1) inadequate concrete oven temperature controls; (2) no measures to control nonconforming aggregate; and (3) failure to dispose of nonconforming aggregate as required. Licensee corrective actions included: (1) implementing a requirement for the re-verification of oven temperature controls every three months; (2) removal of nonconforming aggregate from the batch plant area; (3) modification of subcontractor's QA manual; and (4) training of subcontractor's personnel to the revised QA manual. The corrective actions implemented by the licensee in regards to these noncompliances were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/76-02 and 50-330/76-02.
2. Two items of noncompliance were identified in Inspection Report Nos. 50-329/76-02 and 50-330/76-02. These items regarded: (1) the Vice President of Engineering Inspection did not audit test reports as required; and (2) corrective actions required by audit findings had not been performed. Corrective actions taken by the licensee included revising the U.S. Testing QA manual. The licensee's corrective actions taken in regards to these matters were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/76-08 and 50-330/76-08.
3. Three items of noncompliance were identified in Inspection Report Nos. 50-329/76-08 and 50-330/76-08. These items regarded: (1) inadequate classification, review, and approval of field engineering procedures and instructions; (2) inadequate documentation of concrete form work deficiencies; and (3) inadequate control of site storage of post tension embedments. Licensee corrective actions included: (1) revision of the Bechtel Nuclear QA manual; (2) revision of Bechtel field procedure for "Initiating and Processing Field Procedures and Instructions;" (3) initiation of Bechtel Discrepancy Report; (4) training sessions for Bechtel QC; and (5) revision of storage inspection procedures. The licensee's corrective actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/77-01 and 50-330/77-01.
4. Two items of noncompliance were identified in Inspection Report Nos. 50-329/76-09 and 50-330/76-09. These items regarded: (1) noncompliance report not written to identify broken reinforcing steel; and (2) hold down studs for the reactor vessel skirt were not protected. Licensee corrective actions included: (1) inspection of all rebar dowels; (2) initiation of new field procedure; and (3) initiation of new

procedure for inspecting reactor vessel and steam generator anchor bolts. The licensee's corrective actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/77-01 and 50-330/77-01.

5. One significant construction problem was identified during 1976. It involved rebar omissions/placement errors and the issuance of a Headquarters Notice of Violation. Details are as follows:

During an NRC inspection conducted in December 1974 the licensee informed the inspector that an audit had identified rebar spacing problems in the Unit 2 containment. The failure of QC inspectors to identify the nonconforming rebar spacing was identified in the 1974 NRC inspection report as an item of noncompliance. (See the 1974 section of this report, Paragraph D.3.) This matter was subsequently reported by the licensee as required by 10 CFR 50.55(e).

Additional rebar deviations and omissions were identified in March and August 1975 and in April, May and June 1976.

Five items of noncompliance regarding reinforcement steel deficiencies were identified in Inspection Report Nos. 50-329/76-04 and 50-330/76-04. These items regarded: (1) no documented instructions for the drilling and placement of reinforcement steel dowels; (2) nonconformance reports concerning reinforcement steel deficiencies were not adequately evaluated; (3) inadequate inspections of reinforcement steel; (4) inadequate evaluations of a nonconformance report problem relative to 10 CFR 50.55(e) reportability requirements; and (5) results of reviews, interim inspections, and monitoring of reinforcement steel installations were not documented.

The licensee's response, dated June 18, 1976, listed 21 separate items (commitments) for corrective actions. A June 24, 1976 letter from the licensee provided a plan of action schedule for implementing the 21 items. The licensee suspended concrete placement work until the items addressed in the licensee's June 24 letter were resolved or implemented. This commitment was documented in a Region III Immediate Action Letter (IAL) to the licensee, dated June 25, 1976.

Rebar installation and concrete placement activities were resumed in early July, 1976 following satisfactory completion of the corrective actions and verification by Region III as documented in Inspection Report Nos. 50-329/76-05 and 50-330/76-05.

A subsequent inspection to followup on reinforcing steel placement problems identified two noncompliances. These noncompliances are documented in Inspection Report Nos. 50-329/76-07 and 50-330/76-07. The noncompliances regarded: (1) failure to follow procedures; and (2) inadequate Bechtel inspections of rebar installations. The inspection report documents licensee corrective actions which included: (1) removal of cognizant field engineer and lead Civil engineer from the project; (2) removal of lead Civil Quality Control engineer from the project; (3) reprimand of cognizant inspector; (4) additional training given to cognizant foremen, field engineers, superintendants and Quality Control inspectors; and (5) assignment of additional field engineers and Quality Control engineers. The licensee's actions in regard to these items were reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/76-07 and 50-330/76-07.

As a result of the rebar omissions and placement errors, a Headquarters Notice of Violation was issued on August 13, 1976.

Additional actions taken by the licensee included the establishment of an overview inspection program to provide 100% reinspection of embedments by the licensee following acceptance by the contractor Quality Control personnel.

Additional actions taken by the contractor included: (1) personnel changes and retraining of personnel; (2) preparation of a technical evaluation for the acceptability of each identified construction deficiency; and (3) improvement in the QA/QC program coverage of civil work.

G. 1977

Twelve inspections pertaining to Unit 1 and fifteen inspections pertaining to Unit 2 were conducted in 1977. Ten items of non-compliance were identified during 1977. Two significant construction problems were identified involving a bulge in the Unit 2 containment liner plate (see Paragraph 3) and errors in the placement of tendon sheathings (see Paragraph 4). These items/problems are described below:

1. Five examples of noncompliance with Criterion V of 10 CFR 50, Appendix B, were identified in Inspection Report Nos. 50-329/77-05 and 50-330/77-08. The examples of noncompliance regarded: (1) inadequate clearance between concrete wall and pipe support plates; (2) assembly of pipe supports using handwritten drawing changes; (3) inadequate preparation and issue of audit reports; (4) inadequate review of nonconformance reports and audit findings for trends; and (5) inadequate tagging of defective measuring equipment. Licensee corrective actions included: (1) clarification of

design and acceptance criteria contained in pertinent specifications; (2) modification and review of Quality Control Instructions; (3) issuance of two field procedures relative to field modifications of piping hanger drawings; (4) staffing of additional QA personnel at the site; (5) closer management attention; and (6) additional training in the area of tagging. The licensee actions in regard to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/77-08, 50-330/77-11, 50-329/78-01, and 50-330/78-01.

