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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION 11/26/80

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
CONSUMERS POWER COMPANY)	Docket Nos. 50-329-0M
(Midland Plant, Units 1 and 2))	50-330-0M
)	50-329-0L
)	50-330-0L

NRC STAFF INTERROGATORIES TO CONSUMERS POWER COMPANY

Pursuant to 10 C.F.R. § 2.740(b), the NRC Staff serves the following interrogatories on Consumers Power Company. In several interrogatories we have included requests for documents. The requests are made in the event you will respond absent a formal Motion to Produce these Documents.

INSTRUCTIONS AND DEFINITIONS

1. Information sought in these Interrogatories shall include information within the knowledge, possession, control or access of any agents, employees and independent contractors of Consumers Power Company.
2. As used herein, "documents" includes, but is not limited to, subsurface investigation and foundation reports, geotechnical engineering calculations, geotechnical evaluations and special study reports, construction plans and specifications, papers, photographs, criteria, standards of

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review, recordings, memoranda, books, records, writings, letters, telegrams, mailgrams, correspondence, notes and minutes of meetings or of conversations or of phone calls, interoffice, intra-agency or interagency memoranda or written communications of any nature, recordings of conversations either in writing or upon any mechanical or electronic or electrical recording devices, notes, exhibits, appraisals, work papers, reports, studies, opinions, surveys, evaluations, projections, hypotheses, formulas, designs, drawings, manuals, notebooks, worksheets, contracts, agreements, letter agreements, diaries, desk calendars, charts, schedules, appointment books, punchcards and computer printout sheets, computer data, telecopier transmissions, directives, proposals, and all drafts, revisions, and differing versions (whether formal or informal) of any of the foregoing, and also all copies of any of the foregoing which differ in any way (including handwritten notations or other written or printed matter of any nature) from the original.

Interrogatory 1

As a result of settlement and inadequate compaction in the fill area, you have proposed remedial actions and you have agreed to re-analyze the seismic/structural analyses of the Category I structures located in this area.

- (a) Have you verified and evaluated any changes in the design safety margins available for any Category I structures by performing structural re-analysis?
- (b) If the answer to (a) is yes, please provide documents related to any structural re-analysis performed.

- (c) If the answer to (a) is no, please state the reasons for not performing that re-analysis.
- (d) If the answer to (a) is no, but you plan to make such re-analysis, please state when you plan to do so.
- (e) Have you factored into any re-analysis information contained in, or resulting from, a letter from Robert Tedesco to Vice President J. Cook, dated October 14, 1980, concerning seismological input data acceptable to the Staff?
- (f) If the answer to (e) is yes, please provide copies of all documents relating to that re-analysis.
- (g) If the answer to (e) is no, please state if you plan to make an analysis incorporating that data, which structures you plan to re-analyze, and when you plan to do so.
- (h) If you believe re-analysis is not required for any such Category I structure, please state for each structure why such re-analysis is not required.
- (i) Was the floor response spectra for the diesel generator building generated on the assumption that the shear wave velocity would not be lower than 500 feet per second?
- (j) If the answer to Question (i) is negative, please state the assumption used with respect to shear wave velocity.
- (k) How have you assured yourself that the soil shear wave velocity will not be less than 500 feet per second for the life of the plant?

Interrogatory 2

The fill material under the northern wing of the service water pump structure has been found to provide inadequate support. While the portion of the structure over the fill material is being supported by the main structure founded on natural material, through cantilever action, it is stated in Management Corrective Action Report No. 24, Interim Report 6, issued September 7, 1978, that the total design loads cannot be supported by the main structure. Your proposed remedial action will utilize corbels attached to

the side of the structural wall by bolts. The corbels are to be supported by pilings placed underneath them.

- (a) What alternative corrective actions did you consider for supporting the cantilevered portion of the Service Water Pump Structure?
- (b) Was one of the alternatives considered to provide a stable solid foundation support of the cantilever portion of the structure down to the glacial till rather than the concentrated support design eventually chosen?
- (c) What structural analyses for each of these alternatives did you perform?
- (d) Please provide copies of documents relating to any analysis described in 2(c) above.
- (e) Did you factor into any analysis identified in 2(c) above the information contained in a letter from Robert Tedesco to Vice President J. Cook, dated October 14, 1980, concerning seismological input data acceptable to the Staff?
- (f) Explain why each of the alternatives identified in 2(a) above was rejected or accepted.
- (g) For those alternatives that were rejected, but for which no analysis was identified in 2(c) above, give the reasons for not considering those alternatives.
- (h) What analyses have you done to assure yourselves that the long longitudinal bolts which will be used in the remedial action will withstand the force produced in the bending mode?
- (i) Please provide copies of documents relating to any analysis identified in 2(h).
- (j) If no such analysis has been performed do you plan to do an analysis and if so when?
- (k) Do you have a plan for pre-service and in-service inspection of the integrity of the bolts during the life of the plant?
- (l) If the answer to 2(k) is yes, provide a copy or description of that plan.
- (m) If the answer to 2(k) is no, state the reasons that such a plan is not necessary.

- (n) What type of bracing (if any) will be provided to assure that the vertical piling will resist horizontal forces?
- (o) What analysis have you done to assure the adequacy of any horizontal braces identified in 2(n).
- (p) Please provide a copy of any analysis identified in 2(o).
- (q) What analyses have you done to assure yourselves that the piling under the service water pump structure will provide adequate vertical support after the occurrence of a postulated earthquake (OBE)?
- (r) What analyses have you done to assure yourselves that the piling under the service water pump structure will provide adequate vertical support after the occurrence of a postulated earthquake (SSE)?
- (s) Please provide a copy of any analysis identified in 2(q) and 2(r).
- (t) Did you factor into any analysis identified in 2(r) above the information contained in a letter from Robert Tedesco to Vice President J. Cook, dated October 14, 1980, concerning seismological input data acceptable to the Staff?