2. Three items of noncompliance were identified in Inspection Report Nos. 50-329/77-09 and 50-330/77-12. The items regarded: (1) failure to follow audit procedures; (2) failure to qualify stud welding procedures; and (3) inadequate welding inspection criteria. Licensee corrective actions included: (1) administrative instruction issued to require the audit manager to obtain a semi-monthly audit findings status report from the project manager; (2) administrative instruction issued for the close out and followup of internal corrective action requests; (3) revision of Quality Control Instruction; (4) special inspections and audit; and (5) prescribing specific acceptance criteria. The licensee's actions in regard to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/78-01, 50-330/78-01, 50-329/78-05, and 50-330/78-05.
3. A significant construction problem involving a bulge in the Unit 2 containment liner plate was identified in 1977. Details of the liner plate bulge follow:

The initial identification by the licensee of a bulge in the Unit 2 liner plate occurred on February 26, 1977. The liner plate bulge occurred between column line azimuths 250 degrees and 270 degrees and between elevations 593 and 700. Inspection Report No. 50-330/77-02 documents a special inspection concerning the liner plate bulge. This report further identifies an item of noncompliance relative to the failure of the licensee to report the bulge deficiency pursuant to the requirements of 10 CFR 50.55(e). The licensee's corrective actions in regard to this item were reviewed and the item closed by the NRC as documented in Inspection Report No. 50-330/77-14.

The cause of the liner plate bulge was determined to be due to a leaking 2 inch water line installed in the containment concrete as a construction convenience. It was theorized that the water line froze, started to leak, allowing water to seep behind the liner. The water line was supplied by a construction water pump that was set to cycle between 100 and 130 PSI. This pressure was considered to be sufficient to cause the liner plate bulge.

A meeting was held on April 4, 1977 at the Ann Arbor, Michigan Office of Bechtel to review the original design and construction concept of the containment liner, the procedures and actions taken during the removal of bulge affected zones, the investigation activities and results, and to ascertain the concepts involved in the licensee's proposed repair program.

The containment liner bulge deficiency repair was started on August 1, 1977. Inspection Report No. 50-330/77-11 documents the observed fit up and welding of the first four foot lift of replacement liner plate installed. The completion of repair and the repair records were subsequently reviewed as documented in Inspection Report No. 50-330/79-25.

4. A second significant construction problem involved tendon sheath placement errors and resulted in an Immediate Action Letter (IAL). Details are as follows:

The licensee reported, on April 19, 1977, the discovery of an error in the Unit 1 containment building which resulted in two tendon sheathings (H32-036 and H13-036) being misplaced, and two tendon sheathings (H32-037 and H13-037) being omitted. As shown on pertinent vendor drawings, these four tendons were to be deflected downward to clear the two main steam penetrations at center line elevation 707' 0". Concrete had been placed to a construction joint at elevation 703' 7" approximately one week before these tendon deficiencies were discovered.

Corrective actions resulted in the rerouting of tendon sheathing H32-037, originally planned for below the penetration, to a new alignment above the penetration. Tendon sheathing H13-037 was installed below the penetration. Tendon sheathings H32-036 and H13-036 did not require modification.

The tendon sheath placement errors and the past history of rebar placement errors indicated the need for further NRC evaluation of the licensee's QA/QC program. As a result, an IAL was issued to the licensee on April 29, 1977. Licensee commitments addressed by this IAL included: (1) NRC notification prior to repairs or modifications involving the placement of concrete in the area of the misplaced and omitted tendon sheaths; (2) identification of the cause of the tendon sheath deficiencies and implementation of required corrective action; (3) expansion of the licensee's QC overview program; (4) NRC notification of all embedment placement errors identified after QC acceptance; (5) review and revision of QC inspection procedures; and (6) training of construction and inspection personnel.

A special QA program inspection was conducted in May 1977 as documented in Inspection Report Nos. 50-329/77-05 and 50-330/77-08. The inspection team was made up of personnel from Region I, Region III, and Headquarters. It was the consensus of opinion of the inspectors that the licensee's program was acceptable.

The licensee issued the final 50.55(e) report on this matter on August 12, 1977. Final onsite review was conducted and documented in Inspection Report Nos. 50-329/77-08 and 50-329/79-15.

H. 1978

Twenty-two inspections and one investigation were conducted during 1978. A total of fourteen items of noncompliance were identified in 1978. One significant construction problem was identified involving excessive settlement of the Diesel Generator building foundation (see Paragraph 10). These items/problems are described below:

1. Three items of noncompliance were identified in Inspection Report Nos. 50-329/78-03 and 50-330/78-03. These items regarded: (1) inadequate inspections of welds on cable tray supports; (2) inadequate control of welding voltage and amperage as required by AWS; and (3) inadequate documentation of repairs on purchased equipment. Licensee corrective actions included: (1) additional training given Quality Control Engineers and craft welders; (2) revision of pertinent technical specifications and weld acceptance requirements; (3) revision of welding procedures; (4) revisions of vendor QA manual; and (5) reinspections and engineering evaluations. The licensee actions in regard to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/78-15, 50-330/78-15, 50-329/79-25, 50-330/79-25, 50-329/81-12, 50-330/81-12, 50-329/79-22, and 50-330/79-22.
2. Two items of noncompliance were identified in Inspection Report Nos. 50-329/78-05 and 50-330/78-05. These items regarded: (1) inadequate control of welding filler material; and (2) inadequate protection of spool pieces. Licensee corrective actions included: (1) additional instructions given to welding personnel; (2) generation of nonconformance report to require Bechtel to perform a thorough inspection of the facility, correct and document discrepancies noted, and instruct craft personnel. The licensee actions in regard to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/78-05, 50-330/78-05, 50-329/79-22, and 50-330/79-22.
3. Two examples of noncompliance with one 10 CFR 50 Appendix B criterion were identified in Inspection Report Nos. 50-329/78-07 and 50-330/78-07. These examples regarded: (1) inadequate

- control of drawings; and (2) inadequate drawing control procedures. Licensee corrective actions included: (1) Zack and Bechtel revised drawing control procedures; and (2) extensive audits of drawing controls. The licensee actions in regard to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/79-25 and 50-330/79-25.
4. One item of noncompliance was identified in Inspection Report No. 50-330/78-09 concerning inadequate backing gas flow rate during welding operations. Licensee corrective actions included: (1) revision of Bechtel welding procedure specifications; (2) revision of Bechtel Quality Control Instruction; and (3) additional training for all welding Quality Control Engineers. The licensee's actions in regard to this item were subsequently reviewed and the item closed by the NRC as documented in Inspection Report No. 50-330/78-16.
 5. Two items of noncompliance were identified in Inspection Report Nos. 50-329/78-13 and 50-330/78-13. The items regarded: (1) inadequate inspection of weld joints; and (2) inadequate storage of Class 1E equipment. Licensee corrective actions included: (1) revision of welding specifications; (2) additional instructions to QC inspectors; (3) additional overinspections; (4) upgrade of administrative procedures; and (5) actions to bring storage environment within controlled specifications. The licensee's actions in regard to these items were reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/78-13 and 50-330/78-13.
 6. Two items of noncompliance were identified in Inspection Report Nos. 50-329/78-15 and 50-330/78-15. These items regarded: (1) nonconforming welds on Main Steam Isolation Valve support structures; and (2) inadequate corrective action taken to repair nonconforming Nelson Stud weld attachments. Licensee corrective actions included: (1) responsible welding Quality Control Engineer required to attend training course; (2) defective welds reworked; and (3) engineering evaluation. The licensee's actions in regard to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/79-22, 50-330/79-22, 50-329/79-25 and 50-330/79-25.
 7. One deviation was identified in Inspection Report No. 50-330/78-16 concerning the failure to meet ASME code requirements for nuclear piping. Licensee corrective actions included the determination that the impact test values of the pipe material in question met the code requirements, and the UT thickness measurements made by ITT Grinnell were in error and

voided by measurements made by Bechtel. The licensee's actions in regard to this item were subsequently reviewed and the item closed by the NRC as documented in Inspection Report No. 50-330/79-24.

8. One item of noncompliance was identified in Inspection Report Nos. 50-329/78-17 and 50-330/78-17 regarding the failure to follow weld procedures pertaining to the repair welding of cracked welds on the personnel air locks. The licensee's corrective actions included steps to revise affected drawings and to update the stress analysis report for the air locks. The corrective actions taken by the licensee will be reviewed during future NRC inspections.
9. One item of noncompliance was identified in Inspection Report Nos. 50-329/78-22 and 50-330/78-22 concerning the failure to perform specified maintenance and inspection activities on Auxiliary Feed Pumps. Licensee corrective actions included: (1) training of pertinent Quality Control engineers; (2) transition of personnel in QC department relative to storage and maintenance activities; and (3) inspections and evaluations of omitted maintenance. The licensee's actions in regard to this item were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/78-22 and 50-330/78-22.
10. One significant construction problem was identified during 1978. It involved excessive settlement of the Diesel Generator Building foundation. Details are as follows:

The licensee informed the Region III office on September 8, 1978, per requirements of 10 CFR 50.55(e), that settlement of the Diesel Generator foundations and structures was greater than expected.

Fill material in this area was placed between 1975 and 1977, with construction starting on the diesel generator building in mid-1977. Review of the results of the Region III investigation/inspection into the plant fill/Diesel Generator building settlement problem indicate many events occurred between late 1973 and early 1978 which should have alerted Bechtel and the licensee to the pending problem. These events included non-conformance reports, audit findings, field memos to engineering, and problems with the administration building fill which caused modification and replacement of the already poured footing and replacement of the fill material with lean concrete.

Causes of the excessive settlement included: (1) inadequate placement method - unqualified compaction equipment and excessive lift thickness; (2) inadequate testing of the soil material; (3) inadequate QC inspection procedures; (4) unqualified Quality Control inspectors and field engineers; and (5) overreliance on inadequate test results.

Lead technical responsibility and program review for this issue was transferred to NRR from IE by memo, dated November 17, 1978.

During 1978 the licensee conducted soil borings in the area of the Diesel Generator building and in other plant fill areas. In addition, a team of consultants who specialize in soils was retained by the licensee to provide an independent evaluation and provide recommendations concerning the soil conditions existing under the Diesel Generator building.

As previously stated, an investigation was initiated in December 1978 by the NRC to obtain information relating to design and construction activities affecting the Diesel Generator Building foundation and the activities involved in the identification and reporting of unusual settlement of the building. The results of the investigation and additional developments in regard to this matter are discussed in the 1979 section of this report, Paragraph I.11.

I. 1979

Thirty inspection reports were issued in 1979 of which one pertained to an onsite management meeting, two to investigations, one to a vendor inspection, one to a meeting in Region III, and twenty-five to onsite inspections. A total of seventeen items of noncompliance were identified in 1979. These items are described below:

1. One item of noncompliance was identified in Inspection Report Nos. 50-329/79-10 and 50-330/79-10 concerning inadequate measures to assure that the design basis was included in drawings and specifications. Licensee corrective actions included: (1) revision to Midland FSAR; and (2) revision to pertinent specification. The licensee's actions in regard to this item were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/79-19 and 50-330/79-19.
2. Three items of noncompliance were identified in Inspection Report Nos. 50-329/79-12 and 50-330/79-12. The items were: (1) inadequate corrective action in regard to drawing controls; (2) discrepancy in Zack Welding Procedure Specification; and (3) inadequate control of purchased material. Licensee corrective actions included: (1) audit of drawing control program; (2) revision to drawing control requirements; (3) revision of Zack Welding Procedure Specification; (4) review of other Zack procedures; (5) missing data added to documentation packages; and (6) audits of other documentation packages. The actions taken by the licensee were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/81-01, 50-330/81-01, 50-329/80-15, 50-330/80-16, 50-329/79-22, and 50-330/79-22.

3. One item of noncompliance was identified in Inspection Report No. 50-330/79-13 concerning the failure to inspect all joints and connections on the Incore Instrument Tank as prescribed in the hydrostatic test procedure. Licensee corrective actions included a supplemental test of the Incore Instrument Tank and the initiation of a supplemental test report. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report No. 50-330/80-38.
4. One item of noncompliance was identified in Inspection Report No. 50-330/79-14 concerning the use of a wad of paper in making a purge dam during welding activities. Licensee corrective actions included: (1) revision of pertinent procedures; (2) revision of pertinent Quality Control inspection checklist; and (3) training sessions for welders and Quality Control inspectors. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report No. 50-330/80-16.
5. One item of noncompliance was identified in Inspection Report Nos. 50-329/79-18 and 50-330/79-18 concerning inadequate controls to protect materials and equipment from welding activities. Licensee corrective actions included training sessions for cognizant Field Engineers, Superintendents, General Foremen and Foremen. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/80-15 and 50-330/80-16.
6. Two items of noncompliance were identified in Inspection Report Nos. 50-329/79-19 and 50-330/79-19. These items regarded: (1) failure to ensure that appropriate quality standards were in the specification for structural backfill; and (2) Quality Control inspection personnel performing containment prestressing activities were not being qualified as required. Licensee corrective actions included: (1) revision of pertinent specification; (2) examination given to Level I and Level II inspector; and (3) reinspection of selected tendons. The licensee's actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-330/80-09, 50-329/80-04 and 50-330/80-04.
7. One item of noncompliance was identified in Inspection Report Nos. 50-329/79-20 and 50-330/79-20 concerning inadequate controls for welding activities pertaining to 4.16 KV switchgear. Licensee corrective actions included: (1) correction of relevant records; (2) additional training for Quality Control Engineers; and (3) additional training for the Quality Control Document Coordinator. The licensee's actions were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/80-15 and 50-330/80-16.