Interrogatory 3

The following questions refer to the remedial actions at the service water pump structure.

- (a) Is the corbel design such that it depends upon a friction-fit with the service water pump structure's north wall resulting from the pre-tensioning of the long longitudinal bolts.
- (b) How have you assured yourselves that this friction-fit will be maintained under all the design loads for the building?
- (c) If the answer to 3(b) is based on tests or other analysis please identify and provide copies of the analysis or test results.
- (d) How have you assured yourself that the concrete at the interface between the corbel and the Service Water Pump Structure can adequately resist bearing pressures developed as a result of pre-tensioning of the bolts.
- (e) If the answer to 3(d) is based on tests or other analysis please identify and provide copies of the analysis or test results.

Interrogatory 4

In the response to Question 15 of the NRC request, regarding plant fill, it is stated that, "differential settlement primarily induces additional strain, which is a self-limiting effect and does not affect the ultimate strength of the structural members." Additional clarification of this statement is needed.

- (a) Why do you classify the resulting strains as self-limiting in nature?
- (b) How do you reconcile your statement quoted above with your statement concerning the Service Water Pump Structure in the Management Corrective Action Report No. 24, Interim Report 6, issued September 7, 1978 that the total design loads cannot be supported by the main structure.

Interrogatory 5

Your responses to Questions 14, 28, and 29 of the NRC request regarding the causes of cracks due to settlement, the significance of the extent of cracks, and the consequences of cracking, addressed only the existing condition of the Category I structures.

- (a) Have you performed analyses which provide tension field data under the design load combinations at any crack locations for each Category I structure.
- (b) Provide documents relating to data or analysis described in Part (a).
- (c) If the answer to (a) is no, state why it is not necessary to perform that analysis.
- (d) Have you performed any analyses to show the limiting tension field conditions in which a crack will not propagate.
- (e) Provide documents relating to data or analysis described in Part (d).
- (f) If the answer to (d) is no, state why you do not believe it is necessary to perform that analysis.

- (g) What analyses have you performed prior to loading or surcharging of any structures or tanks to assure that existing cracks will not further propagate?

Interrogatory 6

Since the fill was replaced by other material, such as lean concrete, in the vicinity of the auxiliary building and of the feedwater valve pits, the soil properties of the foundation material have been changed.

- (a) Have you performed new seismic/structural analyses that utilizes the new soil properties, (e.g. damping valves and shear modules).
- (b) If the answer to (a) is yes, please provide documents relating to such seismic/ structural analysis.
- (c) If the answer to (a) is no, please state the reasons for not performing such new seismic/structural analysis.
- (d) If the answer to (a) is no, please state your basis for concluding that these structures will comply with current NRC criteria.
- (e) If the answer to (a) is yes, have you performed a new soils structural interaction analysis for the auxiliary building and the feedwater isolation valve pits.
- (f) If the answer to (e) is yes, please provide documents relating to that analysis.

Interrogatory 7

Your replies to date indicate that the effectiveness of the proposed ground water well system has not yet been established. These wells will be needed to control the ground water level and prevent soil-liquifaction.

- (a) Will the permanent dewatering system be designed to withstand the safe shutdown earthquake (SSE)?

- (b) If no, will the permanent dewatering system be designed to withstand any lesser ground vibratory motion?
- (c) If the answer to (a) is no, have you evaluated the impact of soil liquification on any soil supported Category I structure.
- (d) If no, why not?
- (e) If the answer to (b) is yes, what ground vibratory motion has been considered?
- (f) If the answer to (a) is yes, have you performed any analysis based upon information contained in or resulting from a letter from Robert Tedesco to Vice President J. Cook dated October 14, 1980 concerning seismological input data acceptable to the Staff?
- (g) If the answer to (f) is yes, what changes in the dewatering system design and ground water drawdown levels were determined to be needed.

Interrogatory 8

In connection with your seismic analysis of the service water pump structure and the diesel generator building have you developed: (1) Lump mass models (2) Stiffness value for each member (3) Mass at each nodes point (4) Spring constants used in the analysis (K_o , C_o , K_x , C_x , K_y , C_y) and (5) Seismic inputs of the modified Taft N21E 1952 record used in this analysis. As to any affirmative answer, please provide copies.

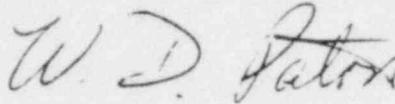
Interrogatory 9

With respect to the seismic Category I valve pits located in the fill adjacent of the east and west side of the diesel generator building:

- (a) What changes, if any, occurred to these pits during the diesel generator surcharge program?

- (b) Do any cracks exist in these pits?
- (c) What changes, if any, occurred in the rattle space for the piping during the diesel generator building surcharge program?

Respectfully submitted,

A handwritten signature in cursive script that reads "W. D. Paton".

William D. Paton
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 26th day of November, 1980.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
CONSUMERS POWER COMPANY) Docket Nos. 50-329-OM & OL
(Midland Plant, Units 1 and 2)) 50-330-OM & OL

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF INTERROGATORIES TO CONSUMERS POWER COMPANY" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 26th day of November, 1980:

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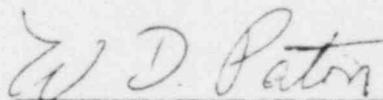
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