8. One item of noncompliance was identified in Inspection Report No. 50-330/79-22 concerning inadequate weld rod controls. Licensee corrective actions included a training session for cognizant welding personnel. The actions taken by the licensee in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report No. 50-330/80-01.
9. One item of noncompliance was identified in Inspection Report Nos. 50-329/79-26 and 50-330/79-26 concerning failure to follow procedures relative to the shipment of auxiliary feed water pumps to the site with nonconforming oil coolers. Licensee corrective actions included: (1) reinstruction given to cognizant engineer; and (2) Supplied Deviation Disposition Request (SDDR) generated by the vendor. The licensee's actions in regards to this matter were reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/79-26 and 50-330/79-26.
10. One item of noncompliance was identified in Inspection Report Nos. 50-329/79-27 and 50-330/79-27 concerning the violation of QC Hold Tags. Licensee corrective actions included: (1) a training session for Construction Supervisors and Field Engineers; and (2) a Field Instruction on Quality Control Hold Tags was issued. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/81-04 and 50-330/81-04.
11. As a followup to the significant construction problem identified in 1978 (see Paragraph H.10), an investigation was initiated in December, 1978 to obtain information relating to design and construction activities affecting the Diesel Generator Building foundations and the activities involved in the identification and reporting of unusual settlement of the building. The investigation findings were documented in Inspection Report Nos. 50-329/78-20 and 50-330/78-20, dated March 22, 1979. Information obtained during this investigation indicated: (1) a lack of control and supervision of plant fill activities contributed to the inadequate compaction of foundation material; (2) corrective action regarding nonconformances related to plant fill was insufficient or inadequate as evidenced by the repeated deviations from specification requirements; (3) certain design bases and construction specifications related to foundation type, material properties, and compaction requirements were not followed; (4) there was a lack of clear direction and support between the contractor's engineering office and construction site personnel; and (5) the FSAR contained inconsistent, incorrect and unsupported statements with respect to foundation type, soil properties, and settlement values. Nine examples of noncompliance involving four different 10 CFR 50, Appendix B Criteria were identified in the subject inspection report.

Meetings were held on February 23, 1979 and March 5, 1979 at the NRC Region III office to discuss the circumstances associated with the settlement of the Diesel Generator Building at the Midland facility. The NRC staff stated that it's concerns were not limited to the narrow scope of the settlement on the Diesel Generator Building, but extended to various buildings, utilities and other structures located in and on the plant area fill. In addition, the staff expressed concern with the Consumers Power Company Quality Assurance Program. Under the authority of Section 182 of the Atomic Energy Act of 1954, as amended, and Section 50.54(f) of 10 CFR Part 50, additional information was requested regarding the adequacy of the fill and the quality assurance program for the Midland site in order for the Commission to determine whether enforcement action such as license modification, suspension or revocation should be taken. Question 1 of the 50.54(f) letter dated March 21, 1979 requested information regarding the quality assurance program. On April 24, 1979, Consumers Power Company submitted the initial response to the 50.54(f) request, Questions 1 through 22. As a result of the NRC staff review of Question 1, the NRC concluded that the information provided was not sufficient for a complete review. Subsequently, on September 11, 1979, the NRC issued a request for additional quality assurance information (Question 23). On November 13, 1979, Consumers Power Company submitted Revision 4 to the 50.54(f) responses which included response to Question 23. As a result of the Region III investigation report and CPCo responses, the NRC issued an Order modifying construction Permits No. CPPR-81 and No. CPPR-82, dated December 6, 1979. This order prohibited further soils related activities until the submission of an amendment to the application seeking approval of the Remedial Soils work with the provision that the order would not become effective in the event that the licensee requested a hearing. Due to the licensee's decision to request a hearing this order forms the basis for the ongoing ASLB Hearings.

During 1979, the licensee continued soil boring operations in order to identify and develop the quality of material in the plant area fill and beneath safety related structures. The licensee completed a program regarding the application of a surcharge of sand material in and around the Diesel Generator Building. This surcharge was an attempt to accelerate any future settlement of the Diesel Generator Building by consolidating the foundation material.

Additional developments in this matter are discussed in the 1980 section of this report, Paragraph J.9.

J. 1980

Thirty-seven inspection reports were issued in 1980 of which two pertained to meetings at the licensee's corporate office, one to a meeting in Glen Ellyn, two to investigations, and thirty-two to onsite inspections. A total of twenty-one items of noncompliance were identified during 1980. Two significant construction problems were identified involving quality assurance problems at the Zack Company (see Paragraph 7) and deficient reactor vessel anchor studs (see Paragraph 8). These items/problems are described below:

1. Two items of noncompliance and one deviation were identified in Inspection Report Nos. 50-329/80-01 and 50-330/80-01. These items regarded: (1) a welder welding on material of thickness which exceeded his qualified range; (2) failure to date and sign the cleanliness inspection of Unit 2 Service Water System valve; and (3) failure to implement a design change or prepare a Field Change Request. Licensee corrective actions in regards to the items of noncompliance included: (1) testing and qualification of the subject welder; (2) reinstruction of QC engineer; (3) review of the inspection records for additional valves; and (4) the revision of applicable turnover procedures. The licensee's actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/80-20, 50-330/80-21, 50-329/82-04 and 50-330/82-04.
2. One item of noncompliance was identified in Inspection Report No. 50-329/80-09 concerning the failure to maintain levelness requirements during core support assembly lifts. The licensee's corrective actions in response to the item of noncompliance included the issuance of a nonconformance report and the commitment to ensure compliance with Quality Control procedures. The licensee's corrective actions in regards to this matter will be reviewed during subsequent NRC inspections.
3. One item of noncompliance was identified in Inspection Report Nos. 50-329/80-20 and 50-330/80-21 concerning the failure of a Bechtel purchase order for E7018 welding rods to specify the applicable codes. Licensee commitments in regards to corrective actions included an audit of the ordering and receiving records of weld filler material. The licensee's corrective actions in regards to this matter will be reviewed during subsequent NRC inspections.
4. One item of noncompliance was identified in Inspection Report Nos. 50-329/80-21 and 50-330/80-22 concerning the failure to perform an audit of Photon Testing, Inc. for services to qualify Zack Company welders. Licensee corrective actions included an audit of Photon Testing, Inc. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/81-03 and 50-330/81-03.

5. One item of noncompliance was identified in Inspection Report Nos. 50-329/80-28 and 50-330/80-29 concerning the bypassing of a hold point on a Pressure Surge System weld. The inspection report further identifies that action had been taken to correct the identified noncompliance and to prevent recurrence. The item is closed.
6. One item of noncompliance was identified in Inspection Report Nos. 50-329/80-31 and 50-330/80-32 concerning substantial delays by the licensee in making 10 CFR Part 21 reportability determinations. Licensee corrective actions included training sessions for key personnel in recognizing 10 CFR 21 reporting obligations. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/81-07 and 50-330/81-07.
7. A significant construction problem involving quality assurance problems at the Zack Company, the heating, ventilating, and air condition contractor was identified in 1980. Details of the Zack problem follow:

During March and April, 1980 the NRC received numerous allegations pertaining to the Zack Company. The Zack Company is the heating, ventilation and air conditioning (HVAC) subcontractor at the Midland construction site. The allegations dealt with material traceability, violations of procedures, falsification of documents, and the training of quality control inspectors.

As the result of the allegations, an investigation was initiated by the NRC. During the initial phases of the investigation, the NRC determined that Consumers Power Company had issued a Management Corrective Action Request (MCAR), dated January 8, 1980, pertaining to the Zack Company. The MCAR showed that Zack had failed to initiate corrective action in a timely manner on a large number of nonconformance reports and audit findings and had failed to address other requirements and commitments of the quality program.

Consumers Power Company had issued seven nonconformance reports during the period of May 23 to October 2, 1979 all of which recommended 100% reinspection of work as a corrective action. The investigation determined that as of March 19, 1980, corrective action had not been completed on any of the nonconformance reports.

Based on preliminary findings during the investigation, which revealed some instances of continued nonconformance in the implementation of Zack's Quality Assurance Program, an Immediate Action Letter (IAL) was issued to the licensee on March 21, 1980. The IAL stated the NRC's understanding that a Stop Work Order had been issued to the Zack Corporation for all its safety related construction activities.

Seventeen examples of noncompliance involving eight different 10 CFR 50, Appendix B, criteria were identified during the investigation. The investigation findings are documented in Inspection Report Nos. 50-329/80-10 and 50-330/80-11. The licensee's actions in regards to the items of noncompliance were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/82-15 and 50-330/82-15.

On June 30, 1980, the NRC received from the licensee a letter documenting a Program Plan for resumption of safety related work by the Zack Company. The licensee identified that corrective actions required prior to lifting the Stop Work included: (1) the review and approval of all Field Quality Control Procedures and specific Weld Procedure Specifications; (2) the review and approval of the revised Zack QA Manual; (3) the training and certification of the QC personnel; and (4) the training of site production personnel.

Subsequent to followup NRC inspections to determine the effectiveness of licensee corrective actions, it was determined by the NRC, on August 14, 1980 that HVAC safety related work could resume.

The Bechtel Power Corporation released the Zack Company from the Stop Work Order by letter dated August 14, 1980.

As a result of the aforementioned investigation findings, the NRC imposed a Civil Penalty, on January 7, 1981, on Consumers Power Company for the amount of \$38,000.

8. The second significant construction problem involved reactor pressure vessel anchor stud failures. Details are as follows:

On September 14, 1979, Consumers Power Company personnel notified the NRC of the discovery of a broken reactor vessel anchor stud on the Midland Unit 1 reactor vessel. On October 12, 1979, this condition was reported under the requirements of 10 CFR 50.55(e). Two other studs were subsequently found to be broken. As this condition reflected a significant deficiency, an NRC investigation was initiated in February 1980 to review the materials, manufacturer, and installation of the studs.

The investigation findings, as documented in Inspection Report Nos. 50-329/80-13 and 50-330/80-14, indicate several Quality Assurance deficiencies: (1) lack of licensee involvement; (2) failure to advise the heat treater of different heats of material; (3) inadequate document review; (4) failure to respond to indications that the studs were deficient; (5) failure to review materials previously purchased when the purchase specification was revised; and (6) miscalculation of

the stud stress area resulting in a slight over-specification stressing of the studs (this item was identified by the licensee).

Three items of noncompliance were identified in the inspection report. These items regarded: (1) failure to identify Subsection NF of the ASME Code as the applicable requirement for the reactor vessel anchor bolts; (2) failure to establish measures to assure that purchased material conforms to the procurement documents; and (3) failure to establish measures to assure that heat treating and nondestructive tests were controlled in accordance with applicable codes and specifications. Licensee commitments in regards to corrective actions included: (1) a commitment to conduct a review to confirm that safety related low alloy steel bolting and/or component support materials, which have been tempered and quenched and are 7/8" or greater in diameter, have been procured in accordance with proper codes and standards; (2) a commitment to obtain NRR approval of the acceptability of the Unit 2 reactor vessel anchor bolts and (3) a commitment that actual plant modifications to compensate for the defective bolts would not be started on Unit 1 until approval of the design concept was received from NRR.

The stud failure mechanism was identified as stress corrosion cracking which propagated to the point that the studs failed by cleavage fracture. Tests indicated that some studs utilized in Unit 2, although of different material and heat treatment, have above specification surface hardness readings.

The final report per 50.55(e) requirements was submitted by the licensee on December 1, 1981.

NRR has the lead responsibility for evaluation and approval of the licensee's proposals for resolution of this matter.

9. A special inspection was conducted in December, 1980 at the Bechtel Power Company Ann Arbor, Michigan offices to verify implementation of the specific commitments and action items reflected in Consumers Power Company response to 10 CFR 50.54(f) questions (regarding excessive settlement of the Diesel Generator Building foundations). The results of this inspection were documented in Inspection Report Nos. 50-329/80-32 and 50-330/80-33. Two items of noncompliance were identified regarding: (1) failure to provide adequate corrective actions with regard to identified audit results; and (2) inadequate design control. Licensee corrective actions included: (1) revision of procedures; (2) revision of specification; and (3) audit of FSAR sections. The licensee actions were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/81-12, 50-330/81-12, 50-329/81-19 and 50-330/81-19.

Additional information regarding this matter is discussed in the 1981 section of this report, Paragraph K.6.

K. 1981

Twenty-three inspection reports were issued in 1981 of which one pertained to a management meeting and twenty-two to onsite inspections. A total of twenty-one items of noncompliance were identified during 1981. One significant construction problem was identified involving deficiencies in piping suspension system installations (see Paragraph 4). These items/problems are described below:

1. Two items of noncompliance were identified in Inspection Report Nos. 50-329/81-04 and 50-330/81-04. These items regarded: (1) failure to account for all tools and materials used in a controlled clean room area; and (2) inadequate procedure for the installation of the Unit 2 vent valves in the core support assembly. Licensee corrective actions included: (1) the upgrading of personnel and equipment logs; (2) the addition of new logs; (3) issuance of a formal Stop Work Order for further work on the installation of vent valves; (4) the revision of installation procedures; (6) training and indoctrination of personnel performing vent valve installations; and (5) the revision of the overview inspection plan. The licensee's actions in regards to these items were reviewed and it was determined that action had been taken to correct the identified non-compliances and to prevent recurrence. This determination is documented in Inspection Report Nos. 50-329/81-04 and 50-330/81-04.
2. One item of noncompliance was identified in Inspection Report Nos. 50-329/81-08 and 50-330/81-08 regarding the failure to provide adequate storage conditions for Class 1E equipment. Licensee corrective actions included: (1) additional training for Bechtel maintenance engineers; (2) an audit of maintenance activities; and (3) reinspections of affected equipment. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/81-23 and 50-330/81-23.
3. Four items of noncompliance were identified in Inspection Report Nos. 50-329/81-11 and 50-330/81-11. These items regarded: (1) inadequate procedures for the temporary support of cables and for the routing of cables into equipment; (2) failure of QC inspectors to identify inadequate cable separation; (3) inadequate control of nonconforming raceway installations; and (4) failure to translate the FSAR requirements into instrumentation specifications. Licensee corrective actions in regards to (1) and (2) above, included: (1) the revision of cable pulling procedures;

(2) the repair of damaged cables; (3) training given to the termination personnel and the involved QC inspector; and (4) the revision of the cable termination procedure. The licensee's actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/81-20, 50-330/81-20, 50-329/82-03 and 50-330/82-03. Licensee commitments in regards to corrective actions pertaining to items (3) and (4), above, included: (1) the addition of required barriers on pertinent raceway drawings; (2) the revision of Project Quality Control Instruction; (3) and the revision of the instrumentation specification. The licensee's actions in regards to these items will be reviewed during subsequent NRC inspections.

4. Eight items of noncompliance were identified during a special indepth team inspection to examine the implementation status and effectiveness of the Quality Assurance Program. The results of the inspection are documented in Inspection Report Nos. 50-329/81-12 and 50-330/81-12. Three of the items of noncompliance regarded: (1) failure to take adequate corrective action concerning the trend analysis procedure; (2) failure of QC inspections to identify a nonconforming cable bend radius; and (3) failure to take adequate corrective action in regards to the lack of rework procedures. Licensee corrective actions in regards to items (1) and (2) above, included: (1) the issuance of a new procedure for trending; (2) the revision of cable termination procedures; and (3) additional training given to the responsible QC inspector. The licensee's actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/82-02, 50-330/82-02, 50-329/82-03 and 50-330/82-03. The licensee's commitments in regards to corrective actions pertaining to item (3) above, included: (1) the development of Administrative Guidelines and Instructions for rework; and (2) the revision of field procedures. The licensee's actions in regards to this item will be reviewed during subsequent NRC inspections.

The remaining five items of noncompliance identified in Inspection Report Nos. 50-329/81-12 and 50-330/81-12 are considered to be a significant construction problem. Safety related pipe support and restraint installations and QC inspection deficiencies in regard to those installations were identified. The five items of noncompliance pertaining to this issue regarded: (1) failure to install large bore pipe restraints, supports and anchors in accordance with design drawings and specifications; (2) failure of QC inspectors to reject large bore pipe restraints, supports and anchors that were not installed in accordance with design drawings and specifications; (3) failure to prepare,

review and approve small bore pipe and piping suspension system designs performed onsite in accordance with design control procedures; (4) failure to adequately control documents used in site small bore piping design activities; and (5) failure of audits to include a detailed review of system stress analysis and to follow up on previously identified hanger calculation problems. Licensee corrective actions in regards to items (3) through (5) included: (1) the review and upgrading of small bore piping calculations (2) audits of small bore piping activities; (3) revision of Engineering Directive; (4) additional training in QA procedures; and (5) audits of document control. The licensee's actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/82-07 and 50-330/82-07.

As a result of the adverse findings, an Immediate Action Letter (IAL) was issued by the NRC on May 22, 1981 acknowledging the NRC's understanding that the licensee would not issue fabrication and construction drawings for the installation of the safety related small bore pipe and piping suspension systems until requirements identified in the IAL had been completed and audited.

The IAL requirements were subsequently reviewed and determined to have been satisfactorily addressed. This is documented in Inspection Report Nos. 50-329/81-14 and 50-330/81-14.

The licensee's actions in regards to noncompliance items (1) and (2) above, are discussed in Paragraph 1 of the following report section for 1982(L).

5. One item of noncompliance was identified in Inspection Report Nos. 50-329/81-14 and 50-330/81-14 concerning inadequate design controls involving the Bechtel Resident Engineer's review of the field engineers redline drawings for small bore piping. Licensee corrective actions included: (1) a 100% review of all questionable systems; and (2) the revision of a Project Instruction. The licensee's actions in regards to this matter were subsequently reviewed and the item closed by the NRC as documented in Inspection Report Nos. 50-329/82-07 and 50-330/82-07.
6. In January, 1981 an inspection was conducted by the NRC to verify whether adequate corrective actions had been implemented as described in the Consumers Power Company response to Questions 1 and 23 of 10 CFR 50.54(f) submittals (regarding excessive settlement of the Diesel Generator Building foundation). The findings during this inspection, which include three items of noncompliance and one deviation, are documented in Inspection Report Nos. 50-329/81-01 and

50-330/81-01. The items of noncompliance and the deviation regarded: (1) failure to develop test procedures for soils work activities; (2) failure to have soils laboratory records under complete document control; (3) failure to have explicit instructions for the onsite Geotechnical Engineer's review of test results; and (4) failure to have a qualified Geotechnical Engineer onsite. Licensee corrective actions included: (1) revision of Quality Control Procedures and Specification; (2) development of new Quality Control Procedures; and (3) the addition of a qualified Geotechnical Engineer. The licensee's actions in regards to these items were subsequently reviewed and the items closed by the NRC as documented in Inspection Report Nos. 50-329/81-12 and 50-330/81-12.

7. In March 1981, an inspection was initiated by the NRC to verify the licensee's Quality Assurance Program for the ongoing soil borings. The soil borings were performed by the licensee in response to a request from the Corps of Engineers for additional soil information for their review of the licensee's 10 CFR 50.54(f) answers. The findings of this inspection, which includes one item of noncompliance, are documented in Inspection Report Nos. 50-329/81-09 and 50-330/81-09. The noncompliance regards the lack of evaluation of Woodward-Clyde technical capabilities prior to the commencement of drilling operations. Licensee commitments in regards to corrective actions included: (1) the review, for compliance, of Midland Project major procurements and contracts; and (2) the review and revision of pertinent procedures. The licensee's corrective actions in regards to these items will be reviewed during subsequent NRC inspections.

L. 1982

Fourteen inspection reports have been issued during 1982 covering the period through June 30, 1982 of which two pertain to management meetings, one to an investigation, one to the SALP meeting, and ten to onsite inspections. During this period of time seven items of noncompliance were identified. One significant construction problem was identified involving electrical cable misinstallations (see Paragraph 2). These items/problems are discussed below:

1. The licensee conducted reinspections to determine the seriousness of the safety related support and restraint installation and QC inspection deficiencies identified in Inspection Report Nos. 50-329/81-12 and 50-330/81-12. The results of the reinspections are documented in Inspection Report Nos. 50-329/82-07 and 50-330/82-C7. From a sample size of 123 safety related supports and restraints installed and inspected by Quality Control, approximately 45% were identified by the licensee as rejectable.

On August 30, 1982, the licensee was informed of the NRC's position that the licensee shall reinspect all the supports and restraints installed prior to 1981 and perform sample reinspections of the components installed after 1981. The licensee has agreed to perform the reinspections.

2. One significant construction problem was identified during 1982. It involved electrical cable misinstallations. Details are as follows:

During the special team inspection conducted in May 1981, the NRC identified concerns in regards to the adequacy of inspections performed by electrical Quality Control inspectors. These concerns were the result of the NRC's review of numerous Nonconformance Reports (NCR) issued by Midland Project Quality Assurance Department (MPQAD) personnel during reinspections of items previously inspected and accepted by Bechtel QC inspectors. The NRC required the licensee to perform reinspections of the items previously inspected by the QC inspectors associated with the MPQAD NCRs. The licensee, in reports submitted to the NRC in May and June 1982, reported that of the 1084 electrical cables reinspected, 55 had been determined to be misrouted in one or more vias. This concern was upgraded to an item of non-compliance and is documented in Inspection Report Nos. 50-329/82-06 and 50-330/82-06.

On September 2, 1982, the licensee was informed by the NRC that a 100% reinspection of class 1E cables installed or partially installed before March 15, 1982 was required. In addition, the licensee was required to develop a sample reinspection program for those cables installed after March 15, 1982. The licensee has agreed to perform the reinspections.

3. Three examples of noncompliance to one 10 CFR 50 Appendix B Criterion were identified in Inspection Report Nos. 50-329/82-03 and 50-330/82-03. These examples regarded: (1) failure to follow procedures concerning drawing changes; (2) inadequate specification resulting in the undermining of BWST No. 2 valve pit; and (3) inadequate control of changes to procedures. The licensee's response to the identified item of noncompliance is presently under review. Corrective actions taken by the licensee in regards to this item will be reviewed during future inspections.
4. Four examples of noncompliance to one 10 CFR 50 Appendix B Criterion and a deviation were identified in Inspection Report Nos. 50-329/82-05 and 50-330/82-05. The examples of noncompliance and the deviation regarded: (1) failure to review and approve a Mergentine (the soils contractor) field procedure prior to initiation of work; (2) inadequate control of specification changes; (3) inadequate acceptance

criteria for dewatering specification; (4) inadequate instruction to prepare or implement reinspection plans; and (5) inadequately qualified remedial soils staff. The corrective actions taken by the licensee in regards to this item will be reviewed during future inspections.

5. One item of noncompliance was identified in Inspection Report Nos. 50-329/82-06 and 50-330/82-06 concerning the licensee's failure to establish a QA program to provide controls over the installation of remedial soils instrumentation. This item resulted in the issuance of a letter by the licensee on March 31, 1982 confirming the licensee's suspension of all underpinning instrumentation installation activities until: (1) approved, controlled drawings and procedures or instructions were developed to prescribe underpinning instrumentation installation activities; (2) plans were established to inspect and audit instrumentation installation activities; and (3) Region III had concurred that (1) and (2), above, were acceptable.

A followup inspection by Region III in April 1982 identified that the licensee had developed acceptable drawings, procedures, and instructions for underpinning instrumentation installations such that instrumentation installation activities could be resumed. An additional followup inspection on August 23, 1982 determined that the installation of underpinning instrumentation for the Auxiliary Building was complete and acceptable. This item will remain open pending the licensee's development of drawings, procedures, and instructions for the future installation of underpinning instrumentation for the Service Water Building.

6. One item of noncompliance and a deviation were identified in Inspection Report Nos. 50-329/82-11 and 50-330/82-11. The items regarded: (1) inadequate anchor bolt installation; and (2) the use of unapproved installation/coordination forms during remedial soils instrumentation installations. The licensee's responses to the identified items of noncompliance are presently under review. Corrective actions taken by the licensee in regards to these items will be reviewed during future inspections.

The ASLB issued an order modifying Construction Permits No. CPPR-81 and No. CPPR-82, dated April 30, 1982. This order suspended all remedial soils activities on "Q" soils for which the licensee did not have prior explicit approval. The ASLB issued another order, dated May 7, 1982 clarifying the April 30, 1982 order. This order only includes those activities bounded by the limits identified on Drawing C-45.

As a result of past Region III findings, the Region III Administrator created a special Midland Section staffed with individuals assigned solely to the Midland project. Since the formation of the Midland Section a work authorization procedure has been developed by Region III and the licensee to control work and ensure compliance to the ASLB Order.

Remedial Soils activities performed by the licensee thus far in 1982 involve: (1) the drilling of a number of wells which function as part of the temporary and permanent dewatering systems; (2) the installation of the freeze wall associated with the Auxiliary Building Underpinning activity; (3) the completion of the initial work on the access shaft; and (4) the completion of the Auxiliary Building instrumentation for remedial soils activities.

RFLW

TESTIMONY OF
JAMES G. KEPPLER
REGIONAL ADMINISTRATOR
REGION III (CHICAGO) OFFICE
BEFORE THE
SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT
OF THE
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
UNITED STATES HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.

JUNE 16, 1983

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Good morning Mr. Chairman and members of the Subcommittee. My name is James Keppler and I am Regional Administrator of the Nuclear Regulatory Commission's Region III (Chicago) office. I am appearing before this Subcommittee today, in response to your May 6, 1983 request, to present testimony on behalf of the NRC staff concerning the NRC's procedures for handling construction quality issues at the Midland Nuclear Power Plant, specifically problems in the remedial soils and the Quality Assurance (QA) program areas.

The NRC has recognized that there have been significant problems at Midland. You will recall, Mr. Chairman, that at this Subcommittee's Hearing of November 19, 1981, on the subject of quality assurance, Chairman Palladino identified Midland as one of several facilities where there have been serious QA problems with broad repercussions. We want to assure you, however, that before the NRC will issue Operating Licenses for Midland, we will be satisfied that the plant has been properly constructed and can be operated safely.

Since the inception of this project in 1970, there has been a series of QA problems. The most significant of these have been:

1. inadequacies in splicing of concrete reinforcing steel in 1973,
2. inadequate control of concrete rebar installation in safety-related structures in 1976,
3. omission of containment tendons in 1977 and a bulge in containment liner in that same year,
4. failure to properly compact soil under safety-related structures, identified in 1978,
5. deficiencies in the heating, ventilating and air conditioning system and deficiencies in reactor anchor studs identified in 1979, and
6. problems in pipe suspension systems and electric cable routing, identified in 1981.

Additionally, a comprehensive NRC inspection of systems and components within the Diesel Generator Building conducted in 1982 identified many construction problems which resulted from a breakdown in the implementation of the QA program.

Contrary to the Zimmer case where the NRC staff did not recognize the full significance of the QA problems as they unfolded, the NRC staff has been aware that there have been QA problems at Midland and has attempted to deal with them as they were identified.

In 1981, I provided testimony to the Atomic Safety and Licensing Board (ASLB), presiding over the hearing on the remedial soils issues at the Midland Plant. I testified on the more significant QA problems that had been experienced in connection with the Midland project and the corrective actions taken by Consumers Power Company and its contractors. I stated that, while many significant QA deficiencies had been identified, it was the NRC staff's conclusion that the problems experienced were not indicative of a breakdown in the implementation of the overall QA program. I also noted that while deficiencies had occurred which should have been identified earlier, Consumers Power Company's QA program had been generally effective in the ultimate identification and subsequent correction of these deficiencies. Furthermore, I discussed the results of Region III's special QA inspection, of May 18-11, 1981, which I had initiated to determine whether modifications made to the QA program in August 1980 were effective. The results reflected favorably on the Midland Plant Quality Assurance Department, formed in August 1980 to improve QA performance. The thrust of my testimony was that I had confidence in Consumers Power Company's QA program, both for the remedial soils work and for the remainder of construction.

In April 1982, I was made aware that additional significant QA problems were being encountered. This concerned me in view of my 1981 testimony to the ASLB. As a result I notified the ASLB that this previous testimony would have to be modified, directed staff evaluations to assess the cause and correction of these problems, and created a special Section within the Region III office solely to handle the Midland facility. After reviewing the facility status and history, meetings were held with Consumers Power Company to discuss the NRC's concerns and to inform them that additional measures were required to assure the quality of the plant. In addition, the Midland Section recommended and then conducted the comprehensive inspection of systems and components within the Diesel Generator Building.

As a result of the problems found in the Diesel Generator Building by the NRC staff and similar findings by Consumers Power Company in other areas, a number of actions have been or are being taken. These include:

1. all safety related work was stopped on December 2, 1982 by Consumers Power Company except the following: (1) nuclear steam supply system installation work, performed by Babcock & Wilcox; (2) heating, ventilating, and air conditioning installation work performed by Zack Company; (3) post system turnover work; (4) hanger and cable reinspection; (5) design engineering; (6) system layup activities and (7) remedial soils work.
2. a civil penalty of \$120,000 was proposed in February 1983 for two violations related to the findings from the inspection of the systems and components within the Diesel Generator Building.

3. a Construction Completion Program (CCP) is being developed by Consumers Power Company and is being reviewed by the NRC staff. This CCP will require an evaluation of the quality of construction completed to date and will provide a team approach to complete future work. Furthermore, a separate review of the design and construction of portions of three safety related systems will be performed by an independent third party (TERA Corporation).

Although these actions are encouraging and should lead to an acceptable QA program and assurance of plant quality, the NRC is requiring an additional third party overview of the CCP until the NRC determines that Consumers Power Company's QA program is effective on a sustained basis.

From a technical standpoint, the remedial soils work required to correct the settlement of safety related structures at Midland is complex and unique in the nuclear industry. Because of this complexity, Consumers Power Company developed a comprehensive remedial soils program. The design and construction methods for the necessary remedial work to support properly the affected safety-related structures have been reviewed and evaluated by the NRC staff, as set forth in the Safety Evaluation Report related to the operation of Midland Plant, Units 1 and 2, NUREG-0793, Supplement No. 2.

During the course of remedial soils work, problems have been identified by both Consumers Power Company and NRC inspectors. As a result of these problems, the ASLB issued an order in April 1982 requiring Consumers Power Company to obtain prior NRC staff authorization for remedial soils measures. In August 1982, Consumers Power Company and the NRC staff agreed to a Work Authorization Procedure, under which the NRC staff would review and authorize remedial soils activities before they are conducted. Remedial soils work at the site is presently reviewed and authorized under this procedure.

To provide assurance that the remedial soils activities are being conducted in accordance with established QA requirements, the NRC staff also requested Consumers Power Company to retain an independent third party to overview the remedial soils work activities. Stone and Webster was selected for this role by Consumers Power Company and was subsequently approved by the NRC. They have been onsite performing the independent overview since September 20, 1982.

Mr. Chairman, I have attempted to summarize the significant issues with respect to remedial soils problems and problems in the QA area at Midland. I will be happy to respond to questions concerning the Midland project.